



City of Rockville
Rockville, Maryland
INVITATION FOR BIDS #18-24

LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS

**Bids Due by 2:00 PM ET
November 8, 2024**

ISSUED BY:
Procurement Department
City of Rockville, City Hall
111 Maryland Avenue, 1st Floor
Rockville, Maryland 20850
Phone: (240) 314-8430
Fax: (240) 314-8439

A 5% Bid Bond is required for this Invitation for Bid

Any individual with a disability who would like to receive the information in this publication in another form may contact the ADA Coordinator at 240-314-8100, TDD 240-314-8137

MFD Outreach Program

It is the intent of the City of Rockville to increase opportunities for minority, female and disabled (MFD) owned businesses to compete effectively at supplying goods, equipment, and services to the City, within the constraints of statutory purchasing requirements, departmental needs, availability, and sound economical considerations. Suggested changes and MFD enhancements to this solicitation's requirements for possible consideration and/or inclusion in future solicitations are encouraged. Any questions regarding MFD outreach or questions/concerns regarding the City's bidding process should be addressed to Pat Ryan, pryan@rockvillemd.gov or 240-314-8434.



Statement of "No Bid Submittal"

If you do not intend to submit on this requirement, please complete and return this form prior to date shown for receipt of bids to the buyer listed in this IFB by **email only to pryan@rockvillemd.gov**.

I/WE HAVE DECLINED TO BID ON **IFB #18-24**, titled **Lincoln Park Community Center Improvements** for the following reason(s): [Please place a check mark (✓) next to the reason(s) as applicable]

| (✓) | Reason |
|-----|--|
| | Proposal requirements too "restrictive". |
| | Insufficient time to respond to the Invitation for Bids. |
| | We do not offer this service. |
| | Our schedule would not permit us to perform. |
| | Unable to meet requirements. |
| | Unable to meet insurance or bond requirements. |
| | Scope of Services unclear (please explain below). |
| | Other (please specify below). |

REMARKS:

Are you a Minority, Female, or Disabled (MFD) business? _____ Yes _____ No

Company Name: _____

Mailing Address: _____

Telephone Number: _____ Email Address: _____

Authorized Signatory

Printed Name

Title

Date

**CITY OF ROCKVILLE
ROCKVILLE, MARYLAND**

**INVITATION FOR BIDS #18-24
LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS**

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SECTION I: PROJECT OVERVIEW

1.1 SECURED BIDS will be received electronically via a City designated bid receipt software solution until **2:00 PM ET on FRIDAY, NOVEMBER 8, 2024**. The bidder assumes full responsibility for the timely delivery of a bid via the designated solution. Bids delivered in any other fashion will not be considered. Properly submitted bids will be opened in a virtual environment after the time set for receipt of bids and will be read aloud via a City telepresence software solution at the phone number and/or web address provided by the City and contained within this solicitation.

Submission of a bid electronically is consent by the bidder to conduct any or all elements of the procurement by electronic means, in accordance with the terms of this invitation for bids.

Bids presented after the bid receiving deadline will not be received for any reason. The official time clock for receiving bids will be that of the City's computer server system, located at Rockville City Hall. In order to be considered, bids must be received on or before 2:00 p.m (Rockville Server Time). Therefore, a bid submitted at 2:00 p.m. is acceptable, where a bid received a fraction of a second after 2:00 p.m. (Rockville Server Time) is late and will not be accepted.

ATTENTION: BIDDERS ARE HEREBY NOTIFIED THAT ROCKVILLE SERVER TIME MAY DIFFER FROM THAT OF OTHER ELECTRONIC DEVICES, COMPUTER SOFTWARE AND COMPUTER HARDWARE THAT MAY BE USED TO ELECTRONICALLY SUBMIT THE BID. BIDDERS ARE RESPONSIBLE FOR ALLOWING ADEQUATE TIME TO SUCCESSFULLY DELIVER THE BID TO THE REQUIRED ELECTRONIC LOCATION BY THE REQUIRED TIME.

1.2 SITE LOCATION

The Lincoln Park Community Center Improvements is located at 357 Frederick Avenue, Rockville, Maryland 20850. The project limits are shown on Appendix A.

1.3 BACKGROUND

The Lincoln Park Community Center (LPCC) is approximately 12,500 square feet and serves the public through a variety of classes, rentals, and special events, and provides more than 600 programs, including afterschool, sports, fitness, and other events throughout the year. The facility also hosts more than 500 community gatherings and meetings. The center opened in 1970 and has had additions added in 1977, 1987, and 1999. As the community has grown and its needs became more diverse, LPCC has adapted to meet the needs and wants of the community.

1.4 PROJECT DESCRIPTION

This project consists of selective demolition and interior renovation of approximately 7,000 square feet of the existing 12,500 square feet building, including finishes, restroom upgrades, new exterior windows and existing exterior walls, and other work as shown on the Contract Drawings, specified in the Contract Documents, or as directed by the Engineer.

It is the intent of the City to keep the Multi-Purpose Room and Front Lobby operational for the Center's After-School Program, which runs during the school year (approximately late August 2024 to late-June 2025); these areas will be available for some construction activities, to be coordinated in the field, but major demolition and construction in these areas will be sequenced to occur during the summer. These areas may become available

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for sequenced construction activities during breaks in the school year, such as Winter Break or Spring Break, for example, but it will need to be coordinated in the field.

The Phasing Plan provided on G-101 of the Contract Documents is provided for illustrative purposes only. The provided phased turnover plan shown on G-101 is based on a scenario where construction NTP is issued in July 2025, after schools close for the summer, in which the City would close the facility for construction.

1.5 SUMMARY DESCRIPTION OF ADD/ALTERNATE ITEMS:

The contractor shall submit a bid for each add alternate section. The City reserves the right to award, to the lowest responsible bidder, the combination of base plus add/alternate sections that will allow the most work to be completed within the City's budget. Please find the descriptions provided for each Add/Alternates below.

Add/Alternate 1: Furnish and Install Tegular Style Ceiling Tiles in lieu of Drop-in Tiles

1.6 PROJECT DURATION/COMPLETION

Contractor shall begin the project within ten (10) calendar days following issuance of a City of Rockville Purchase Order (Notice to Proceed). All work shall be completed within **300** consecutive calendar days. The time allotted for the work is of the essence. Liquidated damages shall be assessed at Four Hundred Dollars (\$400) per day for each calendar day the work exceeds beyond the specified time allotted for this contract. the City may issue a Limited Notice to Proceed (LNTP) to allow for mobilization, coordination, field measuring, shop drawing review/approval, submission of work plan, and ordering of long-lead items.

1.7 PERMITS

The City of Rockville is listed as the applicant for all permits in order to waive City of Rockville permit fees. It is the contractor's responsibility to comply with all permit terms and conditions, including maintenance and warranty requirements. The Contractor is contractually responsible for implementation and compliance with all conditions of all permits as listed below and also responsible for obtaining additional trade/utility permits listed in order to successfully complete the Lincoln Park Community Center Improvements project:

- **City of Rockville, Building Permit #2024-6907-ALT**

The Contractor is responsible for all reporting, inspection requests, documentation and notifications associated with these permits. Compensation for implementation of the requirements of the above permits is to be included in appropriate bid items and no special compensation will be made

1.8 PROPOSED SCHEDULE

- A. IFB release date – Thursday, October 3, 2024
- B. Pre-Bid Conference VIRTUAL – Thursday, October 10, 2024 @ 3:00 PM ET
- C. Site Visits – See below (bottom of Section 1.9) for dates and times
- D. Questions Due – Friday, October 25, 2024 @ 2:00 PM ET
- E. City's Responses to Questions – Friday, November 1, 2024
- F. IFB Closing Date – Friday, November 8, 2024, at 2:00 PM ET

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1.9 PRE-BID/SITE VISIT MEETING

A virtual pre-bid meeting will be held on Thursday, October 10, 2024, at 300PM ET. Bidders MUST register below prior to attending the meeting. This meeting is not mandatory; however, bidders are strongly encouraged to attend.

REGISTER

It is mandatory that the bidder attend a minimum of one (1) Site Visit as outlined in the following paragraph. To record and provide evidence of your visit, all visitors MUST sign-in at the front desk prior to viewing the work site(s). All individuals interested in viewing the vicinity of the work area shall assume complete responsibility and liability for any and all visits. The City will not be able to answer questions at these Site Visits. See DEADLINE FOR QUESTIONS below regarding how questions shall be addressed.

Lincoln Park Community Center is located at 357 Frederick Avenue, Rockville, Maryland 20850.

Site Visit options are as follows:

MONDAY, October 14, 2024, between 1:00 PM to 3:00 PM,
TUESDAY, October 15, 2024, between 1:00 PM to 3:00 PM, or
THURSDAY, October 17, 2024, between 9:00 AM to 11:00 AM.

1.10 DEADLINE FOR QUESTIONS

Questions pertaining to this bid may be directed to Pat Ryan, Principal Buyer via City's Collaboration Portal only at <https://contracts.rockvillemd.gov/gateway/Default.aspx> no later than 2:00 PM ET on Friday, October 25, 2024. Oral answers to questions relative to interpretation of specification or the bid process will not be binding on the City.

1.11 BID SECURITY

Bids must be accompanied by an electronic copy of the Bid security made payable to the Mayor and Council of Rockville in an amount of five percent (5%) of Bidder's Total Bid Price and in the form of a Bid Bond (AIA Bid bond form is acceptable) or a certified check, where the original security instrument must be mailed to City of Rockville, Procurement Division, 111 Maryland Avenue, Rockville, Maryland 20850, referencing the solicitation number. The City reserves the right to disqualify any bid, in any instance, where the City cannot locate the mailed, original security instrument. The City shall not be liable for any certified checks it cannot locate, or in any instance where a certified check is cashed by any individual not employed by the City of Rockville.

1.12 AGREEMENT/PERFORMANCE & PAYMENT BONDS

The successful contractor shall be required to complete and electronically return a copy of the City's Standard Form of Agreement along with Performance and Payment Bonds in the amount of 100% of the Contract award within fifteen days after the date of issuance (samples attached), where two (2) sets of the original agreement and original bonds must be mailed to City of Rockville, Procurement Division, 111 Maryland Avenue, Rockville, Maryland 20850. No other form of performance or payment security will be permitted. Failure by the contractor to provide both the electronic versions and original versions of the agreement or bonds, as required, shall be just cause for annulment of the award and the forfeiture of the Bid Guarantee which shall become the property of the City, not as a penalty but in liquidation of damages sustained. Any instance where the City cannot locate the mailed versions of the agreement or bonds shall be just cause for annulment of the award and the forfeiture of the Bid Guarantee which shall become the property of the City, not as a penalty but in liquidation of damages sustained.

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1.13 SUBMISSION

All bid forms and documents must be electronically filled out, signed, and submitted via one combined pdf document using the City's Collaboration Portal **only** at:

<https://contracts.rockvillemd.gov/gateway/Default.aspx>

At a minimum the file name of the pdf document must contain the Bid Number, Bidders Name and Bid Due Date.

A virtual, telepresence bid opening will be held a few minutes after the bid submittal due date and time. Individuals interested in attending the virtual bid opening must register below:

Register for Virtual Bid Opening Here: [REGISTER](#)

1.14 SUBMITTALS

The following information must be submitted with the bid, **where failure to submit requested items may result in rejection of the bid:**

- Bid Proposal Forms
- A certified check or bid bond must be in the amount of five percent (5%) of the total bid amount, made payable to the Mayor and Council of Rockville as in General Conditions and Instructions to Bidders, #24.
- If the bidder intends to subcontract any or part of the work, then the bidder must identify and include references for each qualified subcontractor, together with a description of the proposed subcontract work. This evidence shall be submitted with the bid. A minimum of three references shall be provided; additional project references may be required to meet all the requirements.

1.15 ADDENDUM

Oral answers to questions relative to interpretation of specifications or the proposal process will not be binding on the City.

To ensure fair consideration for all offerors, any interpretation made to prospective offerors will be expressed in the form of an addendum to the specifications, if such information is deemed necessary for the preparation of proposals or if the lack of such information would be detrimental to the uninformed offeror. Such addendums, if issued, will post at City's Collaboration Portal listed below:

<https://contracts.rockvillemd.gov/gateway/Default.aspx>

Please note, that it is the respondent's responsibility to check this site frequently for Addendums, which may impact pricing, this documents requirements, terms and/or conditions. Failure to sign and return an Addendum with your response may result in disqualification of proposal.

1.15 ENVIRONMENTAL IMPACT

It is the intent of the City of Rockville to purchase goods, equipment, and services having the least adverse environmental impact, within the constraints of its codified purchasing requirements, departmental needs, availability, and sound economic considerations. Suggested changes and environmental enhancements for possible inclusion in future revisions of this specification are encouraged.

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1.16 NOTICE TO BIDDERS

"Pursuant to 7-201 et seq. of the Corporations and Associations, Article of the Annotated Code of Maryland corporations not incorporated in the State, shall be registered with the Department of Assessments and Taxation, 301 West Preston Street, Baltimore, Maryland 21201 before doing any interstate or foreign business in this state. Before doing any intrastate business in this state, a foreign corporation shall qualify with the Department of Assessments and Taxation."

1.17 US TREASURY IDENTIFICATION NUMBER

Bidders must supply with their bids their U.S. Treasury Department Employers' Identification Number as such number is shown on their Employer's quarterly Federal Tax Return (U.S. Treasury Department Form No. 941). This number shall be inserted on the Bid Sheet in the space provided.

1.18 QUALIFICATION TO CONTRACT WITH PUBLIC BODY

Bidders must be qualified to bid in the State in accordance with Section 14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland which ordains that any person convicted of bribery (upon acts committed after July 1, 1997) in furtherance of obtaining a contract from the state or any subdivision of the State of Maryland shall be disqualified from entering into a contract with the City.

1.19 DISABILITY INFORMATION

ANY INDIVIDUALS WITH DISABILITIES WHO WOULD LIKE TO RECEIVE THE INFORMATION IN THIS PUBLICATION IN ANOTHER FORM MAY CONTACT THE ADA COORDINATOR AT 240-314-8100 TDD 240-314-8137.



**CITY OF ROCKVILLE
MARYLAND
Section II: GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS
CONSTRUCTION 3/2022**

1. **TERMS AND CONDITIONS** The terms and conditions of this document govern in event of conflict with any terms of the bidder's proposal and are not subject to change by reasons of written or verbal statement by the contractor unless accepted in writing. Words and abbreviations which have well known technical, or trade, meanings are used in accordance with such meanings.
2. **PRE-BID MEETING** A virtual, telepresence pre-bid meeting may be held for the purpose of describing the project and for answering any questions prospective bidders may have. If applicable, time and date will be shown on the bid announcement page.
3. **SUBMISSION OF BID** All bids are to be submitted electronically, in a pdf format file, via a City designated bid receipt software solution. File name of the pdf document must contain the Bid Number, Bidders Name and Bid Due Date. The following forms must be submitted:
 - Bid proposal page(s) in duplicate
 - Non-collusion/non-conviction affidavit
 - Bid Bond
 - Reference sheet
 - Other forms as required in the bid document.

The bid proposal form must be filled out and submitted electronically. Conditional bids and bids containing escalator clauses will not be accepted. All bids must be regular in every respect and no interlineation, exclusions, or special conditions shall be made or included. Bids must contain an electronic or scanned signature, in the space provided, of an individual authorized to bind the bidder.

4. **LATE BIDS** It is the bidder's responsibility to assure delivery of the bid at the proper time via the designated electronic, software solution. Bids delivered in any other fashion will not be considered. All bids will be publicly opened in a virtual environment after the time set for receipt of bids and read aloud via a City telepresence software solution. Bidders may attend bid openings at the phone number and/or web address provided by the City.
5. **ADDENDUM** In the event that any addenda to this solicitation are issued, all solicitation terms and conditions will retain in effect unless they are specifically changed in the addendum. It is the responsibility of the bidder to make inquiry as to addenda issued. Oral answers to questions relative to interpretation of specifications or the proposal process will not be binding on the City.

Such addendums, if issued, will posted via the city's designated electronic, software solution

Please note, that it is the bidder's responsibility to check this site frequently for Addendums, which may impact pricing, this document's requirements, terms and/or conditions. Failure to acknowledge an addendum on the bid proposal form or to sign and return an Addendum with your response may result in disqualification of proposal.

6. **BID OPENING** All bids received in response to an Invitation for Bid will be opened at the date, time and place specified and publicly read via a City telepresence software solution. A tabulation of bids received are posted using the City's designated electronic software solution.
7. **ACCEPTANCE OF BIDS** Unless otherwise specified in the Invitation for Bid documents, the City will accept or reject any or all bids or any or all items within ninety (90) days after the date of bid opening. Bids may not be withdrawn during that period.
8. **BID WITHDRAWAL** Bids may be electronically withdrawn (deleted) or modified by deleting the initial file uploaded and replacing it with a modified file using the City's electronic, software solution before the time specified for bid opening. Requests received after bid opening will not be considered.
9. **BID AWARD** Unless otherwise specified in the Invitation for Bid documents, award will be made to lowest responsive and responsible bidder complying with all provisions of the Invitation for Bid, provided the price is reasonable and in the best interest of the City to accept. The City reserves the right to award by individual commodities/services, group, all or none or any combination thereof. When a group is specified, all items in the group must be bid.

In determining the responsibility of a bidder, the following criteria will be considered:

- a. The ability, capacity and skill of the bidder to perform the contract or provide the services required;
- b. Whether the bidder can perform the contract or provide the service promptly, or within the time specified, without delay or interference;
- c. The character, integrity, reliability, reputation, judgment, experience and efficiency of the bidder;
- d. The quality of performance on previous contracts or services;
- e. The previous and existing compliance by the bidder with laws and ordinance relating to the contract or service;
- f. The sufficiency of the financial resources and ability of the bidder to perform the contract or provide the service;
- g. The quality, availability and adaptability of the goods or services to the particular use required;
- h. The ability of the bidder to provide future maintenance and service for the use of the subject of the contract;
- i. Whether the bidder is in arrears to the City or a debt or contract or is in default on a surety to the City;
- j. Such other information as may be secured by the City having a bearing on the decision to award the contract.

10. ELECTRONIC PAYMENT OPTION

The Vendor ACH Payment Program of the City allows payments to be deposited directly to a designated financial institution account. Funds will be deposited into the account of your choice automatically and on time. All transactions are conducted in a secure environment. The program is totally free as part of the Finance Department's efforts to improve customer services. Program information and registration can be viewed at the following web address:

<https://na3.docusign.net/Member/PowerFormSigning.aspx?PowerFormId=8868c030-9f7e-4b3e-88de-c89fbce65636&env=na3&acct=b56266c3-6d22-426a-8422-e01bcbb466ec&v=2>

11. SENSITIVE DOCUMENTS

All project participants needing either electronic or hardcopy documents dealing with critical facilities or sensitive information will be required to make application with and receive approval from the City prior to receiving this information. Permission to receive said documents (herein referred to as "sensitive") will pertain only to the individual approved. Sensitive documents (either electronic or hardcopy documents dealing with critical facilities or sensitive information) received from the City must be handled consistent with the terms of non-disclosure required for application. Contractor is responsible to restrict use of sensitive documents to project participants only and shall take appropriate measure to prevent distribution of sensitive document to anyone inside or outside of the Contractor's company except Contractor's project participants. After completion of the project, all sensitive documents remaining in the Contractor's possession shall continue to be governed under the terms of non-disclosure and must continue to be stored in a secure manner. After such records are no longer needed for record purposes, the records shall be destroyed or returned to the City.

Where services require the Contractor to access the City's electronic information resources and/or its electronic data assets, the Contractor shall adhere to all requirements, terms, and conditions of the City's Contractor/Vendor On-Site and Remote Access Confidentiality Agreement, which can be viewed at the following web address:

<https://www.rockvillemd.gov/documentcenter/view/36407>

12. DOCUMENTS, MATERIALS AND DATA All documents materials or data developed as a result of this contract are the City's property. The City has the right to use and reproduce any documents, materials, and data, including confidential information, used in the performance of, or developed as a result of this contract. The City may use this information for its own purposes, including reporting to state and federal agencies. The contractor warrants that it has title to or right to use all documents, materials or data used or developed in connection with this contract. The Contractor must keep confidential all documents, materials and data prepared or developed by the contractor or supplied by the City.

13. ERRORS IN BIDS When an error is made in extending total prices, the unit price will govern. Erasures in bids must be initialed by the bidder. Carelessness in quoting prices or in preparation of the bid will not relieve the bidder from performing the contract. Errors discovered after public opening cannot be corrected and the bidder will be required to perform if the bid is accepted.

14. MISTAKES Bidders are expected to be thoroughly familiar with all bid documents, including all addenda. No consideration will be granted for any alleged misunderstanding of the intent of the contract documents. In the process of assembling and binding the bid documents individual pages or drawings may have been inadvertently omitted. Each bidder shall carefully and thoroughly examine these bid documents for completeness. No claim of any bidder will be allowed on the basis that these bid documents are incomplete.

15. PRICES Bids must be submitted on a firm, fixed price, F.O.B. destination basis only unless otherwise specified herein.

16. PROMPT PAYMENT DISCOUNTS All discounts other than prompt payment are to be included in the bid price. Prompt payment discounts will be considered in the evaluation of your bid if the discount on payment is not conditioned on payment being made in less than thirty (30) days from receipt of invoice.

17. BIDDER'S PAYMENT TERMS The City will reject as non-responsive a bid under this solicitation, which is conditioned on payment of proper invoices in less than thirty (30) days. However, this does not preclude a bidder from offering a prompt payment discount for payment of proper invoices in less than thirty (30) days.

18. INTEREST IN MORE THAN ONE BID AND COLLUSION
Multiple bids uploaded/received in response to a single solicitation from an individual, firm, partnership, corporation, affiliate, or association under the same or different names will be rejected. Reasonable grounds for believing that a bidder is interested in more than one bid for a solicitation both as a bidder and as a subcontractor for another bidder will result in rejection of all bids in which the bidder is interested. However, a firm acting only as a subcontractor may be included as a subcontractor for two or more bidders submitting a bid for the work. Any or all bids may be rejected if reasonable grounds exist for believing that collusion exists among any bidders. Bidders rejected under the above provisions shall be disqualified if they respond to a re-solicitation for the same work.

19. QUALIFICATION OF THE BIDDER The City shall have the right to take such steps as it deems necessary to determine the responsibility of the bidder to perform the obligations under the contract and the bidder shall furnish to the City all such information for this purpose as the City may request. The right is reserved to reject any bid where an investigation of available information does not satisfy the City that the bidder is qualified to carry out the terms of the contract.

20. PLACING OF ORDERS Orders against contracts will be placed with the Contractor on a Purchase Order (or Procurement Card – currently Mastercard) executed by the Purchasing Agent or designee. Where Master Agreements have been released by the City, orders may be placed directly with the Contractor by authorized personnel in the ordering Department(s). Issuance of all purchase orders will be contingent upon appropriation of funds by the Mayor and Council and encumbrance of such funds after July 1st of each year, as provided by the City Code.

21. INSPECTION OF THE WORK SITE Each bidder shall visit the site of the proposed work and become fully acquainted with the existing conditions and fully informed as to any facility involved, and the difficulties and restrictions attending the performance of this contract. Applicable drawings, technical specifications and contract documents should be thoroughly examined. The successful bidder shall in no way be relieved of any obligation due under the executed contract by the failure to examine any form of legal instrument or to visit the site.

22. RISK OF LOSS AND CONDITION OF SITE The City makes no representation and assumes no responsibility for the condition of the site or applicable structures on the site. The contractor shall accept the site and the contents thereon in the condition in which they are represented. Any damages or loss whatsoever while the contract is in effect (whether by reason of fire, theft, breakage or other happenings) shall not relieve the Contractor from

any obligations under this contract. The Contractor shall store any materials on site as not to damage the materials and shall maintain such storage areas, as directed by the City, in hazard free condition.

23. **SUBCONTRACTORS** Nothing contained in the contract documents, shall create any contractual relationship between the City and any subcontractor or sub-subcontractor.

Unless otherwise indicated, the successful contractor who will subcontract the delivery, installation, or portion of the work herein described will submit to the Project Manager, prior to the start of work, the following information: 1) A description of the items to be subcontracted, 2) the subcontractor name, address, and telephone number, and 3) the nature and extent of the work utilized during the life of the contract. Subcontractors shall be considered agents of the Contractor, who shall be held fully accountable for all of the subcontractor services, labor, and materials relative to the contract.

24. **BID BOND** Bids must be accompanied by an electronic copy of a certified check or bid bond for five percent (5%) of the total amount of the bid, made payable to the Mayor and Council of Rockville, where the original security instrument must be mailed to City of Rockville, Procurement Division, 111 Maryland Avenue, Rockville, Maryland 20850, referencing the solicitation number. AIA Bond forms are acceptable. Bonds must be issued by a surety licensed to do business in the State of Maryland. The City reserves the right to disqualify any bid, in any instance, where the City cannot locate the mailed, original security instrument. The City shall not be liable for any certified checks it cannot locate, or in any instance where a certified check is cashed by any individual not employed by the City of Rockville. Bid bonds will not be returned.

25. **EXECUTION OF AGREEMENT/BONDS** Subsequent to award and within fifteen (15) calendar days after the prescribed forms are presented to the Contractor, the Contractor shall execute and electronically deliver to the City the required Agreement and Bonds, where two (2) sets of the original agreement and original bonds must be mailed to City of Rockville, Procurement Division, 111 Maryland Avenue, Rockville, Maryland 20850.

Bonds shall be in effect during the original term of the contract and during the guarantee and warranty period required under the Contract, unless otherwise stated therein.

PERFORMANCE BOND The Contractor shall execute and deliver to the City the required Performance Bond for 100% of the bid amount.

PAYMENT BOND For a contract exceeding One Hundred Thousand Dollars (\$100,000) the payment bond shall be in an amount equal to 100% of the bid amount. For a contract exceeding Twenty-Five Thousand Dollars (\$25,000) but not exceeding One Hundred Thousand Dollars (\$100,000) the payment bond shall be in an amount equal to fifty percent (50%) of the bid amount. Bonds shall be executed by a surety company authorized to do business in the State of Maryland.

The successful bidder may request that in lieu of bonds, the City accept the equivalent in the form of a certified check or other security. Such requests will be accepted or rejected by the City Manager. If rejected, the successful bidder will be required to furnish the bonds or forfeit the bid bond. The City shall not be liable for any certified checks it cannot locate, or in any instance where a certified check is cashed by any individual not employed by the City of Rockville.

Failure of the successful bidder to execute the agreement and supply both the electronic versions and original versions of the required forms within fifteen (15) calendar days shall constitute a default. Any instance where the City cannot locate the mailed versions of the agreement or bonds shall also constitute a default. The successful bidder shall forfeit to the City as liquidated damages for such failure or refusal an amount in cash equal to the security deposited with the bid.

The City may either award the contract to the next low responsive and responsible bidder or re-advertise the bids and may charge against the original bidder the difference between the amount of the bid and the amount for which a contract for the work is subsequently executed. If a more favorable bid is received by a re-advertising, the defaulting bidder shall have no claim against the City for a refund.

26. **LEGAL REQUIREMENTS** All materials, equipment, supplies and services shall conform to applicable Federal, State, County and City laws, statutes, rules, and regulations. The Contractor shall observe and comply with all Federal, State, County and City laws, statutes, rules, and regulations that affect the work to be done. The provisions of this contract shall be governed by the laws of the State of Maryland.

27. **INDEMNIFICATION OF THE COUNCIL** The Contractor shall indemnify and save harmless the Mayor and Council from all suits, actions and damages or costs, of every name and description to which the Council may be subjected or put by reason of injury to persons or property as a result of the work, whether caused by negligence or carelessness on the part of the Contractor, or subcontractors or agents thereof.

28. **DELIVERY** Time is of the essence. The Contractor shall expedite the work and achieve substantial completion within the contract time. If time limits are not specified, state the number of days required to make delivery/completion in the space provided. Defective or unsuitable materials or workmanship shall be rejected and shall be made good by the Contractor, notwithstanding that such materials/workmanship have previously been overlooked and accepted.

29. **CHANGES IN QUANTITIES/ITEMS** The City reserves the right to add or delete any item(s) from the bid in whole or in part at the City's discretion as given in the Bid or Proposal wherever it deems it advisable or necessary so to do and such changes shall in no way vitiate the contract nor affect the bid prices for any item or remaining work. Unit prices submitted in the bid shall not be increased or decreased regardless of changes in quantity. The City may waive minor differences in specifications in bids provided these differences do not violate the specifications' intent nor materially affect the operation for which the items or services are being purchased

The Contractor will be paid for the actual amount of authorized work done or material furnished under any item of the bid at the price bid and stipulated for such item. In case any quantity is increased, the Contractor shall not be entitled to any increased compensation over and above the unit price bid for such item, or any claim for damages on account of loss of anticipated profits should any quantities be decreased. The Contractor shall be responsible for confirming the accuracy of the specified quantities prior to ordering materials or supplies and the City's payment shall be based on the actual quantities incorporated in the work and not the quantities specified in the bid document. The quantities must not exceed the Contract specified quantities without specific written authorization of the Project Manager and it is the Contractor's responsibility to obtain said authorization.

30. **MATERIALS** All materials shall be new and free from defects. They shall be standard products of current manufacture. Unless otherwise noted in the contract documents, the Contractor shall abide by specific manufacturer instructions and recommendations on installation and operation.

31. **BRAND NAME OR EQUAL** Identification of an item by manufacturer's name, trade or brand name, or catalog number is for information and establishment of a quality level desired and is not intended to restrict competition. Bidders may offer any brand which meets or exceeds the

specification, unless 'brand name only' is specified. Bids on other makes and/or models will be considered provided the bidder States on the proposal what is being proposed and forwards with the bid complete descriptive literature indicating how the characteristics of the article being offered will meet the specifications. The City reserves the right to accept or reject items offered as an equal.

32. DEFECTIVE MATERIALS/WORKMANSHIP

Defective or unsuitable materials or workmanship shall be rejected and shall be made good by the Contractor. If the work shall be found to be defective or to have been damaged before final acceptance, the Contractor shall make good such defect in a manner satisfactory to the City, without extra compensation even though said defect or injury may have not been due to any act or negligence of the Contractor.

33. TIME OF BEGINNING AND COMPLETION

Unless otherwise specified in the Invitation for Bid documents, the Contractor shall begin work on the Contract within ten (10) working days after the mailing of a purchase order and shall diligently prosecute the same, so that it shall be fully completed within the time as stated in the contract. The Contractor shall not commence any work under the Contract until a written Purchase Order is received from the Purchasing Agent.

34. FAILURE TO COMPLETE WORK ON TIME/ LIQUIDATED DAMAGES

The Contractor accepts this contract with the understanding and intention to perform fully and in an acceptable manner within the time stated. Should he fail to complete fully, to all intent and purpose, the work specified in the time specified, or within the time as it may have been extended by the City, the Contractor shall pay, for each calendar day that any work shall remain uncompleted, not including Sundays, the sum of \$400 per calendar day or such other amount as specified in the Section III Special Provisions. This sum is hereby agreed upon, not as a penalty, but as liquidated damages and the City shall have the right to deduct the amount of such damages from any moneys due the Contractor under this Contract.

The City shall recover such Liquidated Damages by deducted the amount thereof out of any moneys due or that may become due the Contractor, and if said moneys are insufficient to cover said damages, then the Contractor or the Surety shall pay the amount due upon demand by the City.

35. AUTHORITY OF THE CITY MANAGER IN DISPUTES

Except as may otherwise be provided by the final agreement, any dispute concerning a question of fact arising under the agreement signed by the City and the Contractor which is not disposed of by the final agreement shall be decided by the City Manager who shall notify the Contractor in writing of his determination. The Contractor shall be afforded the opportunity to be heard and offer evidence in support of the claim. Pending final decision of the dispute herein, the Contractor shall proceed diligently with performance under the agreement signed by the City and the Contractor. The decision of the City Manager shall be final and conclusive unless an appeal is taken pursuant to the City Purchasing Ordinance.

36. CONTRACT DELAYS/EXTENSION OF TIME

The Contractor shall pursue the contract so as to complete all work within the time allotted in the bid document. The completion date as set in the bid document allows for inclement weather, holidays, and coordination with other companies. If the Contractor is delayed in the delivery of the supplies, equipment, or services by any act of neglect of the City or by a separate Contractor employed by the City, or by any changes, strikes, lockouts, fires, unusual delays in transportation or delay authorized by the City, the City shall review the cause of such delay and shall make an extension of time if warranted. All claims for extensions must be in written notice sent to the Project Manager within ten (10) calendar days after the date when such alleged cause for extension of time occurred. All such claims shall state specifically the amount of time of the delay the Contractor believes to have suffered. If written notice is not received within the prescribed time the claim shall be forfeited and invalidated.

37. CONTRACT DELAYS - NO DAMAGE CLAIMS ACCEPTED

The Contractor shall make no claim for extra monetary compensation for delays, whether ordered by the City or not, caused by delays in funding, governmental approvals, private or public companies' actions, inclement weather, site conditions, or from any cause whatsoever. The Contractor shall adjust its operation to continue the work at other locations under the contract, if available, and as directed by the City. If it is necessary to discontinue the work temporarily, the Contractor shall resume work within 48 hours of notice from the City. The City may adjust the completion date to compensate for the lost day(s) on a day-for-day basis, if the City finds that the Contractor could not make up for such lost day(s) by reallocating its forces or rescheduling the work, up to the time remaining on the original schedule at the time of shutdown.

38. PROGRESS SCHEDULE AND SCHEDULE OF OPERATIONS

The construction of this project will be planned and recorded with an Activities Chart Project Schedule (AC) and Written Narrative (WN) unless specifically determined to be unnecessary by the Project Manager. The AC Project Schedule and Written Narrative will break down, in detail, the time (working days or completion date) involved in performing major construction activities for the duration of the project. The AC Project Schedule shall be used for the coordination and monitoring of major work under the contact including the activities of subcontractors, vendors, and suppliers. The AC Project Schedule shall be prepared in accordance with the requirements of the Maryland State Highway Administration Standard Specifications for Construction and Materials dated January 1982, and the errata and addend thereto, subsequent supplement(s) and the Special Provisions as set forth in this Invitation for Bids, unless otherwise directed or approved by the Project Manager. The schedule shall be consistent with the contract specified completion date(s) and/or working days. The Contractor is responsible for preparing the initial AC Project Schedule and Written Narrative.

Preparation of Initial Schedule - Within 10 calendar days after notification that the Contractor is the apparent successful bidder, the Contractor will complete development of an initial AC Project Schedule and Written Narrative (describing the logical time representations as proposed in the AC Project Schedule) and submit 2 (two) copies of each AC and WN to the Project Manager for review and approval.

Updating Project Schedule: At any time that it becomes apparent the schedule, created as above and approved by the Project Manager, is not being implemented, either because the work or service is ahead or behind schedule, the Contractor shall immediately notify the Project Manager and shall submit a revised, written, updated AC and WN for the Project Manager's review, revision and approval. The contractor shall make every effort to meet the original completion date and/or working days allowed unless otherwise so directed by the Project Manager.

Payment for Schedule AC/WN: No special compensation will be paid for preparing or revising the above project AC/WN as the cost shall be considered incidental to the contract with compensation incorporated into the bid items(s).

39. SPECIFICATIONS

The Construction Specifications for this contract will be those shown below, and additions included in the bid document, if applicable. In the event of conflict, the City determination shall govern. The following specifications and standards, listed below, including all subsequent addenda, amendments and errata are made part of this contract to the extent required by the references thereto:

1. Maryland Department of Transportation, State Highway Administration, "Standard Specifications for Construction and Materials" (Maryland Department of Transportation, State Highway Administration), dated January 2008 and all errata and addenda thereto. MDSHA Book of Standards for Highway and Incidental Structures.
2. Montgomery County Department of Transportation "Montgomery County Road Construction Code and Standard Specifications."

3. Standard Specifications of WSSC dated July 2005.
4. Montgomery County Department of Transportation "Design Standards" August 1991.
5. Maryland Dept of the Environment "1994 Standards and Specifications Soil Erosion and Sediment Control"
6. The U. S. Department of Transportation, Federal Highway Administration, "Manual on Uniform Traffic Control Devices" latest edition.
7. Montgomery County Noise Ordinance.

40. **CONTRACT DOCUMENTS** The contract documents are complementary and what is required by anyone shall be binding as if required by all. Words and abbreviations that have well known technical or trade meanings are used in the contract documents in accordance with such recognized meanings. On drawings, the figured dimensions shall govern in the case of discrepancy between the scales and figures. Anything shown on the construction plans and not mentioned in the specifications or mentioned in the specifications and not shown on the plans shall have the same effect as if shown or mentioned respectively in both.

Prior to bidding, the Contractor should obtain clarification of all questions which may have arisen as to intent of the contract document, or any actual conflict between items in the contract documents. Should the Contractor have failed to obtain such clarification, then the City may direct that the work proceeds by any method indicated, specified or required, in the judgment of the City, by the contract documents. Such direction by the City shall not constitute the basis for a claim for extra costs by the Contractor. The Contractor acknowledges that he had the opportunity to request clarification prior to submitting his bid to the City and that he is not entitled to a claim for extra cost as a result of failure to receive such clarification.

Any discrepancies which may be discovered during the execution of work between actual conditions and those represented by the contract documents shall be reported to the City and work shall not proceed until written instruction has been received by the contractor from the City.

41. **INTERPRETATION** Any questions concerning terms, conditions and definitions of the contract and bidding regulations shall be directed in writing to the Contract Officer. Any questions concerning the technical specifications and drawings shall be directed in writing to the Project Manager. The submission of a bid shall be prima facie evidence that the bidder thoroughly understands the terms of the contract documents. The Contractor shall take no advantage of any error or omission in these contract documents.
42. **PRE-CONSTRUCTION CONFERENCE** A pre-construction conference may be held in person or virtually following contract award. The meeting must be attended by the Contractor. No compensation will be made by the City to the Contractor for meetings.
43. **EMERGENCY CONTACT** The Contractor shall provide at least two local telephone numbers which may be used for contacting an official of the Contractor at all times, 24 hours per day, seven days per week: at which numbers person(s) of responsibility will be available to respond to City directives relative to the contract. The Contractor shall have available sufficient personnel and equipment to immediately respond to emergency needs, as determined by the City. There will be no special compensation paid for this requirement, but the cost is to be considered incidental to the other contract pay items.
44. **SUPERVISION AND DIRECTION OF WORK** The work shall be under the general supervision of the Project Manager. While it is intended that the Contractor shall be allowed in general to carry on the contract in accordance with such general plan as may appear to the Contractor most desirable, the Project Manager, at the Project Manager's discretion, may from time to time, direct the order in which, and points at which, the work shall be prosecuted and may exercise such general control over the conduct of the work at a time or place, as shall be required, in the Project Manager's opinion, to safeguard the interests of the City, and the Contractor shall have no claims for damages or extra compensation on account of the fact that it shall have been necessary to carry on the work in different sequence from that which the Contractor may have contemplated. The Contractor shall immediately comply with any and all orders and instructions given by the Project Manager, but nothing herein contained shall be considered such an assumption of control over the work by the City or the Project Manager as to relieve the Contractor of any obligations or liabilities under the contract.
45. **INSPECTION** Work and materials will be inspected promptly to see that the same strictly correspond with the drawings and specifications, but if, for any reason, delay should occur in connection with such inspection, the Contractor shall have thereby no claim for damages or extra compensation. Materials and workmanship shall be always subject to the approval of the Project Manager, but no inspection, approval or acceptance of any part of the work or of the materials used therein, nor any payment on account thereof shall prevent the rejection of said materials or work at any time thereafter, should said work or materials be found to be defective or not in accordance with the requirements of the contract. Any costs for any "re-inspection" of the job shall be the responsibility of the contractor.
46. **TERMINATION FOR DEFAULT** The contract may be cancelled or annulled by the City in whole or in part by written notice of default to the Contractor upon nonperformance or violation of contract terms and an award made to next low Bidder, or, articles specified may be purchased on the open market similar to those so terminated. In either event, the defaulting Contractor (or his surety) shall be liable to the City for costs to the City in excess of the defaulted contract prices: provided, that the Contractor shall continue the performance of this contract to the extent not terminated under the provisions of this clause.
47. **TERMINATION FOR CONVENIENCE** This Contract may be terminated, in whole or in part, upon written notice to the Contractor when the City determines that such termination is in its best interest. The termination is effective 10 days after the notice is issued unless a different time is given in the notice. The City is liable only for payment for goods and services delivered and accepted or approved by the City prior to the effective date of the termination.
48. **EMPLOYEES** The Contractor shall employ only competent, skillful persons to do the work, and whenever the Project Manager shall notify the Contractor in writing that any person employed on the work is, in his opinion, incompetent, disobedient, disorderly, discourteous, or otherwise unsatisfactory, such person shall be discharged from the work and shall not again be employed for this contract except with the consent of the Project Manager.
49. **NON-WORK DAY** The City observes the following holidays: New Year's Day, Martin Luther King's Birthday, President's Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Thanksgiving Friday and Christmas Day, all days of general and congressional elections throughout the State, and a five-day work week.

The Contractor will not be permitted to do any work which requires the services of the City's inspection, supervisory or line and grade forces on the days on which the above-mentioned holidays are observed by the City or on Saturdays or Sundays, unless otherwise authorized by the Project Manager in writing. However, the Contractor, with verbal permission of the Project Manager, may be permitted to perform clean up and such other items for which no specific payment is involved on Saturdays and holidays.

The normal number of working hours per day on this Contract will be limited to eight, unless otherwise authorized by the Project Manager in writing.

In case of an emergency, which may require the services of the City on Saturdays, Sundays, holidays or longer than eight hours per day, the Contractor shall request permission of the Project Manager to work. If, in the opinion of the Project Manager the emergency is bona fide, he will grant permission to the Contractor to work such hours as may be necessary. Also, if in the opinion of the Project Manager, a bona fide emergency exists, the Project Manager may direct the Contractor to work such hours as may be necessary whether the Contractor requests permission to do so or not.

- 50. **LANGUAGE** The Contractor shall appoint one or more crewmembers or supervisors to act as liaison with the City and emergency services personnel. All liaisons shall be fluently bilingual in English and the Contractor's employees' language(s), and at least one liaison shall be present at each work site at all times when any of the Contractor's employees or agents are at the site.
- 51. **IMMIGRATION REFORM AND CONTROL ACT**
The Contractor awarded a contract pursuant to this bid shall warrant that it does not and shall not hire, recruit or refer for a fee, for employment under the contract, an individual, knowing the individual is an unauthorized individual, and hire any individual without complying with the requirements of the Immigration Reform and Control Act of 1986 (the Act), including but not limited to any verification and record keeping requirements. The Contractor shall further assure the City that, in accordance with the Act, it does not and will not discriminate against an individual with respect to hiring, or recruitment or referral for a fee, of the individual for employment or the discharging of the individual from employment because of such individual's national origin or in the case of a citizen or intending citizen, because of such individual's citizenship status.
- 52. **EQUAL EMPLOYMENT OPPORTUNITY** The Contractor will not discriminate against any employee or applicant for employment because of age (in accordance with applicable law), ancestry, color, national origin, race, ethnicity, religion, disability, genetics, marital status, pregnancy, presence of children, gender, sexual orientation, gender identity or expression, or veteran status. The Contractor will take affirmative action to ensure that applicants are employed, and the employees are treated fairly and equally during employment with regard to the above. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment, layoff or termination, rates of pay or other form of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause. Contractors must also include the same nondiscrimination language in all subcontracts.

If the Contractor fails to comply with nondiscrimination clauses of this contract or fails to include such contract provisions in all subcontracts that subcontractors will not discriminate against any employee or applicant for employment in the manner described above, this contract may be declared void AB INITIO, cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further contracts with the City of Rockville. Any employee, applicant for employment, or prospective employee with information concerning any breach of these requirements may communicate such information to the City Manager who shall commence a prompt investigation of the alleged violation. Pursuant to such investigation, the Contractor will permit access to the Contractor's books, records, and accounts. If the City Manager concludes that the Contractor has failed to comply with nondiscrimination clauses, the remedies set out above may be invoked.
- 53. **ETHICS REQUIREMENTS** In accordance with the City's financial disclosure and ethical conduct policy and/or ordinances a prerequisite for payment pursuant to the terms of this contract is that the Contractor may be required to furnish explicit statements, under oath, that the City Manager, and/or any other officer, agent, and/or employee of the City, and any member of the governing body of the City of Rockville or any member or employee of a Commission, Board, or Corporation controlled or appointed by the City Council, Rockville, Maryland has not received or has not been promised directly or indirectly any financial benefit by way of fee, commission, finder's fee, or in any other manner, remuneration arising from directly or indirectly related to this contract, and that upon request by the City Manager, or other authorized agent, as a prerequisite to payment pursuant to the terms of this contract, the Contractor will furnish to the Mayor and Council of the City of Rockville, under oath, answers to any interrogatories to a possible conflict of interest has herein embodied.
- 54. **DRAWINGS TO BE FOLLOWED** The approved drawings, profiles, and cross sections on file with the City will show the location, details and dimensions of the work contemplated, which shall be performed in strict accordance therewith and in accordance with the specifications. Any deviations from the drawings or specifications as may be required by the exigencies of construction in all cases will be determined by the Project Manager. There shall be no such deviations without the written authorization of the Project Manager. On all drawings, etc., the figured dimensions shall govern in the case of discrepancy between the scales and figures. The Contractor shall take no advantage of any error or omission in the drawings or specifications. The Project Manager shall make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the specifications and of the drawings as construed by the Project Manager whose decision shall be final.
- 55. **CERTIFICATION** Under no circumstances will Contractors be paid for materials utilized on any City contract unless certified to by the Project Manager. The Contractor must not incorporate any materials into a City project without prior authorization and certification of the Project Manager, unless necessary to eliminate or avoid hazardous conditions. Under these emergency circumstances the responsibility for notification to the Project Manager and quantity/quality confirmation rests with the Contractor and must be obtained within 24 hours of the work.
- 56. **DECISIONS AND EXPLANATIONS BY PROJECT MANAGER** The Project Manager shall make all necessary explanations as to the meaning and intent of the specifications and drawings, and shall give all orders and directions, either contemplated therein or thereby, or in every case in which a difficult or unforeseen condition arises during the prosecution of the work. Should there be any discrepancies, or should any misunderstanding arise as to the intent of anything contained in the drawings and specifications, the decision of the Project Manager shall be final and binding. The Project Manager shall in all cases determine the amount, quality, acceptability and estimates of the work to be paid for under the Contract and shall decide all questions in relation to the work. In case any questions arise between parties relating to the Contract, such decision and estimate shall be a condition precedent to the right of the Contractor to receive payment under that part of the Contract which is in dispute.
- 57. **WORK TO BE DONE AND MATERIALS TO BE FURNISHED** The Contractor shall do all the work and furnish all the labor, materials, tools, and equipment necessary or proper for performing the work required by the Contract, in the manner called for by the drawings and specifications and within the Contract time. The Contractor shall complete the entire work together with such extra work as may be required, at the prices fixed therefore, to the satisfaction of the Project Manager and in accordance with the specifications and drawings.
- 58. **NOTIFICATION TO OTHER AGENCIES** The Contractor will be responsible for notifying all concerned agencies affected by the work a minimum of 48 hours in advance of any activity, as prescribed by said agencies, including, but not limited to: the Washington Gas, PEPCO, Verizon Comcast Cable, Transcontinental Gas, City of Rockville Utilities Division, Montgomery County Government, State Highway Administration and the Washington Suburban Sanitary Commission. The Contractor must notify MISS UTILITY at 1-800-257-7777 a minimum of 72 hours and no more than 5 working days prior to removal of any pavement or beginning any excavation. There shall be no measurement or direct payment to the Contractor for such notification, working around, the protection of, or repair of damage to such existing utilities caused by the proposed construction activities directly or indirectly.

59. **PERMITS AND REGULATIONS** Unless stipulated elsewhere in these specifications, the Contractor shall be responsible for obtaining and paying for all applicable permits. Where signatures of the City are required in connection with the obtaining of such permits, certificates, etc., the Contractor shall prepare the proper paperwork and present it to the City for signature. City of Rockville Permit fees shall be waived. If the Contractor ascertains at any time that any requirement of this contract is at variance with applicable laws, ordinances, regulations and/or building codes, notification to the Project Manager shall be made immediately and any necessary adjustment to the contract shall be made. Without proper notice to the Project Manager, the Contractor shall bear all costs arising from the performance of work the Contractor knows to be contrary to such laws, ordinances, etc.
60. **EXCAVATION** Unless specifically provided in the specifications, all trench and roadway excavation is hereby unclassified as to the character of materials. The lump sum or unit price, as specified, for or including excavation shall constitute full payment for removal and disposal of all materials, regardless of type, encountered in trenching and roadway excavation, within the limits of this Contract, as necessary and as shown to be removed on the Contract drawings and/or as directed by the Project Manager, except as otherwise provided for under this Contract. All bidders are hereby directed to familiarize themselves with all site conditions including subsurface and the proximity of adjacent features.
61. **SERVICE OF NOTICES** The mailing a written communication, notice or order, addressed to the Contractor at the business address filed with the City, or to his office at the site of the work shall be considered as sufficient service upon the Contractor of such communication, notice or order; and the date of said service shall be the date of such mailing. Written notice shall also be deemed to have been duly served if delivered in person to the individual or member of the firm or to any officer of the corporation for whom it was intended if delivered or sent by registered or certified mail to the last known address.
62. **PATENT RIGHTS** Whenever any article, materials, equipment, process, composition, means, or things called for by these specifications is covered by letters of patent, the successful bidder must secure, before using or employing such article, material etc., the assent in writing of the Owner or Licensee of such Letters of Patent and file the same with the City.
- The said assent is to cover not only the use, employment, and incorporation of said article, material, equipment, process, composition, combination, means, or thing in the construction and completion of the work but also the permanent use of said article, material, etc., thereafter by or on behalf of the City, in the operation and maintenance of the project for the purposes for which it is intended or adapted. The Contractor shall be responsible for any claims made against the City, its agents and employees or any actual or alleged infringement of patents by the use of any such patented articles, etc., in the construction and completion of the work, and shall save harmless and indemnify the City, its agents and employees from all costs, expenses, and damages, including Solicitor's and Attorney's fees which the City may be obligated to pay by reason of any actual or alleged infringement of patents used in the construction and completion of the work herein specified.
63. **CARE AND PROTECTION OF WORK** From the commencement of the Contract until its completion, the Contractor shall be solely responsible for the care of the work and all injury or damage to the same, from whatever cause, shall be made good by the Contractor at the Contractor's own expense, before the final estimate is made. The Contractor shall provide suitable means of protection for all materials intended to be used in the work and for work in progress, as well as completed work.
64. **ABANDONMENT OF OR DELAY IN WORK** If the work under the Contract shall be abandoned by the Contractor, or if at any time the Project Manager shall be of the opinion and shall so certify, in writing, to the Contractor, that the performance of the Contract is unnecessarily or unreasonably delayed, or that the Contractor has violated any of the provisions of the Contract or is executing the same in bad faith or if the work is not fully completed within the time specified for its completion, together with such extension of time as may have been granted, the City by written notice, may order the Contractor to discontinue all work there under, or any part thereof, within the number of days specified on such notice. At the expiration of said time the Contractor shall discontinue the work, or such part thereof, and the City shall have the power, by Contract, or otherwise, to complete said work and deduct the entire cost thereof from any monies due or to become due to the Contractor under the Contract. For such completion of work the City may, for itself or its Contractor, take possession of and use or cause to be used any or all materials, tools, and equipment found on the site of said work. When any part of the Contract is being carried on by the City, as herein provided, the Contractor shall continue the remainder of the work in conformity with the terms of the Contract and in such manner as not to interfere with the City's workmen.
65. **SUBLETTING OR ASSIGNING OF CONTRACT** The City and the Contractor each bind themselves, their partners, successors, assigns and legal representatives of such other parties in respect to all covenants, agreements, and obligations contained in the contract documents. Neither party to the contract shall sublet, sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of the work provided for therein, or of his right, title or interest therein to any person, firm or corporation without the written consent of the other party, nor shall the Contractor assign any monies due or to become due hereunder without the previous written consent of the City.
66. **NO WAIVER OF CONTRACT** Neither the acceptance by the City or its Project Manager nor any order, measurement, certificate or payment of money, of the whole or any part of the work, nor any extension of time nor possession taken by the City or its Project Manager shall operate as a waiver of any portion of the Contract, or any right to damage therein provided. The failure of the City to strictly enforce any provision of this contract shall not be a waiver of any subsequent breach of the same or different nature.
67. **DUTIES, OBLIGATIONS, RIGHTS AND REMEDIES** The duties and obligations imposed by the contract documents and the rights and remedies available there under shall be in addition to and not a limitation of the duties, obligations, rights and remedies otherwise imposed or available by law, unless so indicated.
68. **IMPLIED WORK** All incidental work required by the drawings or specifications for which no payment is specifically provided and any work or materials not therein specified which are required to complete the work and which may fairly be implied as included in the Contract, and which the Project Manager shall judge to be so included, shall be done or furnished by the Contractor without extra compensation. The intent is to prescribe a complete work or improvement which the Contractor undertakes to do in full compliance with the contract documents together with any authorized alterations, special provisions, and supplemental agreements.
69. **MEASUREMENT OF WORK AND MATERIAL** The work and material to be paid for will be measured and determined by the Project Manager according to the specifications and drawings, and the working lines that may be given. No allowance will be made for any excess above the quantities required by the specifications, drawings, and lines on any part of the work, except where such excess material has been supplied or work done by order of the Project Manager and in the absence of default or negligence on the part of the Contractor. Should the dimensions of any part of the work or of the materials be less than those required by the drawings or the directions of the Project Manager, only the actual quantities placed will be allowed in measurement.
70. **EXTRA COSTS** If the contractor claims that any instructions by the contract documents or otherwise involve extra compensation or extension of time, a written protest must be submitted to the Project Manager within ten (10) calendar days after receipt of such instructions and before proceeding to execute the work, stating in detail the basis for objection. No such claim will be considered unless so made.

71. **CONTINGENT ITEMS & QUANTITIES** Items and quantities identified as being contingent are provided in the Contract for use when and as directed by the Project Manager. These items shown on the Plans or in the specifications are established for the purpose of obtaining a bid price. The quantities for these contingent items may be increased or decreased without any adjustment to the Contract unit price bid or the contingent items may be deleted entirely from the Contract by the Project Manager without negotiation. The Contractor shall submit no claim against the City for any adjustment to the Contract unit price bid, should the contingent items be increased, decreased, or eliminated entirely. Payment for any contingent items used will be made on the basis of the quantities as actually measured and as specified in the Specifications. Materials, Construction Requirements and Basis of Payment shall be as specified elsewhere in the Specifications, Plans or Special Provisions.
72. **CHANGES IN THE SCOPE OR EXTRA WORK** The City, without invalidating the contract, may issue written changes in the work consisting of additions, deletions, or modifications with the contract sum and completion date being adjusted accordingly. All such changes, or additional work must be authorized in writing by the Purchasing Agent prior to starting such work. Costs shall be limited to the cost of materials, labor, field supervision and field office personnel directly involved in and attributed to the change. All costs and/or credits to the City for a change in the work shall be determined by the unit price bid or by mutual agreement, where any agreed upon charges related to overhead may not exceed 5% of the total cost of the changes and any agreed upon charges to profit may not exceed 10% of the total cost of the changes.

The Contractor shall do all work that may be required to complete the work contemplated at the unit prices bid or at a lump sum price to be mutually agreed upon.

The Contractor shall perform extra work, for which there is no quantity or price included in the Contract, whenever it is deemed necessary or desirable, to complete fully the work as contemplated, and such work shall be done in accordance with the specifications therefore, or in the best workmanlike manner as directed. Where such a price or sum cannot be agreed upon by both parties, or where this method of payment is impracticable, the Project Manager may order the Contractor to do such work on a force account basis, which will be paid for as follows.

73. **FORCE ACCOUNT WORK** When the Contractor is required to perform work as a result of additions or changes to the contract for which there are no applicable unit prices in the contract, the City and Contractor shall make every effort to come to an agreed upon price for the performance of such work. If an agreement cannot be reached, the City may require the Contractor to do such work on a force account basis to be compensated in accordance with the following:

- A. **Labor.** For all labor and for foremen in direct charge of the specific operations the Contractor shall receive the actual wages for each and every hour that said labor and foremen are actually engaged in such work.
- B. **Materials.** For materials accepted by the Project Manager and incorporated into the project, the Contractor shall receive the actual cost of such materials, including transportation charges paid by him (exclusive of machinery rentals as hereinafter set forth). Excess materials delivered to the job site and not incorporated into the project will not be paid for and it is the Contractor's responsibility to remove said excess material from the job site.
- C. **Equipment.** For any machinery or special equipment (other than small equipment tools, whether rented or owned), the use of which has been authorized in writing, by the Project Manager the Contractor shall receive the rates agreed upon in writing before such work is begun which price shall include fuel, oil and miscellaneous necessities, or the Contractor shall receive those rates which may be specified elsewhere in the Special Provisions. For the purpose of definition, equipment with a new cost of \$1000 or less will be considered small tools and equipment.
- D. **Materials and Supplies Not Incorporated in the Work.** For materials and supplies expended in the performance of the work (excluding those required for rented equipment) and approved by the Project Manager, the Contractor shall receive the actual cost of such materials and supplies used.
- E. **Subcontractors.** The Contractor shall receive the actual cost of work performed by a subcontractor. The subcontractor's cost is to be determined as in A., B., C., and D. above, plus the fixed fee for overhead and profit allowance computed as in G.
- F. **Superintendence.** No additional allowance shall be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided
- G. **Contractor's Fixed Fee.** The procurement officer and the Contractor shall negotiate a fixed fee for force account work performed pursuant to this specification by his force and by his subcontractors. The City shall pay 10 percent of A as compensation for overhead and profit for the work performed. The Contractor shall proceed diligently with the performance of the force account work to completion. The Contractor's fixed fee shall include an amount equal to the sum of 65 percent of A, which shall include, but not be limited to the following:

(1) Compensation for all costs paid to, or in behalf of, workmen by reason of subsistence and travel allowances, health and welfare benefits, pension fund benefits or other benefits that may be required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed in the work; and

(2) Bond premiums, property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and Social Security taxes on the force account work.

In addition, the Contractor's fixed fee may include an amount not to exceed 10 percent of B, unless specifically authorized by the Project Manager in advance of the work; 5 percent of D, and 5 percent of E with the exception of that portion chargeable to equipment as defined above.

- H. **Compensation.** The compensation as set forth above shall be received by the Contractor as payment in full for change order work done on a force account basis. At the end of each day, the Contractor's representatives, and the Project Manager, shall compare records of the cost of work as ordered on a force account basis. Differences shall be immediately resolved, and any unresolved difference shall be brought to the attention of the Project Manager by written notice from the Contractor within two working days of the occurrence.
- I. **Statements.** No payment will be made for work performed on a force account basis until the Contractor furnishes the Project Manager duplicate itemized statements of the cost of such force account work detailed as to the following:

- (1) Name, classification, date, daily hours, total hours, rate, and extension for such workmen. Contractor shall provide certified payrolls

(2) Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment. Contractor shall provide original receipts and invoices.

(3) Quantities of materials, prices, and extensions. Contractor shall provide original receipts and invoices.

(4) Transportation of materials. Contractor shall provide original receipts and invoices.

If, however, the materials used in the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the original invoices the statements shall contain or be accompanied by an affidavit of the Contractor which shall certify that such materials were taken from his stock that the quantity claimed was actually used and that the price and transportation of the material as claimed represent actual cost. Any request for payment under this Section should be submitted in the order outlined by the above.

The Contractor shall be responsible for all damages resulting from work done on a force-account basis, the same as if this work had been included in the original Contract.

Work performed without previous written order by the Project Manager will not be paid.

74. **ALLOWANCES** Whenever an allowance is mentioned in the specifications, then the contractor shall include in his contract sum the entire amount of such specified allowances. The expenditure of these allowances is to be at the Purchasing Manager's direction. However, the allowance expenditure is limited to items properly inferable from the title and description of the allowance. Unexpended balances are to be credited to the City. Compensation payable to the contractor for expenditure of allowances directed by the Purchasing Manager shall be based on the cost to the contractor as shown by actual invoices or receipts, and no additional overhead or profit shall be payable to the contractor for such allowances.

75. **PROGRESS PAYMENTS AND RETAINAGE** The Contractor shall submit a detailed application for payment on a monthly basis, preferable on an AIA G702 form. Such application for payment, notarized, if required, must be accompanied by supporting data and documents substantiating the Contractor's right to payment and reflecting a five percent (5%) retainage.

Applications for payment shall not include payment for equipment or materials delivered to the site but not installed or for materials or equipment properly stored off-site unless specifically approved by the Project Manager. If such approval is granted, the Contractor must submit with the application for payment, bills of sale or other such documentation satisfactory to the City to establish the City's title to such materials or equipment or otherwise to protect the City's interest, including applicable insurance and transportation to the site for materials and equipment stored off site. Such approvals are typically reserved for "big ticket" items that individually would exceed five percent (5%) of the bid total. The Contractor shall promptly pay each subcontractor and supplier for work completed upon receipt of payment from the City the amount to which said subcontractor is entitled, reflecting any percentage retained from payments to the Contractor on account of each subcontractor's work. The Contractor shall, by an appropriate agreement with each subcontractor, require each subcontractor to make prompt payments to his subcontractors in a similar manner.

The City shall be under no obligation to pay or to see to the payment of any moneys to any subcontractor except as may otherwise be required by law.

No Certificate of Payment or partial or entire use of the facility by the City shall constitute an acceptance of any work which is not in accordance with the Contract Documents.

Payments Withheld – The City may decline to certify payment or because of subsequently discovered evidence or observations, nullify the whole or any part of any Certification of Payment previously issued, as may be necessary to protect the City from loss because of: (1) defective work not remedied, (2) third party claim filed or evidence indicating probable filing of such claim, (3) failure of the Contractor to make payments properly to subcontractors or suppliers, (4) reasonable evidence that the work can not be completed for the unpaid balance of the contract sum, (5) reasonable evidence that the work will not be completed within the Contract time, (6) persistent failure to carry out the work.

76. **FINAL PAYMENT REQUEST** Upon reaching substantial completion, as defined by receipt of occupancy permit or when all related punch list items have been completed, whichever date is later, the Contractor may submit a written Application for Final Payment. All supporting documentation and data shall be submitted with the Request for Final Payment as is applicable to the monthly Requests for Payment referenced heretofore.

Out of the amount representing the total of the final payment request the City shall deduct five (5%) percent, which shall be in addition to any and all other amounts which, under the Contract, it is entitled or required to retain and shall hold said sum for a period of one hundred and twenty (120) days after the date of acceptance of the work by the City.

Within thirty (30) days after the approval of the final payment request, the City will pay to the Contractor the amount remaining after deducting from the total amount of the final estimate all such sums as have hereto before been paid to the Contractor under the provision of the Contract and also such amounts as the City has or may be authorized under the Contract to reserve or retain.

Neither the final payment nor the remaining retainage shall become due until the Contractor submits to the Project Manager:

1. An affidavit that all payrolls, bills for materials and equipment and other indebtedness connected with the work for which the City or his property might in any way be responsible, have been paid.
2. Consent of surety to final payment, and
3. If requested, data establishing payment or satisfaction of obligations, such as receipt, release and waivers of liens arising out of the Contract;
4. All punch list items are completed to the satisfaction of the Project Manager.

If any subcontractor refuses to furnish a release or waiver of liens required by the City, the Contractor may furnish a bond satisfactory to the City to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the City all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorney fees.

Acceptance by the Contractor of final payment shall operate as a release to the Mayor and Council and every officer and agent thereof, from all claims and liabilities to the Contractor for anything done or furnished or relating to the work under the contract.

77. **RELEASE OF RETAINAGE** Upon the expiration of the aforesaid period of one hundred and twenty (120) days succeeding the date of acceptance, the City will pay to the Contractor all sums reserved or retained, less such amount as it may be empowered under the provisions of the Contract to retain.

78. **GUARANTEES / WARRANTIES** All guarantees and warranties required shall be furnished by the Contractor and shall be delivered to the Project Manager before final payment is made. The Contractor guarantees that the items conform to the contract documents.
79. **GUARANTEE PERIOD** The Contractor shall warrant and guarantee the work required under this Contract for a period of twelve (12) months from the date of Final Acceptance. The Contractor warrants and guarantees to the City, that materials and equipment furnished under the Contract shall be of good quality and new unless otherwise required or permitted by the Contract Documents, that all work will be in accordance with the Contract Documents, and that all work will be of good quality, free from faults and defects. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the City, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

The Contractor's obligation to perform and complete the work in a workmanlike manner, free from faults and defects and in accordance with the Contract Documents shall be absolute. The Contractor shall remedy, at his own expense, and without additional cost to the Owner, all defects arising from either workmanship or materials, as determined by the City, or City's representative. The obligations of the Contractor under this Paragraph shall not include normal wear and tear under normal usage.

If the Contractor does not, within ten (10) days after notification from the Project Manager, signify his intention in writing or in action to correct work, as described above, then the Project Manager may proceed with the work and charge the cost thereof to the account of the Contract as herein before provided.

80. **Substantial Completion.** Sufficient completion of the project or the portion thereof to permit utilization of the project, or portion thereof for its intended purpose. Substantial completion requires not only that the work be sufficiently completed to permit utilization, but that the City can effectively utilize the substantially completed work. Determination of substantial completion is solely at the discretion of the City. Substantial completion does not mean complete in accordance with the contract nor shall substantial completion of all or any part of the project entitle the Contractor to acceptance under the contract.

At such time as the Contractor has completed the work and prior to requesting a final inspection, the Contractor shall make written request for an inspection for substantial completion. Such request shall be made no less than seven (7) calendar days prior to the requested date of inspection. An inspection will be made by the City and a determination will be made as to whether or not the work is in fact substantially complete and a "punch list" will be developed. "Punch Lists" containing numerous items or items which may affect the intended use of the work will be considered cause to delay issuance of a document of Substantial Completion. Operation and Maintenance manuals shall be submitted and approved prior to issuance of any document of Substantial Completion.

81. **TRANSFER OF TITLE** The Contractor warrants that title to all work, materials and equipment covered by the Application for Payment will pass to the City either by incorporation in construction or upon the receipt of payment by the Contractor, free and clear of all liens, claims, interests or encumbrances, and that no work, materials, or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any person performing the work at the site or furnishing materials or equipment for the project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other persons.
82. **USE OF PREMISES** Whenever, in the opinion of the Project Manager, any portion of the work is completed or is in an acceptable condition for use, it shall be used for the purpose it was intended, however, such use shall not be held as acceptance of that portion of the work, or as a waiver of any of the provisions of the Contract.
83. **DETERMINATION OF CITY'S LIABILITY** The acceptance by the Contractor of the final payment made as aforesaid shall operate as and be a release to the City and every officer and agent thereof, from all claims by and liabilities to the Contractor for anything done or furnished for or relating to or affecting the work under the contract.
84. **NO LIMITATION OF LIABILITY** The mention of any specific duty or liability of the Contractor in any part of the specification shall not be construed as a limitation or restriction upon any general liability or duty imposed upon the Contractor.
85. **PRESERVATION OF MONUMENTS AND TREES** The Contractor shall be responsible for the preservation of all public and private property, trees, monuments, highway signs, markers, fences, and curbs or other appurtenances, and shall use every precaution to prevent damage or injury thereto. Any expense necessary to provide adequate protection, whether such designated item be on or off the right-of-way, shall be assumed by the Contractor.
86. **PUBLIC ACCESS** The Contractor shall at all times conduct the work in such a manner as to ensure the least obstruction to traffic practicable. The convenience and safety of the general public and the residents along the improvement shall be provided for in an adequate and satisfactory manner. Fire hydrants shall be kept accessible to fire apparatus at all times. Handicap access shall remain accessible.
87. **HAZARDOUS AND TOXIC SUBSTANCES** Manufacturers and distributors are required by Federal "Hazard Communication" provision (29 CFR 1910.1200), and the Maryland "Access to Information About Hazardous and Toxic Substances" law to label each hazardous material or chemical container, and to provide Material Safety Data Sheets to the purchaser. The Contractor must comply with these laws and must provide the City with copies of all relevant documents, including Material Safety Data Sheets, prior to performance of services or contemporaneous with the delivery of goods.
88. **MAINTENANCE OF VEHICULAR TRAFFIC (if applicable)** Unless otherwise directed by the Project Manager, traffic must be maintained on all roadways within the construction area continuously or with the least amount of interruption during the construction period necessary to minimize accidents and accident severity and maintain safety while at the same time minimizing inconvenience to the traveling public and the Contractor. The Project Manager shall have the exclusive right to order a road to be closed or to remain open. No equipment will be stored or permitted to stand within the limits of the roadway right-of-way where traffic must be maintained. Any earth dropped on the surface of the existing road shall be removed immediately to avoid possible hazardous conditions. The Contractor shall prepare and submit a Traffic Control Plan (TCP) for the Project Manager's review, revision, and approval, at least ten days before beginning work, unless otherwise directed. All Traffic Control Devices shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), latest edition (and all revisions). With the approved TCP implemented, the Contractor will be permitted to work with the following provisions: All traffic lanes must be restored at the end of each day unless specifically authorized otherwise, in advance, by the Project Manager:

The City reserves the right to modify or expand on the methods of traffic control specified and to restrict working hours if, in the opinion of the Project Manager, the Contractor's operations are a detriment to traffic during rush hour periods.

Signs on fixed supports shall be mounted on two posts. Signs mounted on portable supports are suitable for temporary conditions. **Security** During periods of partial shutdown, or extended periods when no work is being performed, the Contractor shall remove or adequately cover all construction signs as directed by the Project Manager.

The Contractor shall be responsible for removing, storing, covering, and resetting all existing traffic signs and delineators that become inapplicable and will confuse traffic during the various stages of construction, the cost of which shall be included in the price for Maintenance of Traffic or in the absence of such a pay item it shall be accomplished at no additional compensation, as incidental to the contract. Any signs lost or damaged will be replaced by the Contractor at its expense.

The Contractor shall provide, maintain in new condition, and move when necessary or directed all traffic control devices used for the guidance and protection of vehicles.

The Contractor shall be responsible for providing the appropriate signs to reflect varying traffic patterns prior to the commencement of a new stage of construction.

Traffic must be safely maintained at all times throughout the entire length of the project. No additional compensation shall be paid to the contractor for traffic maintenance, even if the contract time exceeds the contractually specified completion date or working days.

When required lane shifts are implemented, existing painted lane markings no longer applicable shall be removed to the satisfaction of the Project Manager.

Temporary crash cushions are to be installed as shown on the Plans. Unless otherwise specified, sand containers shall be used. The crash cushions shall conform to Subsection 104.10 of the MDSHA Specifications.

Crash cushions shall be reset to reflect changing traffic patterns caused by different stages of Traffic Control. The crash cushions shall be reset at locations shown on the Plans or as directed by the Project Manager.

Should any of the sand container components be damaged during the resetting of the system or during the course of the project, the Contractor shall replace the damaged components at its own expense.

The Contractor shall have flaggers on this Project for the purpose of controlling traffic while maneuvering heavy equipment. This may require a temporary lane closure in any of the specified Traffic Control Phases. These temporary lane shutdowns shall be kept to a minimum and the normal traffic pattern for the Traffic Phase shall be restored as quickly as possible. The Contractor shall comply with Section B-20 of the MUTCD regarding flagger signing.

Prior to stopping work each day the Contractor will be required to reshape all graded areas and eliminate all drop-offs not protected by barriers by filling with compacted stone at maximum of 8:1 slope.

All barriers and barricades shall be adequately illuminated at night, as specified herein, and all lights for this purpose shall be kept operative from sunset to sunrise.

No work shall be commenced in any stage of construction until the barriers and barricades for that stage, indicated on the Plans, or as specified by the Project Manager, are completely in place. The Contractor will be solely responsible for all accidents and damages to any persons and property resulting from its operations. Compliance with prescribed precautions contained herein or in the MDSHA Specifications or Manual On Uniform Traffic and Control shall not relieve the Contractor of its primary responsibility to take all necessary measures to protect and safeguard the work, nor relieve the Contractor from any responsibilities prescribed by GP-7 of the January 2001 MDSHA Standard Specifications for Construction and Materials.

The Contractor shall notify and obtain approval in writing from the Project Manager, at least 48 hours before changing any Traffic Control Phase.

Any construction materials or debris dropped on the roadway surface shall be removed immediately to avoid possible hazardous conditions.

Materials The Contractor shall provide, maintain in first class condition, replace, and move when necessary or directed all materials, devices, flagging, etc., required to maintain traffic in accordance with the Traffic Control Plans or as directed by the Project Manager. Reference is made to the latest edition of the MUTCD, wherein all such items are fully described with regard to use, application, warranties, size, color, placement, etc., and wherein typical traffic control device layouts are shown, as all such devices and techniques planned for use on this project shall strictly conform to the Manual's request except as noted on the Plans.

When any of the following items have been established on the Plans or as directed by the Project Manager, the Specifications will be adhered to in accordance with the respective sections.

Lights, Warnings, Etc. - All banners and imitation barrels shall be adequately illuminated at night, and all lights for this purpose shall be kept operative from sunset to sunrise.

Steady burning warning lights shall be used to delineate channelization through and around obstructions in a construction or maintenance area, on detour curves, on lane closures, and in other similar conditions (MUTCD 6E-4, 6E-5). Flashing warning lights shall be the means for identifying a particular and individual hazard and shall not be used in sequence, in clusters, or for delineation (MUTCD: 6E-5, 6E-6).

Where noted on the plans the first two (2) warning signs shall include a "High Level Warning Device." In addition to the flags the signs shall also be equipped with a Type "B" High Intensity Flag Warning Light. This device must meet the requirements of MUTCD 6C-11 and 6E-5. The device shall be incidental to the Temporary Traffic Sign item if provided for, otherwise the costs shall be considered incidental, and no special compensation will be paid.

Barriers: Temporary concrete barriers shall be installed on the roadway approaches as shown on the plans or as approved in writing.

Any permanent facilities damaged as a result of anchoring temporary concrete barriers (anchor holes, etc.) shall be repaired to the satisfaction of the Project Manager using an epoxy grout or other material as may be specified by the Project Manager. Epoxy grout shall consist of sand and epoxy, mixed by volume according to manufacturer's recommendations.

Method of Measurement and Basis of Payment: All work and materials required under the TCP not covered or specified as a section in the price proposal form will be included in the lump sum price bid for Maintenance of Traffic. In the absence of such an item the Contractor agrees that there will be no special compensation paid for maintenance of vehicular traffic as described above and the cost shall be considered incidental to the contract and compensated as part of other contract bid item(s).

- 89. **PARKING, STORAGE AND STAGING AREAS** Parking, storage and staging areas for the Contractor's use during the Project must have prior approval of the Project Manager. All areas used for storage of equipment or material shall be restored to their original condition, immediately upon completion of the work. No additional compensation will be provided for restoring, re-grading, placement of topsoil, and seed and mulch in these areas.
- 90. **PEDESTRIAN TRAFFIC** Pedestrians shall be safeguarded by the use of signs lights, barricades and barriers as shown on the traffic control plan and/or directed by the Project Manager. Pedestrian traffic shall be maintained at all times unless specifically authorized otherwise, in advance, by the Project Manager. The Contractor shall submit a pedestrian traffic safety plan in accordance with the MUTCD, incorporating safety measures and other provisions to fully implement the intent of this paragraph. All work and materials required to prepare and implement the pedestrian traffic safety plan shall be considered incidental to the contract and there shall be no special compensation paid for this item unless special pay items are included in the Price Proposal page. No additional compensation shall be paid for maintenance of vehicular and pedestrian traffic if for whatever reason the project time extends beyond the contract specified completion date or working days.
- 91. **HANDICAP ACCESS** Where handicap access exists within the line of work under this contract it will be the contractor's responsibility to maintain said access during the life of this contract. This service is considered to be incidental to this contract and no special compensation will be paid for this service unless provided on the Price Proposal page.
- 92. **TOILET FACILITIES** Toilet facilities meeting MOSHA standards shall be provided at the job site for all projects exceeding \$100,000 in value and at all other job sites when directed by the City. No special compensation shall be paid unless specifically provided for in the Price Proposal page of this solicitation.
- 93. **STAKEOUT-CONSTRUCTION CONTROL** Survey construction control provided by the City shall be limited to the baseline with stations not over 100 feet, and the elevation of the top of each marked point. P.C.s, P.T.s, P.I.s, P.V.T.s, and at least one point on the tangent beyond the end of each curve will be staked. The Contractor shall request baseline stakeout a minimum of five days in advance of construction. Stakeout data other than stated above will be furnished by the construction Contractor per MDSHA Section 815 for structures, otherwise per WSSC specs. section 01000(H) and as described in detail below and in these specifications. The City's responsibility for stakeout for the entire project shall be limited to that data described above and this shall be provided only once. The Contractor shall preserve or otherwise ensure adequate survey controls exist throughout the life of the contract.

Surveys and stakeout shall be accomplished by the Contractor as outlined above and in conformance with WSSC specifications Section 01000-10-I (H), entitled "Construction Stakeout By Contractor."

The provisions therein are primarily for pipeline stakeout. The Contractor's responsibilities under this contract are hereby expanded to include, in addition to pipeline stakeout, similar responsibilities for all phases of stakeout necessary to construct all facilities under this contract including but not limited to clearing and grubbing excavation, pavement, curbs and gutters, storm drainage pipes and facilities, culverts, structures, storm water management facilities, street lights, traffic signal conduits and components, noise walls, retaining walls, ditches and sediment control features.

The stakeout and survey record data shall be preserved and turned over to the City for filing following completion of specific components of work.

Method of Measurement and Payment Generally, stakeout shall be considered incidental to the contract and no special compensation shall be paid, unless a specific pay item is included in the contract Price Proposal page of this contract. Where payment is provided, progress payments for stakeout shall be made based on the percentage resulting from the price bid for stakeout divided by the total bid, multiplied by the monthly payment exclusive of the stakeout payment, except the final payment shall be adjusted as necessary to equal the total price bid for stakeout.

Grade Sheet by Contractor: Grade sheets showing hub and design elevations for roadway, water mains, drainage structures and piping, walks, lights, infiltration facilities clearing/grubbing, excavation, and related components will be provided by the construction Contractor at least 8 hours in advance of construction and will be subject to approval by the Project Manager. Stakeout for curb and gutter in all vertical and horizontal curves is to be at intervals of 25 feet or less unless otherwise specifically authorized by the Project Manager. This work is considered incidental to the contract and no extra compensation will be paid.

- 94. **DEBRIS** Under no circumstance will any open fires be permitted within the City of Rockville. All debris will be removed and hauled from site (except when otherwise specifically authorized in the bid document) and disposed in accordance with Local, State and Federal laws in effect at the disposal site. No special compensation will be paid as all costs for off-site disposal shall be included in the applicable bid prices and considered incidental to the contract.
- 95. **CLEAN UP** In addition to any provisions regarding clean up in the bid document, clean up, including the restoration of areas of construction, shall proceed as quickly as is practicable. The period between construction and final clean up shall normally not exceed one week. If at any time during the course of the work the cleaning operation in any given area becomes delinquent in the opinion of the Project Manager, he may order that construction be stopped until such cleaning is completed. Any such order shall not extend the Final Completion date under this contract. Unless otherwise indicated, all materials razed, demolished, or otherwise removed from the work site shall become the property of the Contractor and shall be disposed of legally and properly off site at his expense.

Upon Final Completion of the work and before acceptance and final payment shall be made, the Contractor shall clean and remove from the street, footways, lawns, and adjacent property, all surplus and discarded materials, rubbish and temporary structures, restore in an acceptable manner all property, both public and private, which has been damaged during the prosecution of the work and shall leave the work area in a neat and presentable condition throughout the entire length of the project under contract.

If the Contractor fails to clean up at Final Completion of the work, the City may do so and the cost thereof shall be charged to the Contractor.

INSURANCE REQUIREMENTS REV2 (09/08)

Prior to the execution of the contract by the City, the Contractor must obtain at their own cost and expense and keep in force and effect during the term of the contract including all extensions, the following insurance with an insurance company/companies licensed to do business in the State of Maryland evidenced by a certificate of insurance and/or copies of the insurance policies. The Contractor's insurance shall be primary. The Contractor must electronically submit to the Purchasing Division a certificate of insurance prior to the start of any work. In no event may the insurance coverage be less than shown below.

Unless otherwise described in this contract the successful contractor and subcontractors will be required to maintain for the life of the contract and to furnish the City evidence of insurance as follows:

MANDATORY REQUIREMENTS FOR INSURANCE

Contractor's insurance coverage shall be primary insurance as respects the City, its elected and appointed officials, officers, consultants, agents and employees and any insurance or self-insurance maintained by the City, shall be excess of the Contractor's insurance and shall not be called upon to contribute with it.

| Type of Insurance | Amounts of Insurance | Endorsements and Provisions |
|--|---|---|
| <p>1. <i>Workers' Compensation</i></p> <p>2. <i>Employers' Liability</i></p> | <p>Bodily Injury by Accident: \$100,000 each accident</p> <p>Bodily Injury by Disease: \$500,000 policy limits</p> <p>Bodily Injury by Disease: \$100,000 each employee</p> | <p>Waiver of Subrogation: WC 00 03 13 Waiver of Our Rights to Recover From Others Endorsement signed and dated.</p> |
| <p>3. Commercial General Liability</p> <p>a. Bodily Injury</p> <p>b. Property Damage</p> <p>c. Contractual Liability</p> <p>d. Premise/Operations</p> <p>e. Independent Contractors</p> <p>f. Products/Completed Operations</p> <p>g. Personal Injury</p> | <p>Each Occurrence: \$1,000,000</p> | <p>City to be listed as additional insured and provided 30 day notice of cancellation or material change in coverage. CG 20 37 07 04 and CG 20 10 07 04 forms to be both signed and dated.</p> |
| <p>4. Automobile Liability</p> <p>a. All Owned Autos</p> <p>b. Hired Autos</p> <p>c. Non-Owned Autos</p> | <p>Combined Single Limit for Bodily Injury and Property Damage - (each accident): \$1,000,000</p> | <p>City to be listed as additional insured and provided 30 day notice of cancellation or material change in coverage. Form CA20 48 02 99 form to be both signed and dated.</p> |
| <p>5. Excess/Umbrella Liability</p> | <p>Each Occurrence/Aggregate: \$1,000,000</p> | <p>City to be listed as additional insured and provided 30 day notice of cancellation or material change in coverage.</p> |
| <p>6. Professional Liability NOT REQUIRED</p> | <p>Each Occurrence/Aggregate: \$1,000,000</p> | |

Alternative and/or additional insurance requirements, when outlined under the special provisions of this contract, shall take precedence over the above requirements in part or in full as described therein.

POLICY CANCELLATION

No change, cancellation or non-renewed shall be made in any insurance coverage without a thirty (30) day written notice to the City Purchasing Division. The Contractor shall electronically furnish a new certificate prior to any change or cancellation date. The failure of the Contractor to deliver a new and valid certificate will result in suspension of all payments and cessation of on-site work activities until a new certificate is furnished.

ADDITIONAL INSURED

The Mayor and Council of Rockville, which includes its elected and appointed officials, officers, consultants, agents and employees must be named as an additional insured on the Contractor's Commercial and Excess/Umbrella Insurance for liability arising out of contractor's products, goods, and services provided under this contract. Additionally, The Mayor and Council of Rockville must be named as additional insured on the Contractor's Automobile and General Liability Policies. Endorsements reflecting the Mayor and Council of Rockville as an additional insured are required to be submitted with the insurance certificate.

SUBCONTRACTORS

All subcontractors shall meet the requirements of this Section before commencing work. In addition, Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

CERTIFICATE HOLDER

The Mayor and Council of Rockville

(Contract #, title)

City Hall

111 Maryland Avenue

Rockville, MD 20850

INVITATION FOR BIDS #18-24
LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS
SECTION III: SPECIAL PROVISIONS

These Special Provisions are hereby made part of the contract. In case of conflict with terms and conditions of the Specifications of the City of Rockville, Montgomery County Government, the Washington Suburban Sanitary Commission, the Maryland State Highway Administration, the Maryland Department of the Environment, or the Montgomery Soil Conservation District, the Special Provisions shall govern.

3.1 POINT OF CONTACT

To ensure fair consideration for all Bidders, the City prohibits communication to or with any department, elected official or employee during the submission process, other than the Procurement Division, regarding the requirements for this submittal. Any such contact may be considered grounds for disqualification. The City shall not be responsible for oral interpretations given by any City employee or its representative.

All inquiries concerning clarifications of this solicitation or for additional information shall be submitted in writing by email only and directed as follows:

The sole point of contact at the City for purposes of this RFP, prior to award of any contract, is Pat Ryan, pryan@rockvillemd.gov.

Pat Ryan
City Hall – Procurement Division
111 Maryland Avenue
Rockville, MD. 20850
Telephone: (240) 314-8434
Email: pryan@rockvillemd.gov

All responses to questions/clarifications will be sent to all prospective Bidders in the form of a written addendum. Material changes, if any, to the scope of work, or bid procedures will also be transmitted by written addendum.

3.2 MINIMUM QUALIFICATION REQUIREMENTS

At a minimum, Bidders must provide written evidence (through references) of five (5) years prior experience with the scope of work as detailed in the plans and specifications.

The City shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform the work and reserves the right to request additional information. The right is reserved to reject any bid where an investigation of the evidence or information submitted by such Bidder does not satisfy the City that the Bidder is qualified to properly carry out the terms of the Bid Document.

3.3 CONTRACT TERM

This contract will begin within 10 working days from the date of issuance of a Purchase Order, which will serve as the Notice to Proceed. All work associated with this project must be completed within 300 calendar days after the Notice to Proceed has been issued. It is possible that the City may issue a Limited Notice to Proceed (LNTP) to allow for mobilization, coordination, field measuring, shop drawing review/approval, submission of work plan, and ordering of long-lead items.

3.4 NO EXCLUSIVE CONTRACT/ADDITIONAL SERVICES

Contractor agrees and understands that the contract shall not be construed as an exclusive arrangement and further agrees that the City may, at any time, secure similar or identical services at its sole option.

3.5 **EXCEPTIONS**

An exception is any condition, limitation, restriction, term, or other deviation from the requirements of the Invitation for Bids that is a condition of the bidder's bid or that the bidder expects to become part of a contract with the City. Bidders are strongly discouraged from taking exceptions to the requirements of the Invitation for Bids. Exceptions may result in the City declaring the bidder's bid to be non-responsive. Any exceptions taken must refer to the specific language of the Invitation for Bids to which the bidder objects and must be included with the bid on a separate page. The City shall be entitled to assume that the absence of any exceptions constitutes the bidder's willingness to comply with all requirements of all parts of the Invitation for Bids.

3.6 **COMPLETE INFORMATION REQUIRED ON BID FORM**

All bids must be submitted on the attached Bid Form with all sections completed. To be considered a valid bid, the bid form pages and required forms must be returned, properly completed, as outlined in the General Conditions.

3.7 **COOPERATIVE PROCUREMENT**

The Contractor may extend all of the terms, conditions, specifications, and unit or other prices of any award resulting from this solicitation to any and all other public bodies, subdivisions, school districts, community colleges, colleges, and universities. The City assumes no authority, liability, or obligation, on behalf of any other public entity that may use any contract resulting from this solicitation.

3.8 **LICENSE AND SUPPORT AGREEMENTS**

In the event a bidder or manufacturer requires an agreement to be signed the agreement must be returned with the bid for review prior to any subsequent award. The City reserves the right to refuse consideration of an agreement and may hold the bidder to any agreement entered into as a result of a purchase order being issued as a result of this IFB without prior knowledge that the bidder and/or manufacturer will require an additional document, contract or agreement to be executed.

3.9 **NOTICE TO PROCEED AND COMPLETION SCHEDULE**

The specified completion date and time shown herein below is to be strictly adhered to unless authorized or directed otherwise in writing by the City's Project Manager. The completion date, where specified, has an allowance for inclement weather and holidays. Time extensions for unusual conditions causing project delays not covered in these special provisions will be subject to the conditions covered under the GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS; however, no compensation above that indicated herein for specific items shall be paid to the Contractor for any delay, regardless of the source of delay.

The Contractor shall provide a bar-chart schedule at the Project Kick-Off Meeting or at such time as directed by the City Construction Manager, but not more than once per month or with any change order. In addition, the contractor shall verbally provide updates to the Project Inspector as requested.

3.10 **CONSTRUCTION WORK HOURS**

Work is permitted between 7:00 am to 5:00 pm, Monday through Friday except on adopted City Holidays. Working outside of these hours must first be approved in writing by the City. Work on any street, other than secondary residential (generally 26' in width) shall be limited to 9:00 am to 3:00 pm Monday through Friday. No work shall be permitted outside these hours unless written approval is obtained from the City Project Manager or his designee.

3.11 **CONTRACT DOCUMENTS**

In addition to the requirements of GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS, Item No. 40, in the case of discrepancies in the Contract Documents and need for interpretation, the documents shall be given precedence in the following order:

- Change Orders
- Addenda
- Special Provisions
- Technical Specifications
- Drawings
- General Conditions and Instructions to Bidders (City of Rockville)
- Standard Details by others
- City of Rockville Standard Details for Construction
- Applicable Standards listed below

Any questions, requests for information or revisions to the specifications must first be reviewed and approved by the City of Rockville.

3.12 **APPLICABLE STANDARDS**

As a minimum standard of quality workmanship, all work is to comply with the latest provisions and recommendation of the following documents in the following order of precedence. In the event of conflict, the City's determination shall govern.

- City of Rockville Standards and Details for Construction, dated January 1988.
- Current Montgomery County Department of Public Works and Transportation Design Standards
- Maryland Department of Transportation, State Highway Administration's (MDSHA) "Standard Specifications for Construction and Materials" dated May 2017 including all errata and addenda thereto and additions included in these special provisions.
- MDE, WMA and SCS 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control
- American Society for Testing and Materials, "ASTM Standards", latest edition.
- American Water Works Association Standards (AWWA Standards), latest edition
- [American Association of State Highway and Transportation Officials](#), "AASHTO Standards", latest edition
- American Concrete Institute (ACI) Standards, latest edition.
- US Access Board Americans with Disabilities Act (ADA)
- Washington Suburban Sanitary Commission Standard Specifications and Details for Construction
- The Code of Maryland Regulations (COMAR)
- NSF/ANSI 61
- Safe Drinking Water Act

3.13 **PROJECT KICK-OFF MEETING AND PRE-CONSTRUCTION MEETINGS**

Upon issuance of the Notice to Proceed, the City may arrange a project kick-off meeting with all appropriate City staff and the Contractor. This will be an on-site meeting to review the project requirements. The City will decide which City staff will attend. The Contractor shall arrange any pre-construction meetings required by associated permits. These pre-construction meetings shall be held on the project site between the Contractor, the design engineer's representative, and appropriate City staff, including the Project Inspector, Sediment Control Inspector, and Engineering Project Manager. In addition, the contractor shall invite the following agency representatives to the pre-construction meeting and shall provide at least four (4) business days' notice.

All subsequent notifications for inspection and coordination with the City and all other agencies are the responsibility of the Contractor.

3.14 **MOBILIZATION/DEMobilIZATION**

Mobilization shall include all activities and costs for transportation of personnel, equipment, and operating supplies to and from the site; establishment of offices, and other necessary facilities for the Contractor's operations at the site; premiums paid for performance and payment bonds, including coinsurance and reinsurance agreements as applicable; and other items as specified in this specification. Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not included in the contract from the site; including the disassembly, removal and site cleanup/repair of offices, buildings, and other facilities assembled on the site for this contract. This work includes mobilization and any additional mobilization and demobilization activities, and costs as required during the performance of the contract. The Contractor shall provide and pay all the cost for temporary utilities including electricity, telephone, and water. All temporary facilities shall be available for the duration of the project. The Contractor shall be responsible for compliance with code ordinances and requirements of local officials for temporary facilities, controls, and related health and safety requirements. It shall be the responsibility of the Contractor to provide all necessary electrical service. In the event electrical power will not be available, it shall be the Contractor's responsibility to provide any necessary generator to continue construction. The Contractor shall provide and pay all the cost for toilet facilities for all workmen, as required by local ordinances for complete and adequate sanitary arrangements. Sanitary facilities and the surrounding shall be always kept clean and neat. They shall be located on the project site as approved by the City.

The cost of mobilization shall be considered as incidental to the cost of the entire project. No separate bid item is provided.

3.15 **EMERGENCY CONTACT INFORMATION**

The Contractor shall provide the name(s) and phone number(s) of a representative(s) of the Contractor who can be reached in case of an emergency. This shall be submitted to the City prior to the start of construction.

3.16 **EMERGENCY INFORMATION**

The Contractor shall post information concerning emergency medical, fire, rescue, and hazardous waste phone numbers from which personnel on the site can obtain information if needed. The Contractor shall also list the name and number of at least two representatives of the Contractor who can be reached in case of an emergency. The representatives must be fluent in English. The emergency information shall be in a central position, so it is visible and accessible 24 hours a day. The emergency information shall be posted for the entire length of the Contract.

3.17 **PROJECT SIGNS**

Prior to the start of construction, the contractor shall provide and erect a project sign at a prominent location at the construction site. The signs shall be prepared in accordance with the instructions below and as shown on the construction plans:

- Submit 8.5"x11" or greater size scaled shop drawings or sketch indicating dimensions, layout, content, and materials for each sign, for approval by the Project Manager.
- Locations to be flagged and approved or otherwise verified with Project Manager.
- The sign shall be 4' x 8' in size, constructed of 3/4" exterior density overlaid plywood or equal, and shall have a smooth white finish.

- Lettering shall be black latex or adhesive vinyl firmly affixed to the plywood surface, and each letter shall be a minimum of 3" in height. Letters shall be legible graphic type, as approved by the Project Manager. If provided by Project Manager, a rendering of the project should be included on the sign.
- The sign shall be mounted on two 4" x 4" timber posts with adequate bolts and fittings to ensure proper stability. If unacceptable reflection or other viewing or safety issues are identified by the Project Manager, the sign's positioning shall be adjusted by the Contractor.
- The sign shall be posted at a proper location and erected at a height where the bottom of the sign is a minimum of 5' from the ground or as directed to permit public viewing.
- If applicable, the MDE decal shall be provided by the Maryland Department of the Environment.
- If peeling or damage occurs due to weather, construction activity or vandalism, it shall be the Contractor's responsibility to restore the sign to its original condition at no cost to the City.
- At the completion of the project, the Contractor shall remove the sign from the project site and restore the area to original condition.

Costs associated with project signs shall be incidental to the work and no specific payments will be made.

3.18 **PUBLIC UTILITIES**

Comply with MDSHA Specifications under Sections GP 5.05, and GP 7.17 regarding public utilities.

It shall be the Contractor's responsibility to cooperate to the fullest extent possible with the utility owners in their work of adjusting the existing utilities to suit the proposed construction under this contract. All utilities, unless provided for on the Engineering Drawings, shall be relocated or constructed by their respective owners.

The location of existing utilities shown on the plans and profiles are approximate only and it shall be the Contractor's responsibility to determine the exact location of the utilities prior to commencing work in all areas of possible conflict. All test pits must be completed in coordination with the City and the affected utility companies. The existence of utilities other than those shown on the plans is not known. If, during construction operations, the Contractor should encounter additional utilities, he shall immediately notify the City and take all necessary and proper steps to protect the continuance of service of such facilities.

The Contractor shall notify the utility owner and City when previously unknown or different utilities are encountered. The Contractor shall support and protect existing utilities whether shown on the plans at no additional cost to the City. The Contractor shall not receive compensation for the temporary relocation of or temporary installation of utilities that are constructed for the convenience of the Contractor.

In case of any damage to utilities by the Contractor, either above or below ground, the owner shall be immediately notified. The Contractor shall arrange for restoration of such utilities to a condition satisfactory to the utility company at the Contractor's entire cost and expense.

The Contractor shall take into consideration when preparing his bid, the costs associated with the coordination during construction with various utility companies for any relocation or installation by the utility companies which may be necessary in areas within, or adjacent to, the limits of his contract. No additional compensation or time extensions will be allowed the Contractor for work interruptions, changes in construction sequences, changes in methods of handling excavation and drainage, and changes in types of equipment used, made necessary by others performing work within, or adjacent to, the limits of this contract. The contract time as stated in this contract includes the time needed for utility adjustments and no extension of time will be granted for delays caused by utility adjustments.

All other expenses likely to be incurred by the Contractor as a result of working around and protecting utilities, as well as cooperating with the owners of same during the relocating of such facilities, will not be measured or compensated for under any stipulated pay item.

3.19 **CONTACTS**

The following utility companies and City departments may be affected by this project. It shall be the Contractor's responsibility to notify all utilities and/or City departments and coordinate his construction operations with them to avoid unnecessary delays.

- **City of Rockville**
Senior Construction Project Manager
Mr. Eric Grieshaber
240-314-8609

- **City of Rockville**
Parks and Facilities Development Coordinator
Mr. Mauricio Daza
240-314-8608

- **City of Rockville**
Lincoln Park Community Center Supervisor
Ms. Yvette Yeboah-Schools
240 -314-8783

- **City of Rockville Water and Sewer Utilities**
240-314-8567

- **MISS UTILITY**
1-800-257-7777 or 811
<http://www.missutility.net/>

Before interfering with any utility service, the Contractor shall notify the affected utility companies and affected property owners in advance and coordinate any required service interruption with the owner and City. For any water service shutdown, the Contractor must provide at least 21 calendar days' notice such that the City can provide proper notification.

The Contractor shall be responsible for contracting Miss Utility for the location of all utilities prior to the start of work.

3.20 **PROTECTION OF WORK, PROPERTY AND PERSONS**

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with this project. All necessary precautions shall be taken: to prevent injury to the Contractor's employees and other persons who may be affected by the project; to prevent damage to or loss of materials or equipment incorporated into the project; and to protect other property at or adjacent to the site including but not limited to trees, shrubs, lawns, walks, fences, pavements, roadways, utilities, structures, buildings, playgrounds and park facilities not designated for removal, relocation, or replacement in the course of construction; to provide warning signs as directed by the City for personnel and the public. Costs associated with this work are incidental to the work and no specific payments will be made.

3.21 **WEATHER PROTECTION/LIMITATIONS**

Weather Protection means the temporary protection of that Work adversely affected by moisture, wind, and cold by covering, enclosing, and/or heating.

This protection shall provide adequate working areas during the months of November through March as determined by the City and consistent with the construction schedule to permit the continuous progress of all Work necessary to maintain an orderly and efficient sequence of construction operations.

The Contractor shall furnish and install "Weather Protection" material and be responsible for all costs, including heating required to maintain a minimum of 40 degrees F. at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials, or the applicable conditions set forth in the Contract Documents with added regard to performance obligations of the Contractor.

Weather protection costs associated with this work are incidental to the project and no specific payments will be made. The City reserves the right to stop work if the weather does not meet specifications, manufacturers recommendations and industry standards and specification to complete the work scheduled daily.

3.22 SITE ACCESS AND RESTORATION OF SITE

Access to the site is by public streets and thoroughfares. After the completion of the project, all roads, driveways, parking lots, sidewalks, landscaping, fences, utilities, structures, buildings, lawns, and other facilities not designated for removal, relocation or replacement that are damaged by the Contractor's actions shall be restored to the same condition or better. Prior to any construction activities, it is the Contractor's responsibility to document any existing damage or conditions indicative of substandard facilities. Costs associated with this work shall be included with the appropriate Pay Item.

Access to parks, easements across private property and other City-owned property in wooded areas must be coordinated with the City and the private property owners prior to the Contractor entering the property. Due to the proximity of public park property, private property and natural resources, the Contractor shall exercise extreme care in their construction operations. All work must be kept within these limits and within the "Limits of Disturbance" as shown on the Engineering Drawings.

It should be noted that the nearby park will be open to the public during construction. The Contractor shall exercise prudence regarding site security, storage, staging, safety, worker identification/background and other matters that may impact the public. The Contractor must be sensitive to the community and adjacent property owners. The Contractor shall immediately advise the Engineer and/or the City Project Manager of any problems involving the community.

3.23 ACCESS TO ADJACENT PROPERTIES

Access must be maintained to all properties always abutting this project. All work affecting private properties is to be coordinated with the property owner by the Contractor. The Contractor shall always maintain access to private driveways unless specifically approved in advance by the City.

3.24 PRESERVATION AND RESTORATION OF PROPERTY, & MONUMENTS

The Contractor is to carefully examine the plans provided with the Engineering Drawings to ensure a clear understanding of the private property limits and work limits. The Contractor shall not enter upon private property for any purpose without first obtaining permission from the City and written permission from the property owner. The Contractor shall be responsible for the preservation of all public and private property, including but not limited to plants (trees, shrubs, and seasonal vegetation), lawns, walks, fences, pavements, roadways, utilities, structures, buildings, playgrounds, and park facilities not designated for removal, relocation, or replacement, along and adjacent to the work areas, and shall use every precaution necessary to prevent damage or injury thereto. The Contractor shall take suitable precaution to prevent damage to underground or overhead public utility structures and must protect carefully from disturbances or damages all land monuments and property markers until the Project Inspector has witnessed or

otherwise referenced their locations. All disturbed monuments and markers must be reset to their correct location by the Contractor at no additional compensation.

The Contractor shall be responsible for all damages or injury to public or private property of any character during the prosecution of the work, resulting from any act, omission, neglect or misconduct in his manner or method of executing said work satisfactorily, or due to the non-execution of said work, or at any time due to defective work or materials. When or where any direct or indirect damage or injury is done to public or private property or on account of any act, omission, neglect or misconduct in the execution of the work or in consequence of the non-execution thereof on the part of the Contractor, the Contractor must restore, at its own expense, such property to a condition similar or equal to rebuilding or otherwise restoring as may be directed by the City, or he shall make good such damage or injury in an acceptable manner. In case of the failure on the part of the Contractor to restore such property in a reasonable amount of time or make good such damage or injury the City may, upon 24 hours' notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary and the cost thereof will be deducted from any monies due, or which may become due the Contractor under this Contract. City crews or another Contractor may accomplish said work.

After the completion of the project, all plants (trees, shrubs, and seasonal vegetation), lawns, walks, fences, pavements, roadways, utilities, structures, buildings, playgrounds and park facilities and other facilities not designated for removal, relocation or replacement that are damaged by the Contractor's actions shall be restored to the same condition or better. Prior to any construction activities, it is the Contractor's responsibility to document any existing damage or conditions indicative of substandard facilities. The Contractor shall provide pre-project photographs or videotape of the project work areas to the DPW Project Inspector. Costs associated with this work are incidental to the work and no specific payments will be made.

All the requirements outlined above shall be considered incidental to this contract and no special compensation shall be paid.

3.25 **SITE CONDITIONS**

The Contractor shall visit the work site prior to performing the work to verify the existing conditions. See specification section PHOTOGRAPHIC DOCUMENTATION for requirements of documenting existing conditions.

3.26 **CONTRACTORS STAGING AND STORAGE**

The Contractor will establish temporary staging areas as approved by the City. Cleanup of each staging area shall occur daily. Contractor shall cover topsoil, stone, and aggregate stockpiles with tarps to prevent sedimentation of the street.

Submit a sketch (a marked up set of plans is acceptable) and brief description for approval by the City's Project Manager showing the location of equipment and materials, location of portable sanitary toilet, and means and methods to protect pedestrians and existing public facilities (including trees) within the area as shown on the plans. This plan may have to be approved by the City Forester, if any grassed or tree areas will be utilized.

There shall be no payment for this work. It shall be considered incidental to the contract.

3.27 **TEMPORARY UTILITIES**

The Contractor shall pay all fees, obtain necessary permits, and have meters installed for temporary utilities as may be required for the execution of this contract. As needed, the Contractor through direct local arrangements must obtain temporary electric service for the purpose of this contract with the electric company, PEPCO. The Contractor shall furnish and install all necessary temporary service drops, wiring,

connections, etc., necessary for temporary service required by the Contractor. All costs associated with any temporary electric service required by the Contractor are considered incidental to other pertinent pay items. This item shall not be measured for payment.

The Contractor shall, at the beginning of the project, provide suitable temporary sanitary toilet facilities on the premises, in accordance with the GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS. The City shall approve the location of the sanitary toilet.

3.28 **CONSTRUCTION STAKEOUT AND AS-BUILTS**

Construction Stakeout shall be in accordance with Section 107 of the MDSHA “Standard Specifications for Construction and Materials”, dated July 2018, with the following exceptions:

The Contractor shall be responsible for all construction stakeout. The Contractor shall complete project as shown on approved plans. The City will not provide any construction stakeout for this project. Contractors are to use benchmark and layout information as shown on the plans.

The Contractor shall provide as-built information. One set of redline as-builts shall be always maintained and kept on-site. Any deviations from approved plans shall be marked, in red, on the as-builts. As-built information shall consist of any deviation to the approved plan such as grading limits, slopes, types/length/height of restoration features, and any modifications to typical details. As-built requirements do not include any topographic survey.

Upon completion of project, submit as-builts for approval. Retainage shall not be released until as-builts are approved.

The City will provide an electronic CAD file of the layout information for the Contractor. The Contractor must complete an agreement for receipt of the electronic file.

3.29 **AERIAL ELECTRIC LINES**

The Contractor shall be aware that State law requires that a 10-foot radial clearance shall be maintained for all construction equipment and materials in relation to electric lines carrying 750 volts or more. Because the State law is more stringent than the Federal laws, the State law shall be considered the minimal distance.

3.30 **NOISE CONTROL MEASURES**

All work must comply with the noise ordinance requirements for Montgomery County. A copy of the ordinance enforced by the Department of Environmental Protection (DEP) is attached to these contract documents in Appendix J for observation and compliance. With City approval, the Contractor may request a waiver through Montgomery County. The Contractor is fully responsible to submit the request and comply with any conditions of the waiver approval. The Contractor shall consider the processing time of this request, which includes a public notice element, when scheduling their work.

3.31 **WATER POLLUTION CONTROL MEASURES**

The Contractor shall not discharge or permit discharge into the waters, canals, ditches, or drainage system any fuels, oil, bitumen, garbage, sewage, or other materials which may be harmful to fish, wildlife, or vegetation or that may be detrimental to outdoor recreation. The Contractor shall be responsible for investigation and complying with all applicable federal, state, and local laws and regulations governing pollution of water. All work under this Contract shall be performed in such a manner that objectionable conditions will not be created in waters through or adjacent to the project areas.

3.32 **AIR POLLUTION CONTROL MEASURES**

All fine-grained, loose materials hauled to or from this project shall be covered to prevent spillage and blowing. Material, which is not covered after notification by the City, will not be accepted for use on this project. This material will not be included in measurement for payment.

Burning will not be permitted.

3.33 **ENVIRONMENTAL PROTECTION MEASURES**

Impervious barriers, (i.e., plastic, metal drip pans, etc.) shall be placed under any compressors, generators, welding machines, etc., to prevent oils, solvents, organic compounds, or other contaminants from leaching into the soil. Any oils, solvents, organic compounds, or contaminants spilled on the site during the process of the work shall be immediately removed and cleaned up by the Contractor. Any earth contaminated by a spill shall also be removed and replaced with new certified clean material to the satisfaction of the City and the Maryland Department of the Environment (MDE). If the City has to remove the oils, solvents, organic compounds, contaminants, or earth, the City may deduct the costs of removal and clean up from the total contract amount owed the Contractor.

3.34 **EROSION AND SEDIMENT CONTROLS**

The Contractor is responsible for adhering to the City's laws and ordinances regarding sediment control. The Contractor shall be responsible for coordinating all work, and for notifying the City:

- Upon installation of all erosion and sediment control devices to schedule a “Notice to Proceed” inspection prior to commencing work.
- Prior to removing sediment control devices; and
- Upon completion of final grading, establishment of ground covers and approved land stabilization.
- During the progression of all work, the Contractor shall make periodic inspections and maintain sediment control devices, including cleaning and routine maintenance as directed or necessary, to ensure that the intended purpose is accomplished. Under no circumstances shall sediment be allowed to enter private properties, storm drains, or City waterways.

When directed in the field by the Project Inspector, the Contractor shall be required to make adjustments in location and/or increase or decrease quantities of sediment control measures and provide temporary stabilization measures.

All sediment control measures shall be installed and maintained as shown on the Contract Documents, City Notes in Section VII, approved plans and details per latest City of Rockville Standards, Maryland Department of the Environment’s 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control, in compliance with the MDE/WMA Notice of Intent (NOI) General Permit for construction activities, and as directed by the Project Inspector. Please refer to Maryland Department of Transportation, State Highway Administration’s Specifications entitled, “Standard Specifications for Construction and Material” dated May 2017, revisions thereof, or additions thereto. Comply with MSHA specifications section 308.02 Material and section 308.03 Construction.

Furnish and install temporary erosion and sediment controls. The Contractor is to protect the integrity of the erosion control measures installed. The erosion control measures shall be provided until such times as the temporary ground cover is sufficiently developed, and the Project Inspector gives written authorization to remove said measures. The Contractor shall comply with all local, state, and federal laws, ordinances, and regulations pertaining to erosion, sediment, and pollution control, including those promulgated by the State of Maryland, and shall indemnify and hold harmless the City from and against all claims, damages, losses, and expenses resulting from such work.

The Contractor shall always have an employee present on site who has met the requirements for certification of the Responsible Personnel training in erosion and sediment control according Maryland State Law. This employee shall have sufficient authority to install, maintain, adjust, or otherwise implement approved sediment control measures.

The Contractor shall take all measures to control erosion and sedimentation at construction site, including borrow and waste areas and temporary access roads, and at off-site areas especially vulnerable to damage from erosion and sedimentation. All erosion and sediment control measures will be subject to approval by the City. All erosion and sediment control measures shall be implemented prior to any construction occurring. All temporary erosion and sediment control measures shall be removed within thirty (30) days after completion of construction and establishment of permanent erosion control.

Work shall be scheduled so that areas subject to erosion are exposed for the shortest possible time. Only those trees, shrubs and grasses shall be removed that are necessary for construction as designated by the forest conservation plan and/or approved plans; those remaining shall be protected to preserve their aesthetic and erosion control values. Temporary on-site structures and buildings shall be located to preserve the existing landscape and to minimize erosion, including that from construction traffic. If practicable, work shall be scheduled in seasons when erosion is less of a hazard, particularly for sites with steep slopes and erodible soils.

Temporary protection shall be required for disturbed areas until final grading is completed, and permanent vegetation is established, and shall consist of planting temporary grass cover or other vegetation when feasible. Other short-term protection shall include covering disturbed areas, stockpiles, and topsoil piles with a mulch of hay, straw, or wood chips, stabilizing with netting, or covering with plastic sheets. Graded slopes and fills shall be limited to an angle and to lengths that will maintain stability and allow easy maintenance. Construction equipment shall not be operated in a way to make the land more susceptible to erosion, such as leaving tracks up and down slopes. Access roads shall be located and constructed to prevent erosion.

Controls for surface water runoff shall be constructed as early as possible to prevent the formation of gullies or rills. These controls shall be maintained during the entire construction period or until permanent storm drains/revetments are completed. Diversion channels or berms, slope drains, flow barriers, dikes, or other structures, which retard or spread water flow, shall control runoff. Compacted embankments, ditches, furrows, or temporary diversions across slopes shall be provided to intercept runoff before it reaches erodible areas. Diversions and drains shall be directed into stabilized areas where the discharge can be spread out and dissipated.

If unusually intense storms cause planned control measures to fail, prompt restoration and cleanup of sediment deposits shall be made, including damage to adjacent property. If construction is delayed or shut down, temporary cover of exposed and disturbed areas shall be provided.

3.35 **FOREST AND TREE CONSERVATION REQUIREMENTS**

The Contractor shall complete all forest and tree conservation requirements according to the approved contract documents:

- All forestry related work shall be under the direct supervision of someone who is both certified by the International Society of Arboriculture and registered in the State of Maryland as Licensed Tree Expert. Provide proof of both prior to on-site Forestry pre-construction meeting.
- Promptly replace any existing trees designated to remain that are damaged or destroyed during development.
- Perform all site preparation, including removal of pavements, structures, and inclusion of soil amendments, PRIOR to installing plantings.

- Maintain and monitor all tree plantings in accordance with the contract documents, for a period of two years from the date the plantings are inspected and approved by the City Forester. Such maintenance shall include when appropriate, but not necessarily be limited to:
- Watering, fertilizing and control of competing vegetation during the initial planting and through the two (2) year maintenance period as may be necessary or as dictated by the FTP Permit.
- Pruning, mulching, tightening and removal of guys and stakes within six (6) months, resetting of plants to proper grades or upright position, and furnishing and applying such sprays or other items necessary to thwart damage from insects and disease.
- Providing protection measures such as fencing and interpretive signs as necessary, to prevent destruction or degradation of the planting site.
- Eradicate, suppress, and control non-native invasive plant species, as approved by the City Forester, to maintain the health of the trees planted.
- Guarantee survival of 100% of landscape tree plantings and 85% of forest plantings under 2” caliper in good health and in flourishing condition of active growth for a minimum period of two years from the date that the plantings are inspected and approved by the City Forester.
- Replace, as soon as weather permits, any dead plantings to ensure compliance with the above minimum survival requirements; provided, however, that dead trees and plantings shall be removed immediately.

Special attention must be given the existing landscape features and special care taken to protect the natural surroundings. The roots of such trees or shrubbery will not be cut unnecessarily. The Contractor will be required to root prune the tree roots, which extend into grading limits and/or from trees intended to be left in an undamaged state or otherwise prevent damage to roots of trees. No road machinery of any description, which might throw off gas or smoke in such volume as to damage vegetation, shall be allowed to stand under such trees or shrubbery.

Any tree that in the opinion of the City, may be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or operations must be protected prior to the start of work by means acceptable to the City. Contractor must verify all saved trees prior to construction. Prior to commencing construction, all tree protection techniques must be approved by the City Forester’s office.

Any tree, or landscape features scarred or damaged by the Contractor's operations must be removed, correctively pruned, restored, or replaced as nearly as possible to the original conditions, as required by the Project Inspector and at the Contractor's expense. No ropes, cables or guys are to be fastened to or attached to any nearby trees for anchorage or in lieu of placing of dead men.

3.36 CARE OF WATER DURING CONSTRUCTION

The Contractor shall furnish, install, test, operate, monitor, and maintain dewatering systems of sufficient scope, size, and capacity to control water flow into excavations and permit construction to proceed on dry, stable sub-grades. Dewatering operations shall be maintained to ensure erosion control, stability of excavations and constructed slopes, prevent excavation from flooding, and prevent damage to sub-grades and permanent structures.

The Contractor shall provide a suitable watercourse (i.e., fire hose, etc.) to direct the flow of water to have minimal impact upon the environment, private property, roadway, and pedestrian traffic. Any damage caused by discharge of water is the responsibility of the Contractor. The Contractor shall not discharge any water so as to cause sediment to reach any storm drain inlet or water course.

The Contractor shall provide shoring, bracing and cofferdams during construction as necessary to protect personnel, structures, and equipment. No special payment will be made for shoring, bracing or cofferdams. The Contractor is responsible for ensuring the safety of his employees and sub-contractors,

and for complying with all applicable provisions of Maryland Occupational Safety and Health Administration.

The Contractor shall protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations. The Contractor shall provide an adequate system to lower and control water to permit excavation, construction of structures, and placement of fill materials on dry sub-grades. The Contractor shall install sufficient dewatering equipment to drain water-bearing strata above and below bottom of ponds and other excavations.

Work areas shall be dewatered in a manner that avoids endangering public health, property, and portions of work under construction or completed. The Contractor shall provide sumps, sedimentation tanks, dewatering basins or non-woven dewatering bags as required by the Project Inspector. Standby equipment shall be provided on-site, installed, and available for immediate operation, to maintain dewatering on continuous basis if any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, the Contractor shall restore damaged structures and foundation soils at no additional expense to the City. The Contractor shall remove all dewatering systems from project site on completion of dewatering.

All pumps and generators utilized for bypass and dewatering operations shall be “quiet” rated with a full-load noise level of less than 63 dB at 23 feet or as approved by the Construction Manager. The City may require additional measures, such as the use of straw bale baffle walls, for work approved outside of normal working hours.

Care of water during construction shall be considered incidental to the appropriate pay item.

3.37 **DAILY CLEAN-UP**

The Contractor shall always keep the work areas clean and orderly and shall promptly remove all waste and rubbish. The daily debris shall be collected in covered containers and disposed of in proper fashion. All directions from authorized public officials having jurisdiction over health and safety shall be obeyed. The site will be “broom cleaned” at the end of each working shift. Open excavations may not be left unattended. Site must be secured each night.

The Contractor shall clean every street upon which any work has been performed under this contract daily. The cleanup shall be accomplished by use of a vacuum assisted sweeper truck, manual (push) broom sweeping, or other method as directed and or approved by the Project Inspector. Under no circumstance shall the contractor use compressed air or jet water sprays for cleanup purposes.

3.38 **SUBMITTALS OF MATERIALS**

The Contractor shall submit two (2) copies of all delivery tickets, shop drawings, inspection, testing or certification reports, obtained approvals or permits, and other submittals required for this project to the City Project Manager.

Submittals shall be submitted electronically unless otherwise indicated in the specifications. See the applicable specification section for submittal requirements in association with Project Close-out documents.

3.39 **INSPECTION AND CERTIFICATION**

All materials shall be subject to inspection or test by the City prior to installation and no previous certification or inspection shall bar rejection if the material is found to be inferior, damaged, or defective. The certification requirements may be waived for any or all of the materials at the discretion of the City.

3.40 **INSPECTION AND REPAIRS**

The City reserves the right to inspect all work either in progress or completed. All work shall be inspected prior to backfill. Any portion of the work that is backfilled prior to inspection shall be uncovered at the contractor's expense to enable the Project Inspector to adequately inspect. If the work is found to be unsatisfactory or in conflict with the provisions in these specifications the City may hold back payment for work completed. The City's Recreation and Parks Project Manager will give written notification of the unsatisfactory work to the contractor. The Contractor shall have no more than 10 days to correct the condition.

3.41 **CONTRACTOR'S EMPLOYEES**

Contractor's employees are to present a professional appearance, shall be neat, clean, well groomed, courteous, and conduct themselves in a respectable manner while performing duties and while on City and/or private property.

The Contractor's employees shall conduct themselves in a professional manner. They shall minimize their impacts to the surrounding properties, including when they arrive to the site, take breaks, eat lunch, and depart the site. Contractor's employees shall be respectful and polite to inquiries from residents or individuals not associated with the project. Any inquiries beyond basic information should be referred to the City. The Contractor shall inform the City of any inquiries that occur that is beyond providing basic information.

The Contractor shall provide the City with a listing of all personnel assigned to the contract. In addition, the Contractor shall provide a listing of names, and emergency telephone numbers of supervisory personnel assigned to the contract. It will be the Contractor's responsibility to keep this list up to date.

The City reserves the right to request that the contractor remove any employee if it is determined that services are not being performed in accordance with the terms and conditions of the contract.

3.42 **SUB-CONTRACTORS**

The Contractor shall have the right to sub-contract but shall be fully responsible and cannot be relieved of any liability under this contract on account of any sub-contractor. All sub-contracting must have prior written City approval. The City reserves the right to approve or reject any sub-contractor.

Nothing contained in the contract documents shall create any contractual relationship between the owner and any subcontractor or sub-subcontractor. Vendors who will subcontract the delivery, installation, or any other portion of the work herein described will submit, prior to construction, the following information:

A description of the items to be subcontracted, and the subcontractor's name, address, and telephone number. During the life of the contract, the Contractor shall provide the name, nature, and extent of all subcontractors.

Subcontractors shall be considered an agent of the Contractor, who shall be held fully accountable for all the subcontractor services, labor, and materials relative to the contract.

3.43 **CHANGES IN WORK**

If an event arises which the contractor considers may result in the addition, deletion or modification to the contract, the Contractor shall notify the City prior to commencing work under that change.

All such changes, or additional work must be authorized in writing by the City Project Manager prior to starting such work.

3.44 **INVOICES AND PAYMENT**

The Contractor shall submit a detailed invoice to the City’s Project Manager, for payment at the end of each month for all work completed and accepted by the City during that month. The Contractor shall attach to each monthly invoice, all required documentation of testing results.

3.45 **CONDITIONS FOR APPROVAL FOR ACCESS TO CITY OF ROCKVILLE FACILITIES**

All Contractor and subcontractor employees that will work on the job site or who have access to sensitive information are to have initial background checks performed by the City to assure the City information used and generated by this project will not end up in unauthorized hands. The initial background checks are valid for one year and subject to annual renewal for employees continuing to work on the project. The Contractor shall allow 4 weeks, from date of submission of personnel information or from the date of Notice to Proceed, whichever is later, for the City to perform background checks.

“Sensitive” documents and information are defined as those that could reasonably be used to aid in or plan for contaminating or damaging the City’s system or City customers. Examples of such documents include, but are not limited to:

- plans/blueprints, as-built drawings, or contract documents of City facilities
- plans/blueprints, as-built drawings, contract documents, or 200-foot sheets of the water distribution system or the wastewater collection system

For any document or information to be provided to the Contractor where there is uncertainty whether it is “sensitive”, the City shall have sole discretion to make such determination.

The contractor shall issue contractor’s project participants photo identification cards. Identification cards must be always worn while on any City property. Contractor employees found on-site without proper identification will be immediately removed from City property. The design of identification cards shall be reviewed and approved by the City prior to issuance. Identification cards for employees who are no longer associated with the project, for any reason, will be immediately recovered by the Contractor. The Contractor is responsible to control and inventory all identification cards issued so those cards are not obtained or used by unauthorized individuals.

3.46 **TECHNICAL CONTACT/PROJECT MANAGER**

Eric Grieshaber, Senior Construction Project Manager
Rockville City Hall
Recreation & Parks Department – Capital Projects
111 Maryland Avenue
Rockville, MD 20850
Telephone 240-314-8609
Email: egrieshaber@rockvillemd.gov

INVITATION FOR BIDS #18-24
LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS
SECTION IV: TECHNICAL SPECIFICATIONS/SCOPE OF WORK



**Invitation to Bid Number 18-24
Project Manual & Technical
Specifications**

**Procurement Division
City of Rockville, City Hall
111 Maryland Avenue
Rockville, Maryland 20850**

**LINCOLN PARK COMMUNITY
CENTER - RENOVATION AND ADA
IMPROVEMENTS PROJECT**

**Lincoln Park Community Center
357 Frederick Lane
Rockville, MD 20850**

**LITTLE, Diversified Architectural Consulting
1753 Pinnacle Drive, Ste 1100
McLean, Virginia 22102
Project No. 1916A**

PROJECT MANUAL

Lincoln Park Community Center Rockville, Maryland

March 20, 2024

Bid Submission

Owner

City of Rockville
111 Maryland Avenue
Rockville, Maryland 20850
Telephone: 240-314-5000

Architect

LITTLE, Diversified Architectural Consulting
1753 Pinnacle Drive, Suite 1100
McLean, Virginia 22102
Contact: Gavin Myers
Telephone: 703-908-4505
Electronic Mail: gmyers@littleonline.com

Structural Engineer

Cagley & Associates
6141 Executive Boulevard
Rockville, Maryland 20852
Telephone: 301-881-9050

Fire Protection, Mechanical, Electrical and Plumbing Engineers

Salas O'Brien
6700 Rockledge Drive, Suite 301
Bethesda, Maryland 20817
Telephone: 301-216-2871

Hughes Group Architects Project Number: 1916A

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PROFESSIONAL SEALS PAGE

The specification sections listed below were prepared by or under the direct supervision of the Architect:

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1753 Pinnacle Drive, Suite 1100
McLean, Virginia 22102

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SEAL



I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No.: 15880 Expiration Date: 07/23/2025

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PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 25 00 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
 - 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
 - 3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:
 - 1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
 - 2. Submittal Format: Submit three copies of each written Procurement Substitution Request, using form bound in Project Manual.
 - 3. Submittal Format: Submit Procurement Substitution Request, using format provided on Project Web site.
 - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
 - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
 - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - 2) Copies of current, independent third-party test data of salient product or system characteristics.
 - 3) Samples where applicable or when requested by Architect.
 - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.

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- 7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.
 - c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
 - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.
- B. Architect's Action:
 - 1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.
- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT

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PROCUREMENT SUBSTITUTION REQUEST FORM

PROJECT: _____ **(Before Contract Award)**

TO: _____

NO. _____ DATE: _____

Contractor hereby requests acceptance of the following product or system as a substitution in accordance with provisions of Division 01 Section "Substitution Procedures:"

1. SPECIFIED PRODUCT OR SYSTEM

Substitution request for: _____

Specification Section No.: _____ Article/ Paragraph: _____

2. REASON FOR SUBSTITUTION REQUEST

SPECIFIED PRODUCT . . .

PROPOSED PRODUCT . . .

- | | |
|--|--|
| <input type="checkbox"/> Is no longer available. | <input type="checkbox"/> Will reduce construction time |
| <input type="checkbox"/> Is unable to meet project schedule. | <input type="checkbox"/> Will result in cost savings of \$ _____ to Project |
| <input type="checkbox"/> Is unsuitable for the designated application. | <input type="checkbox"/> Is for supplier's convenience |
| <input type="checkbox"/> Cannot interface with adjacent materials. | <input type="checkbox"/> Is for subcontractor's convenience |
| <input type="checkbox"/> Is not compatible with adjacent materials. | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Cannot provide the specified warranty. | _____ |
| <input type="checkbox"/> Cannot be constructed as indicated | |
| <input type="checkbox"/> Cannot be obtained due to one or more of the following: | |
| <input type="checkbox"/> Strike | <input type="checkbox"/> Bankruptcy of manufacturer or supplier |
| <input type="checkbox"/> Lockout | <input type="checkbox"/> Similar occurrence (explain below) |

3. SUPPORTING DATA

- Drawings, specifications, product data, performance data, test data, and any other necessary information to facilitate review of the Substitution Request are attached.
- Sample is attached. Sample will be sent if requested.

4. QUALITY COMPARISON: Provide all necessary side-by-side comparative data as required to facilitate review of Substitution Request:

| | SPECIFIED PRODUCT | PROPOSED PRODUCT |
|---------------|-------------------|------------------|
| Manufacturer: | _____ | _____ |
| Name / Brand: | _____ | _____ |
| Catalog No.: | _____ | _____ |
| Vendor: | _____ | _____ |
| Variations: | _____ | _____ |

(Add Additional Sheets If Necessary)

Local Distributor or Supplier: _____

Maintenance Service Available: Yes No

Spare Parts Source: _____

Warranty: Yes No _____ Years

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5. PREVIOUS INSTALLATIONS

Identification of at least three similar projects on which proposed substitution was used:

PROJECT #1: _____
Address: _____
Architect: _____
Owner: _____
Contractor: _____
Date Installed: _____

PROJECT #2: _____
Address: _____
Architect: _____
Owner: _____
Contractor: _____
Date Installed: _____

PROJECT #3: _____
Address: _____
Architect: _____
Owner: _____
Contractor: _____
Date Installed: _____

6. EFFECT OF SUBSTITUTION

Proposed substitution affects other work or trades: No Yes (if Yes, explain)

Proposed substitution requires dimensional revisions or redesign of architectural, structural, M-E-P, life safety, or other work: No Yes (if Yes, attach data explaining revisions)

7. STATEMENT OF CONFORMANCE OF REQUEST TO CONTRACT REQUIREMENTS

Contractor and Subcontractor have investigated the proposed substitution and hereby represent that:

- A. They have personally investigated the proposed substitution and believe that it is equal to or superior in all respects to specified product, except as stated above;
- B. The proposed substitution is in compliance with applicable codes and ordinances;
- C. The proposed substitution will provide same warranty as specified for specified product;
- D. They will coordinate the incorporation of the proposed substitution into the Work, and will include modifications to the Work as required to fully integrate the substitution;
- E. They have included complete cost data and implications of the substitution (attached);
- F. They will pay any redesign fees incurred by the Architect or any of the Architect's consultants, and any special inspection costs incurred by the Owner, caused by the use of this product;
- G. They waive all future claims for added cost or time to the Contract related to the substitution, or that become known after substitution is accepted.
- H. The Architect's approval, if granted, will be based upon reliance upon data submitted and the opinion, knowledge, information, and belief of the Architect at the time decision is rendered and Addendum is issued; and that Architect's approval therefore is interim in nature and subject to reevaluation and reconsideration as additional data, materials, workmanship, and coordination with other work are observed and reviewed.

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Contractor: _____
(Name of Contractor)

Date: _____ By: _____

Subcontractor: _____
(Name of Subcontractor)

Date: _____ By: _____

Note: Unresponsive or incomplete requests will be rejected and returned without review.

8. ARCHITECT'S REVIEW AND ACTION

- Substitution is accepted.
- Substitution is accepted, with the following comments: _____

- Resubmit Substitution Request:
 - Provide more information in the following areas: _____

- Provide proposal indicating amount of savings / credit to Owner
- Bidding Contractor shall sign Bidder's Statement of Conformance
- Bidding Subcontractor shall sign Bidder's Statement of Conformance

- Substitution is not accepted:
 - Substitution Request received too late.
 - Substitution Request received directly from subcontractor or supplier.
 - Substitution Request not submitted in accordance with requirements.
 - Substitution Request Form is not properly executed.
 - Substitution Request does not indicate what item is being proposed.
 - Insufficient information submitted to facilitate proper evaluation.
 - Proposed product does not appear to comply with specified requirements.
 - Proposed product will require substantial revisions to Contract Documents.

By: _____ Date: _____

Architect has relied upon the information provided by the Contractor, and makes no claim as to the accuracy, completeness, or validity of such information. If an accepted substitution is later found to be not in compliance with the Contract Documents, Contractor shall provide the specified product.

END OF FORM

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DOCUMENT 00 31 26

EXISTING HAZARDOUS MATERIAL INFORMATION

1.1 EXISTING HAZARDOUS MATERIAL INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
 - 1. Architect is not responsible or involved in any aspect of abatement of hazardous materials. Abatement is handled by specialty consultant retained by others.
- B. An existing asbestos report for Project, will be prepared and made available.
- C. Refer to Section 01 21 00 "Allowances."

END OF DOCUMENT

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Work performed by Owner.
 - 4. Owner-furnished/Contractor-installed (OFICI) products.
 - 5. Owner-furnished/Owner-installed (OFOI) products.
 - 6. Contractor's use of site and premises.
 - 7. Coordination with occupants.
 - 8. Work restrictions.
 - 9. Specification and Drawing conventions.

1.2 PROJECT INFORMATION

- A. Project Identification: Lincoln Park Community Center.
 - 1. Project Location: 357 Frederick Avenue; Rockville, Maryland 20850.
- B. Owner: City of Rockville.
- C. Architect: Little.
- D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:
 - 1. Refer to Title Page.
- E. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
 - 1. See Section 01 31 00 "Project Management and Coordination." for requirements for using web-based Project software.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
 - 1. Interior renovation of approximately 6,000 square feet of existing 11,000 square feet building, including finishes, restroom upgrades, new exterior windows and existing exterior walls, and other Work indicated in the Contract Documents.
- B. Type of Contract:
 - 1. Project will be constructed under a single prime contract.

1.4 WORK PERFORMED BY OWNER

- A. Cooperate fully with Owner, so work may be carried out smoothly, without interfering with or delaying Work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1.5 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFICI) PRODUCTS

- A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:
 - 1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
 - 2. Provide for delivery of Owner-furnished products to Project site.
 - 3. Upon delivery, inspect, with Contractor present, delivered items.
 - a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
 - 4. Obtain manufacturer's inspections, service, and warranties.
 - 5. Inform Contractor of earliest available delivery date for Owner-furnished products.

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- B. Contractor's Responsibilities: The Work includes the following, as applicable:
 - 1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
 - 2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
 - 3. Receive, unload, handle, store, protect, and install Owner-furnished products.
 - 4. Make building services connections for Owner-furnished products.
 - 5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
 - 6. Repair or replace Owner-furnished products damaged following receipt.
- 1.6 OWNER-FURNISHED/OWNER-INSTALLED (OFOI) PRODUCTS
- A. The Owner will furnish and install products indicated.
- 1.7 CONTRACTOR'S USE OF SITE AND PREMISES
- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
 - B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
 - D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.
- 1.8 COORDINATION WITH OCCUPANTS
- A. Full Owner Occupancy: Owner will occupy Project site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.
- 1.9 WORK RESTRICTIONS
- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
 - B. On-Site Work Hours: Limit work to between 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
 - 1. Weekend Hours: Coordinate with Owner.
 - 2. Early Morning Hours: Coordinate with Owner.
 - 3. Work in Existing Building: Coordinate with Owner.
 - 4. Hours for Utility Shutdowns: Coordinate with Owner.
 - 5. Hours for Noisy Activities: Coordinate with Owner.

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- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
 - D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
 - E. Wind-Borne Dust Control
 - 1. Submit narrative that describes measures proposed for the control of wind-borne dust and debris during construction operations, including during periods of work activity and during non-working hours. Comply with the following:
 - a. Federal regulations including those of the Environmental Protection Agency.
 - b. City and county codes and regulations.
 - c. Utilize water trucks on site available throughout the day during site grading and excavation to keep soil damp enough to prevent PM10 levels raised by activities associated with project construction.
 - d. Wet down areas to be graded or that are being graded or excavated during late morning and after work is completed for the day.
 - F. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances on Project site and on Owner's property is not permitted.
 - G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
 - H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.
- 1.10 SPECIFICATION AND DRAWING CONVENTIONS
- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
 - B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
 - C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
 - D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.

1.2 DEFINITIONS

- A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.

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3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1 (Bid Item 13.1): Provide a lump sum allowance of \$15,000 for Hazardous Material removal.
- B. Allowance No. 2 (Bid Item 13.2): Provide a lump sum allowance of \$25,000 to upgrade/update the entire Fire Alarm System.
- C. Allowance No. 3 (Bid Item 13.3): Provide a lump sum allowance of \$15,000 to furnish and install a secondary mini-split HVAC system in the new Fitness Room (approximately 625SF in area with 10-ft high ceilings) to provide supplemental climate control.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.
- C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Acoustical ceiling panels.
 - 1. Base Bid: Drop in type.
 - 2. Alternate: Tegular type.

END OF SECTION

ALTERNATES
01 23 00 - 1

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation in PDF electronic format identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form provided in Project Manual.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - 3. Any substitution request made that is not on required form, is not completely filled in, or does not provide required backup documentation will be rejected without review.

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4. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven business days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 business days of receipt of request, or seven business days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
- 1.4 QUALITY ASSURANCE
 - A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.
- 1.5 PROCEDURES
 - A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.
- 1.6 SUBSTITUTIONS
 - A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

SUBSTITUTION PROCEDURES

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SUBSTITUTION REQUEST FORM

PROJECT: _____ (After Contract Award)
TO: _____
NO. _____ DATE: _____

Contractor hereby requests acceptance of the following product or system as a substitution in accordance with provisions of Division 01 Section "Substitution Procedures:"

1. SPECIFIED PRODUCT OR SYSTEM

Substitution request for: _____

Specification Section No.: _____ Article/ Paragraph: _____

2. REASON FOR SUBSTITUTION REQUEST

SPECIFIED PRODUCT . . .

PROPOSED PRODUCT . . .

- | | |
|--|---|
| <input type="checkbox"/> Is no longer available. | <input type="checkbox"/> Will reduce construction time |
| <input type="checkbox"/> Is unable to meet project schedule. | <input type="checkbox"/> Will result in cost savings of \$ _____ to Project |
| <input type="checkbox"/> Is unsuitable for the designated application. | <input type="checkbox"/> Is for supplier's convenience |
| <input type="checkbox"/> Cannot interface with adjacent materials. | <input type="checkbox"/> Is for subcontractor's convenience |
| <input type="checkbox"/> Is not compatible with adjacent materials. | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Cannot provide the specified warranty. | |
| <input type="checkbox"/> Cannot be constructed as indicated | |
| <input type="checkbox"/> Cannot be obtained due to one or more of the following: | |
| <input type="checkbox"/> Strike | <input type="checkbox"/> Bankruptcy of manufacturer or supplier |
| <input type="checkbox"/> Lockout | <input type="checkbox"/> Similar occurrence (explain below) |

3. SUPPORTING DATA

- Drawings, specifications, product data, performance data, test data, and any other necessary information to facilitate review of the Substitution Request are attached.
- Sample is attached. Sample will be sent if requested.

4. QUALITY COMPARISON: Provide all necessary side-by-side comparative data as required to facilitate review of Substitution Request:

| | SPECIFIED PRODUCT | PROPOSED PRODUCT |
|---------------|-------------------|------------------|
| Manufacturer: | _____ | _____ |
| Name / Brand: | _____ | _____ |
| Catalog No.: | _____ | _____ |
| Vendor: | _____ | _____ |
| Variations: | _____ | _____ |

(Add Additional Sheets If Necessary)

Local Distributor or Supplier: _____

Maintenance Service Available: Yes No

Spare Parts Source: _____

Warranty: Yes No _____ Years

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5. PREVIOUS INSTALLATIONS

Identification of at least three similar projects on which proposed substitution was used:

PROJECT #1: _____
Address: _____
Architect: _____
Owner: _____
Contractor: _____
Date Installed: _____

PROJECT #2: _____
Address: _____
Architect: _____
Owner: _____
Contractor: _____
Date Installed: _____

PROJECT #3: _____
Address: _____
Architect: _____
Owner: _____
Contractor: _____
Date Installed: _____

6. EFFECT OF SUBSTITUTION

Proposed substitution affects other work or trades: No Yes (if Yes, explain)

Proposed substitution requires dimensional revisions or redesign of architectural, structural, M-E-P, life safety, or other work:
 No Yes (if Yes, attach data explaining revisions)

7. STATEMENT OF CONFORMANCE OF REQUEST TO CONTRACT REQUIREMENTS

Contractor and Subcontractor have investigated the proposed substitution and hereby represent that:

- A. They have personally investigated the proposed substitution and believe that it is equal to or superior in all respects to specified product, except as stated above;
- B. The proposed substitution is in compliance with applicable codes and ordinances;
- C. The proposed substitution will provide same warranty as specified for specified product;
- D. They will coordinate the incorporation of the proposed substitution into the Work, and will include modifications to the Work as required to fully integrate the substitution;
- E. They have included complete cost data and implications of the substitution (attached);
- F. They will pay any redesign fees incurred by the Architect or any of the Architect's consultants, and any special inspection costs incurred by the Owner, caused by the use of this product;
- G. They waive all future claims for added cost or time to the Contract related to the substitution, or that become known after substitution is accepted.
- H. The Architect's approval, if granted, will be based upon reliance upon data submitted and the opinion, knowledge, information, and belief of the Architect at the time decision is rendered and Addendum is issued; and that Architect's approval therefore is interim in nature and subject to reevaluation and reconsideration as additional data, materials, workmanship, and coordination with other work are observed and reviewed.

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Contractor: _____
(Name of Contractor)

Date: _____ By: _____

Subcontractor: _____
(Name of Subcontractor)

Date: _____ By: _____

Note: Unresponsive or incomplete requests will be rejected and returned without review.

8. ARCHITECT'S REVIEW AND ACTION

- Substitution is accepted.
- Substitution is accepted, with the following comments: _____

- Resubmit Substitution Request:
 - Provide more information in the following areas: _____

- Provide proposal indicating amount of savings / credit to Owner
- Bidding Contractor shall sign Bidder's Statement of Conformance
- Bidding Subcontractor shall sign Bidder's Statement of Conformance

- Substitution is not accepted:
 - Substitution Request received too late.
 - Substitution Request received directly from subcontractor or supplier.
 - Substitution Request not submitted in accordance with requirements.
 - Substitution Request Form is not properly executed.
 - Substitution Request does not indicate what item is being proposed.
 - Insufficient information submitted to facilitate proper evaluation.
 - Proposed product does not appear to comply with specified requirements.
 - Proposed product will require substantial revisions to Contract Documents.

By: _____ Date: _____

Architect has relied upon the information provided by the Contractor, and makes no claim as to the accuracy, completeness, or validity of such information. If an accepted substitution is later found to be not in compliance with the Contract Documents, Contractor shall provide the specified product.

9. OWNER'S REVIEW AND ACTION

- Substitution is accepted; Architect to prepare Change Order.
- Substitution is not accepted.
- Owner will pay Architect directly for redesign fees.
- Include Architect's Additional Service fee for implementing the substitution in the Change Order.

By: _____ Date: _____
(Owner/Owner's Representative)

END OF FORM

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Within 7 days after submittal of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - 2. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 3. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 5. Include costs of labor and supervision directly attributable to the change.
 - 6. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 7. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 8. Proposal Request Form: Use form acceptable to Architect.
- C. Do not proceed with changes until receipt of written approval by Architect and Owner.

1.4 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

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- B. Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Owner will issue a Change Order for signatures of Architect, Owner, and Contractor on.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

- 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

- 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Contractor shall submit a preliminary SOV with their initial construction schedule for review by Owner and Architect.
1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Owner's name.
 - c. Owner's Project number.
 - d. Name of Architect.
 - e. Architect's Project number.
 - f. Contractor's name and address.
 - g. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 5. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
 6. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 7. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.

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- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.

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10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 01 77 00 "Closeout Procedures."
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Certification of completion of final punch list items.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 4. Updated final statement, accounting for final changes to the Contract Sum.
 5. AIA Document G706.
 6. AIA Document G706A.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.
 10. Proof that taxes, fees, and similar obligations are paid.
 11. Waivers and releases.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Web-based Project management software package.
 - 6. Project meetings.

1.2 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in built facility. Keep list current at all times.

1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.

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6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - e. Indicate required installation sequences.
 - f. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Process: Prepare coordination drawings in the following manner:
1. Schedule submittal and review of Fire Sprinkler, Plumbing, HVAC, and Electrical Shop Drawings to make required changes prior to preparation of coordination drawings.
 2. Commence routing of coordination drawing files with HVAC Installer, who will provide drawing plan files denoting approved ductwork. HVAC Installer will locate ductwork and piping on a single layer, using orange color. Forward drawings to Plumbing Installer.
 3. Plumbing Installer will locate plumbing and equipment on a single layer, using blue color.
 4. Fire Sprinkler Installer will locate piping and equipment, using red color. Fire Sprinkler Installer shall forward drawing files to Electrical Installer.
 5. Electrical Installer will indicate service and feeder conduit runs and equipment in green color. Electrical Installer shall forward drawing files to Communications and Electronic Safety and Security Installer.
 6. Communications and Electronic Safety and Security Installer will indicate cable trays and cabling runs and equipment in purple color. Communications and Electronic Safety and Security Installer shall forward completed drawing files to Contractor.
 7. Contractor shall perform the final coordination review. As each coordination drawing is completed, Contractor will meet with Architect to review and resolve conflicts on the coordination drawings.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format:
 - a. Same digital data software program, version, and operating system as original Drawings.
 2. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
 3. BIM File Incorporation: Develop and incorporate coordination drawing files into BIM established for Project.
 - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
 4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

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- b. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.6 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Owner name.
 3. Owner's Project number.
 4. Name of Architect.
 5. Architect's Project number.
 6. Date.
 7. Name of Contractor.
 8. RFI number, numbered sequentially.
 9. RFI subject.
 10. Specification Section number and title and related paragraphs, as appropriate.
 11. Drawing number and detail references, as appropriate.
 12. Field dimensions and conditions, as appropriate.
 13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 14. Contractor's signature.
 15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
 1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
 1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.

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4. RFI number, including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three days if Contractor disagrees with response.

1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM] model will be provided by Architect for Contractor's use during construction, .

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
 - a. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect] .
4. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.

- B. Web-Based Project Management Software Package: Use Architect's web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.

- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of seven days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Critical work sequencing and long lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Use of web-based Project software.

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- g. Procedures for processing field decisions and Change Orders.
 - h. Procedures for RFIs.
 - i. Procedures for testing and inspecting.
 - j. Procedures for processing Applications for Payment.
 - k. Distribution of the Contract Documents.
 - l. Submittal procedures.
 - m. Preparation of Record Documents.
 - n. Use of the premises.
 - o. Work restrictions.
 - p. Working hours.
 - q. Owner's occupancy requirements.
 - r. Responsibility for temporary facilities and controls.
 - s. Procedures for moisture and mold control.
 - t. Procedures for disruptions and shutdowns.
 - u. Construction waste management and recycling.
 - v. Parking availability.
 - w. Office, work, and storage areas.
 - x. Equipment deliveries and priorities.
 - y. First aid.
 - z. Security.
 - aa. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

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5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - j. Submittal procedures.
 - k. Owner's partial occupancy requirements.
 - l. Installation of Owner's furniture, fixtures, and equipment.
 - m. Responsibility for removing temporary facilities and controls.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.

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- 15) Status of Proposal Requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 1. Contractor's Construction Schedule.
 2. Daily construction reports.
 3. Material location reports.
 4. Site condition reports.
 5. Unusual event reports.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 2. Predecessor Activity: An activity that precedes another activity in the network.
 3. Successor Activity: An activity that follows another activity in the network.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 1. Working electronic copy of schedule file.
 2. PDF file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Weekly Reports: Submit brief description of work achieved that week with four photos. Note weather Conditions.
- F. Material Location Reports: Submit location report of materials stored off-site at monthly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Unusual Event Reports: Submit at time of unusual event.
- I. Qualification Data: For scheduling consultant.

1.4 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including work stages.
 4. Review delivery dates for Owner-furnished products.
 5. Review schedule for work of Owner's separate contracts.
 6. Review submittal requirements and procedures.
 7. Review time required for review of submittals and resubmittals.
 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 9. Review time required for Project closeout and Owner startup procedures.
 10. Review and finalize list of construction activities to be included in schedule.
 11. Review procedures for updating schedule.

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1.5 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
 - a. Securing of approvals and permits required for performance of the Work.
 - b. Temporary facilities.
 - c. Construction of mock-ups, prototypes and samples.
 - d. Owner interfaces and furnishing of items.
 - e. Interfaces with Separate Contracts.
 - f. Regulatory agency approvals.
 - g. Punch list.
 - 3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 4. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 - 5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 - 6. Commissioning Time: Include no fewer than 15 days for commissioning.
 - 7. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 8. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Use-of-premises restrictions.
 - e. Seasonal variations.
 - f. Environmental control.
 - 2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.

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- h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
 - m. Commissioning.
 - 3. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
 - E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
 - 1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.
 - F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and the Contract Time.
 - G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Final Completion percentage for each activity.
 - H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
 - I. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
- 1.7 GANTT-CHART SCHEDULE REQUIREMENTS
- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for commencement of the Work.
 - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
 - B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

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1.8 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Testing and inspection.
 8. Accidents.
 9. Meetings and significant decisions.
 10. Unusual events.
 11. Stoppages, delays, shortages, and losses.
 12. Meter readings and similar recordings.
 13. Emergency procedures.
 14. Orders and requests of authorities having jurisdiction.
 15. Change Orders received and implemented.
 16. Construction Change Directives received and implemented.
 17. Services connected and disconnected.
 18. Equipment or system tests and startups.
 19. Partial completions and occupancies.
 20. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Concealed Work photographs.
 - 3. Periodic construction photographs.
 - 4. Final Completion construction photographs.

1.2 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Submit photos by uploading to web-based Project management software site. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of location, vantage point, and direction.
 - g. Unique sequential identifier keyed to accompanying key plan.

1.3 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time and GPS location data from camera.
- D. File Names: Name media files with date and sequential numbering suffix.

1.4 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take 20 photographs of existing buildings either on or adjoining property, to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
 - 1. Underground utilities.

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2. Underslab services.
 3. Piping.
 4. Electrical conduit.
 5. Waterproofing and weather-resistant barriers.
- D. Periodic Construction Photographs: Take 20 photographs monthly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take 20 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.
- F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
1. Three days' notice will be given, where feasible.
 2. In emergency situations, take additional photographs within 24 hours of request.
 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Immediate follow-up when on-site events result in construction damage or losses.
 - b. Photographs shall be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - c. Substantial Completion of a major phase or component of the Work.
 - d. Extra record photographs at time of final acceptance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.
- B. If Contractor fails to submit a Submittal Schedule or fails to provide submittals in accordance with approved Submittals Schedule, Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on time required for review of submittals.
- C. If Contractor requests an accelerated submittal review by Architect, Architect will endeavor to accommodate Contractor's request. Any such desired accelerated review times shall not supersede requirements of Contract and no extension of Contract Time will be authorized because of Architect's failure or inability to adhere to Contractor's desired accelerated review times.

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1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
 16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.

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4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 - D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
 - E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
 - F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.
- 1.6 SUBMITTAL REQUIREMENTS
- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
 - B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.
 - C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.

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3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 4. Paper Transmittal: Include paper transmittal, including complete submittal information indicated.
 5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

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4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.
- 1.7 DELEGATED-DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
 - B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
 - C. BIM Incorporation: Incorporate delegated-design drawing and data files into BIM established for Project.
 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.
- 1.8 CONTRACTOR'S REVIEW
- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

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- B. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
 - 1. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
 - 2. Action Submittals: Architect will review each submittal, mark to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp, and mark the stamp appropriately to indicate the action taken, as follows:
 - a. Final Unrestricted Release: Where the submittal is marked "Approved," the Work covered by the submittal may proceed, provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
 - b. Final-but-Restricted Release: Where the submittal is marked "Approved as Noted," the Work covered by the submittal may proceed, provided it complies both with Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.
 - c. Resubmit: Where the submittal is marked "Not Approved, Revise and Resubmit," do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity for the product submitted. Revise or prepare a new submittal according to Architect's notations and corrections.
 - d. Rejected: Where the submittal is marked "Not Approved, Resubmit" or "Rejected," do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.
 - e. Incomplete - Resubmit: Where the submittal is marked "Submit Additional Information," do not proceed with the Work covered by the submittal. Prepare additional information requested, or required by the Contract Documents, that indicates compliance with requirements, and resubmit.
 - f. Other Action: If the submittal is primarily for information purposes, record purposes, special processing, or other Contractor activity, the submittal will be returned marked "Action Not Required."
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.
 - 1. Mockups are used for one or more of the following:
 - a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.
 - c. Demonstrate the qualities of products and workmanship.
 - d. Demonstrate successful installation of interfaces between components and systems.
 - e. Perform preconstruction testing to determine system performance.
 - 2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 - 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

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- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Mockup Shop Drawings:
 - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.

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5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of commencement of work, and not less than days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

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12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement of whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement of whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- 1.9 QUALITY ASSURANCE
- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

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- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
 - 1. Provide test specimens representative of proposed products and construction.
 - 2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - 4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
 - 5. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
 - 6. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.
 - 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 - 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow seven business days for initial review and each re-review of each mockup.
 - 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 - 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 10. Demolish and remove mockups when directed unless otherwise indicated.

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.

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4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.
1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
 2. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

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1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections, and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- A. "Day" as used in the Contract Documents means calendar day unless otherwise specifically defined.
- B. "Business Day" as used in the Contract Documents means Monday through Friday and specifically does not include Saturday, Sunday, or holidays.
- C. "Working Day" as used in the Contract Documents means Monday through Friday and specifically does not include Saturday, Sunday, or holidays.
- D. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- E. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- F. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- G. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- H. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- I. "Provide": Furnish and install, complete and ready for the intended use.
- J. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
 - 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, includes as a minimum, the following:
 - 1. Permanent or temporary roofing is complete, insulated, and weathertight, including parapets and roof edge terminations.
 - 2. Exterior walls are insulated, weathertight, and UV-resistant.
 - 3. All openings are closed with permanent construction or substantial weathertight temporary closures.
 - 4. Permanent enclosure envelope shall be capable of retaining controlled interior temperature and humidity levels.

1.3 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use with metering. Provide connections and extensions of services and metering as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use with metering. Provide connections and extensions of services and metering as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.

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3. Location of proposed air-filtration system discharge.
 4. Waste-handling procedures.
 5. Other dust-control measures.
- G. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:
1. Methods used to meet the goals and requirements of the Owner.
 2. Concrete cutting method(s) to be used.
 3. Location of construction devices on the site.
 4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
 5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with the Owner.
 6. Indicate locations of sensitive equipment areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.
- B. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain-link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.
- C. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 1. Furniture required for Project-site documents, including file cabinets, plan tables, plan racks, and bookcases.
 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
 3. Drinking water and private toilet.
 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 5. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

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- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.
- E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

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- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one land-based telephone line(s) for each field office.
 - 1. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.
- I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.
 - 1. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions with wireless connectivity.
 - 2. Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum 10.0 -Mbps upload and 15 -Mbps download speeds at each computer.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
 - 1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas in accordance with Refer to Civil Engineer's documents.
 - 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 - 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course in accordance requirements.
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Storage and Staging: Use designated areas of Project site for storage and staging needs.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touch up signs, so they are legible at all times.

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- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- K. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.
- L. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. 01 10 00 Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

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2. Dry-In Conditions: The building will be considered dried-in when:
 - a. Roofing is complete.
 - b. Windows are installed.
 - c. Sheathing is installed.
 - d. Door openings are protected by temporary enclosures as specified herein.
 - e. Heating and cooling is not required.
 - 1) Where specified materials require humidity control or temperature control, provide heating and cooling.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.

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- b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
- c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 "Submittal Procedures."
- F. Substitution: Refer to Section 01 25 00 "Substitution Procedures" for definition and limitations on substitutions.

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1.3 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
 - 3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.4 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.
- C. Storage:
 - 1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
 - 2. Store products to allow for inspection and measurement of quantity or counting of units.
 - 3. Store materials in a manner that will not endanger Project structure.
 - 4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
 - 5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 7. Protect stored products from damage and liquids from freezing.
 - 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

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1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."
- D. Submittal Time: Comply with requirements in Section 01 78 23 "Operation and Maintenance Data."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
 - 1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
 - 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
 - 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
 - 4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.

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5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
 7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 01 33 00 "Submittal Procedures."
1. Form of Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

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- C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.
 - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.
 - 2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- B. Layout Conference: Conduct conference at Project site.
 - 1. Prior to establishing layout of new perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:
 - a. Contractor's superintendent.
 - b. Professional surveyor responsible for performing Project surveying and layout.
 - c. Professional surveyor responsible for performing site survey serving as basis for Project design.
 - 2. Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.
 - 3. Review requirements for including layouts on Shop Drawings and other submittals.
 - 4. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certified Surveys: Submit two copies signed by land surveyor.

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- C. Certificates: Submit certificate signed by land surveyor, certifying that location and elevation of improvements comply with requirements.
- D. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.
- E. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 CLOSEOUT SUBMITTALS

- A. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.6 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

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4. Inform installers of lines and levels to which they must comply.
 5. Check the location, level and plumb, of every major element as the Work progresses.
 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb, and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

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- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

3.6 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.

- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

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- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Restore permanent facilities used during construction to their specified condition.
- D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.

1.2 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

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- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 01 29 00 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
 5. Submit Final Completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.

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- d. Name of Contractor.
- e. Page number.
- 4. Submit list of incomplete items in the following format:
 - a. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit by uploading to web-based project software site.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - i. Vacuum and mop concrete.
 - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - l. Remove labels that are not permanent.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

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- o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - r. Clean strainers.
 - s. Leave Project clean and ready for occupancy.
 - C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.
 - D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."
- 3.2 REPAIR OF THE WORK
- A. Complete repair and restoration operations required by Section 01 73 00 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Emergency manuals.
 - 3. Systems and equipment operation manuals.
 - 4. Systems and equipment maintenance manuals.
 - 5. Product maintenance manuals.

1.2 01 12 00DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required. In addition, provide two hard copy sets of Operation and Maintenance Manuals at Close-out.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

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- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, [**and**] subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Architect.
 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

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1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.7 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.

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9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.
- 1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS
- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.

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- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
 - G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
 - H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
 - I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.
 - J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of maintenance manuals.
- 1.10 PRODUCT MAINTENANCE MANUALS
- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
 - B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
 - C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
 - D. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
 - E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
 - F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
 - G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints. Record Drawings can be an annotated PDF electronic set.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.

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- m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
 - B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
 1. Format: Same digital data software program, version, and operating system as for the original Contract Drawings.
 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Architect for resolution.
 4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
 - b. Architect will provide data file layer information. Record markups in separate layers.
 - C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.
- 1.4 RECORD SPECIFICATIONS
 - A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
 - B. Format: Submit record specifications as annotated PDF electronic file.
- 1.5 RECORD PRODUCT DATA
 - A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

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- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
- C. Format: Submit Record Product Data as annotated PDF electronic file.
 - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

1.6 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.7 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove, Salvage, and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 INFORMATIONAL SUBMITTALS

- A. Engineering Survey: Submit engineering survey of condition of building.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before Work begins.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.5 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

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1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.9 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- B. Engage an experienced, competent professional to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- C. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."
 - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

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3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - c. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - d. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

3.4 PROTECTION

- A. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- B. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain fire watch during and for at least two hour after flame-cutting operations.
 - 6. Maintain adequate ventilation when using cutting torches.
 - 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 10. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

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- C. 02 42 96Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site .
 - 5. Protect items from damage during transport and storage.
- D. Salvaged Materials for Reinstallation:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 03 54 16

HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Polymer-modified, self-leveling, hydraulic cement underlayment for application below interior floor coverings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
 - 1. Place hydraulic cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

PART 2 - PRODUCTS

2.1 HYDRAULIC CEMENT UNDERLAYMENTS

- A. Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/4 inch (6 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Products Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ARDEX; K-15 Self-Leveling Underlayment Concrete.
 - b. Dayton Superior Corporation; LeveLayer.
 - c. MAPEI Corporation; Ultraplan Easy.
 - d. Maxxon Corporation; Level-Right.
 - e. Specialty Construction Brands, Inc.; an H.B. Fuller company; TEC Smooth Start.
- B. Cement Binder: ASTM C 150/C 150M, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
- C. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C 109/C 109M.
- D. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.
 - 1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- E. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).
- F. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
- G. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of the Work.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
 - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
 - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test, ASTM F1869: Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 85 percent relative humidity level measurement, or as recommended by hydraulic cement underlayment manufacturer.
- C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
 - 2. Coordinate application of components to provide optimum adhesion to substrate and between coats.
 - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply underlayment to produce uniform, level surface.
 - 1. Apply a final layer without aggregate to product surface.
 - 2. Feather edges to match adjacent floor elevations.
- C. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- D. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- E. Apply surface sealer at rate recommended by manufacturer.
- F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 - GENERAL

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Mortar and grout.
 - 3. Steel reinforcing bars.
 - 4. Masonry-joint reinforcement.
 - 5. Ties and anchors.
 - 6. Embedded flashing.
 - 7. Miscellaneous masonry accessories.
- B. Products Installed but not Furnished under This Section:
 - 1. Steel lintels in unit masonry.
 - 2. Steel shelf angles for supporting unit masonry.
 - 3. Cavity wall insulation.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - a. Show locations of control joints including additional proposed locations that may not be indicated on the Drawings.
 - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
 - 1. Colored mortar.
- D. Samples for Verification: For each type and color of the following:
 - 1. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include data on material properties.
 - 2. Integral water repellent used in CMUs.
 - 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 - 4. Mortar admixtures.
 - 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - 6. Grout mixes. Include description of type and proportions of ingredients.
 - 7. Reinforcing bars.
 - 8. Joint reinforcement.
 - 9. Anchors, ties, and metal accessories.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe, and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

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- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide square-edged and bullnose units for outside corners unless where indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
 - 1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E514/E514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - 1) ACM Chemistries, Inc.; RainBloc.
 - 2) BASF Corporation; MasterPel 240.
 - 3) Euclid Chemical Company (The), an RPM International company; EUCON BLOCKTITE.
 - 4) GCP Applied Technologies Inc.; DRY-BLOCK Block Admixture.
 - 5) Moxie International; Moxie Shield 1800 Admixture
- C. CMUs: ASTM C90.
 - 1. Density Classification: Lightweight.
 - 2. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.4 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91/C 91M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cemex S.A.B. de C.V.
 - b. Essroc.
 - c. Holcim (US) Inc.
 - d. Lafarge North America Inc.
 - e. Lehigh Hanson; Heidelberg Cement Group.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. Lanxess Corporation; Bayferrox Iron Oxide Pigments.

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- d. Solomon Colors, Inc; Solomon Colors Mortar Colors.
 - F. Aggregate for Mortar: ASTM C144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4-inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18 mm) sieve.
 - G. Aggregate for Grout: ASTM C404.
 - H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 - 1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Aktiengesellschaft; MasterSet FP 20.
 - b. Euclid Chemical Company (The); an RPM International company; ACCELGUARD 80.
 - c. GCP Applied Technologies Inc., MORSET.
 - I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
 - a. ACM Chemistries, Inc.; RainBloc for Mortar.
 - b. BASF Aktiengesellschaft; MasterPel 235.
 - c. Euclid Chemical Company (The); an RPM International company; BLOCKTITE MORTAR ADMIXTURE.
 - d. GCP Applied Technologies Inc.; DRY-BLOCK Mortar Admixture.
 - J. Water: Potable.
- 2.6 REINFORCEMENT
- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).
 - B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77 mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dur-O-Wal; a Hohmann & Barnard company.
 - b. Heckmann Building Products, Inc.
 - c. Hohmann & Barnard, Inc.
 - d. Lock Rite.
 - e. Wire-Bond.
 - C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch (3.77 mm) diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch (3.77 mm) diameter.
 - 5. Wire Size for Veneer Ties: 0.148-inch (3.77 mm) diameter.
 - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
 - 7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
 - D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.
 - E. Masonry-Joint Reinforcement for Multiwythe Masonry:
 - 1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches (100 mm) wide, plus one side rod at each wythe of masonry 4 inches (100 mm) wide or less.
- 2.7 RETAIN PARAGRAPH BELOW FOR L1.01 25 00TIES AND ANCHORS
- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16 mm) cover on outside face.

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- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M, with ASTM A153/A153M, Class B-2 coating.
 2. Stainless-Steel Wire: ASTM A580/A580M, Type 304.
 3. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
 4. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Corrugated-Metal Ties: Not allowed.
- D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
1. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
 2. Wire: Fabricate from 3/16-inch- (4.76 mm-) diameter, hot-dip galvanized steel wire.
- E. Partition Top Anchors: 0.105-inch- (2.66 mm-) thick metal plate with a 3/8-inch- (9.5 mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from stainless steel.
- F. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf (445-N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch (1.5 mm).
 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.105-inch- (2.66 mm-) thick steel sheet, galvanized after fabrication.
 3. Fabricate wire ties from 0.187-inch- (4.76 mm-) diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 4. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches (32 mm) wide by 6 inches (152 mm) long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch (16 mm) wide by 6 inches (152 mm) long, stamped into center to provide a slot between strap and base for inserting wire tie. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs. Where continuous insulation is shown, provide anchor portion with tabs to prevent crushing of insulation when installed.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Hohmann & Barnard, Inc.
 - 2) Wire-Bond.
 5. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83 mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B117.

2.8 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing: Use the following unless otherwise indicated:
1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.02 mm).
 - a. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Carlisle Coatings & Waterproofing Inc.; CCW-705-TWF Thru-Wall Flashing.
 - 2) GCP Applied Technologies Inc.; Perm-A-Barrier Wall Flashing.
 - 3) Polyguard Products, Inc.; Polyguard 400.
 - b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
- B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- C. Termination Bars for Flexible Flashing: Stainless steel bars 0.075 inch by 1 inch (1.90 mm by 25 mm).

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2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).
- D. Weep/Cavity Vent Products: Use the following unless otherwise indicated:
 - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
 - a. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Heckmann Building Products, Inc.; No. 85 Cell Vent.
 - 2) Hohmann & Barnard, Inc.; QV Quadro-Vent.
 - 3) Wire-Bond; #3601 Cell Vent
 - 4) Mortar Net Solutions; CellVent.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 - 1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - a. Heckmann Building Products, Inc.; #84 WallDefender.
 - b. Hohmann & Barnard, Inc.; Mortar Trap.
 - c. Mortar Net Solutions; MortarNet.
 - d. Wire-Bond; Cavity Net DT (3611D).
 - 2. Configuration: Provide one of the following:
 - a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail-shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

2.10 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Diedrich Technologies, Inc., a Hohmann & Barnard company.
 - b. EaCo Chem, Inc.
 - c. PROSOCO, Inc.

2.11 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 1. Use portland cement-lime or masonry cement mortar unless otherwise indicated.
 - 2. For exterior masonry, use portland cement-lime or masonry cement mortar.
 - 3. For reinforced masonry, use portland cement-lime or masonry cement mortar.
 - 4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

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- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type S.
 - 3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 - 4. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
 - 1. Pigments shall not exceed 10 percent of portland cement by weight.
 - 2. Pigments shall not exceed 5 percent of masonry cement by weight.
 - 3. Mix to match Architect's sample.
- E. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
 - 3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
 - 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).

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3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12 mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12 mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12 mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch (100 mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (100 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.

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2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 2. Allow cleaned surfaces to dry before setting.
 3. Wet joint surfaces thoroughly before applying mortar.
 4. Rake out mortar joints for pointing with sealant.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- F. Cut joints flush where indicated to receive cavity wall insulation unless otherwise indicated.

3.6 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
 1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 2. Embed tie sections in masonry joints.
 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 4. Space anchors as indicated, with not less than one anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.
- B. Provide not less than 2 inches (50 mm) of airspace between back of masonry veneer and face of insulation.
 1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.7 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 1. Space reinforcement not more than 16 inches (406 mm) o.c.
 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.

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- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 - 1. Install preformed control-joint gaskets designed to fit standard sash block.
- C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 92 00 "Joint Sealants," but not less than 3/8 inch (10 mm).
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.9 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under water-resistive barrier, lapping at least 4 inches (100 mm). Fasten upper edge of flexible flashing to sheathing through termination bar.
 - 3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
 - 4. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
 - 1. Use specified weep/cavity vent products to form weep holes.
 - 2. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.
- E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- F. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.
 - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

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3.11 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.12 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor will engage special inspectors for structural masonry to perform tests and inspections and prepare reports. All other tests and inspections will be performed by Contractor. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C67 for compressive strength.
- F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.
- G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.13 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

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6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.14 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Exterior non-load-bearing wall framing.
 - 2. Interior non-load-bearing wall framing.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
- B. Meet with Owner, Architect, testing and inspecting agency representative, metal framing Installer, Metal Framing Engineer, exterior sheathing Installer, and installers whose work interfaces with or affects cold-formed metal framing.
- C. Review methods and procedures related to cold-formed metal framing installation, including those contained in metal framing engineer's delegated design submittal.
- D. Review design loads imposed on building structure.
 - 1. Review and clearly identify locations of interior and corner wind load zones of building façade.
 - 2. Review design wind speeds, and resulting positive and negative loads imposed on metal framing and exterior sheathing at interior zones and corner zones of building façade.
 - 3. Review securement of system components required to withstand design wind loads, including the following:
 - a. Attachment of bottom track to floor structure, and type and spacing of fasteners.
 - b. Attachment of top track to overhead structure, and type and spacing of fasteners.
 - c. Attachment of studs to top and bottom tracks.
 - d. Attachment of clips to overhead structure.
 - e. Attachment of studs to clips.
 - f. Review required minimum edge clearance from edge of slab, and size, spacing, and required penetration of fasteners.
- E. Review size and location of exterior wall framing mockup.
- F. Review requirements and understanding of Field Quality Control article.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 - 3. Indicate exterior sheathing screw fastener spacing to be utilized at interior zones and corner zones of building façade, as required to ensure sheathing installation will withstand negative wind pressures imposed by design wind speeds.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Product Certificates: For each type of code-compliance certification for studs and tracks.
- D. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.
 - 1. Steel sheet.
 - 2. Expansion anchors.
 - 3. Power-actuated anchors.

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4. Mechanical fasteners.
 5. Vertical deflection clips.
 6. Horizontal drift deflection clips.
 7. Miscellaneous structural clips and accessories.
- E. Research Reports:
1. For nonstandard cold-formed steel framing power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
 2. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.
- F. Field Quality Control:
1. Photographic documentation of approved exterior wall framing mockup, in digital form. Include pan and close-up photos of the following:
 - a. Attachment of bottom track to floor structure.
 - b. Attachment of top track to overhead structure.
 - c. Attachment of studs to bottom track and top track/clips.
 - d. Attachment of vertical deflection clips to overhead structure.
 - e. Attachment of horizontal drift clips to overhead structure.
 - f. Attachment of studs to vertical deflection clips.
 - g. Attachment of studs to horizontal drift clips.
 - h. Attachment of sheathing to studs.
 2. Pre-Inspection Notification: Submit written report that work has been reviewed for compliance by Contractor, Installer, and Metal Framing Engineer, and is ready for inspection by Testing Agency.
- 1.5 QUALITY ASSURANCE
- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- D. Manufacturer Qualifications: Member in good standing of the Steel Framing Industry Association (SFIA) or be a part of a similar organization that provides verifiable code compliance program.
1. Products to be certified under an independent third-party inspection program administered by an agency accredited by IAS to ICC-ES AC98 IAS Accreditation Criteria for Inspection Agencies.
- E. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product-certification program of the Steel Framing Industry Association (SFIA) or be a part of a similar organization that provides verifiable code compliance program.
- F. Comply with AISI S100, and AISI S200 and ASTM C955, Section 8.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI's "Code of Standard Practice."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CEMCO.
 2. ClarkDietrich.
 3. MarinoWARE.
 4. SCAFECO Steel Stud Company.
 5. Steel Network, Inc. (The).

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on Drawings.

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2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing behind Brick or Stone Masonry Veneer: Horizontal deflection of 1/600 of the wall height.
 - b. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft. (239 Pa).
 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1 inch (25 mm) unless noted otherwise.
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- B. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
1. Wall Studs: AISI S211.
 2. Lateral Design: AISI S213.
- C. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- 2.3 COLD-FORMED STEEL FRAMING MATERIALS
- A. Framing Members, General: Comply with AISI S200 and ASTM C955, Section 8 for conditions indicated.
- B. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
1. Grade: As required by structural performance.
 2. Coating: G60 (Z180), A60 (ZF180), AZ50 (AZM150), or GF30 (ZGF90).
- C. Steel Sheet for Vertical Deflection Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
1. Grade: As required by structural performance.
 2. Coating: G60 (Z180).
- 2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING
- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: As required by structural performance.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: 1-1/4 inches (32 mm).
- C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. Steel Network, Inc. (The).
- 2.5 INTERIOR NON-LOAD-BEARING WALL FRAMING
- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As required by structural performance.
 2. Flange Width: As required by structural performance.

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- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: As required by structural performance.
 - 2. Flange Width: As required by structural performance.
- C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AllSteel & Gypsum Products, Inc.
 - b. ClarkDietrich.
 - c. MarinoWARE.
 - d. SCAFCO Steel Stud Company.
 - e. Steel Network, Inc. (The).
- D. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Gusset plates.
 - 8. Stud kickers and knee braces.
 - 9. Joist hangers and end closures.
 - 10. Hole-reinforcing plates.
 - 11. Backer plates.

2.7 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Anchor Bolts: ASTM F1554, Grade 55, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by mechanically deposition according to ASTM B695, Class 50.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 as appropriate for the substrate.
 - 1. Uses: Securing cold-formed steel framing to structure.
 - 2. Type: Torque-controlled expansion anchor or torque-controlled adhesive anchor.
 - 3. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.8 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: MIL-P-21035B or SSPC-Paint 20.
- B. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

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- C. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.9 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

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- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.4 INSTALLATION OF EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Connect vertical deflection clips to bypassing studs and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INSTALLATION OF INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

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3.6 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.7 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

- A. Testing: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for countertops.
 - 2. Steel framing and supports for equipment.
 - 3. Steel tube reinforcement for low partitions.
 - 4. Steel framing and supports for mechanical and electrical equipment.
 - 5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 6. Shelf angles.
 - 7. Miscellaneous steel trim.
 - 8. Loose bearing and leveling plates for applications where they are not specified in other Sections.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
 - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.2 04 20 00COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 - 2. Fasteners.
 - 3. Shop primers.
 - 4. Shrinkage-resisting grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for all items listed in the summary above.
 - 1. Include shop drawings and structural analysis data signed and sealed by the qualified professional engineer licensed to practice in the location of the project, demonstrating the design and connections will meet all indicated and code required loads.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research Reports: For post-installed anchors.

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1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
1. Provide stainless steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
- C. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 2 (A4).
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- F. Post-Installed Anchors: Torque-controlled expansion anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Division 09 Section(s) on Painting
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

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- D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated and coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
 - 1. Provide mitered and welded units at corners.
 - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
 - A. Weld shelf angle to embed plate where indicated.
 - B. Galvanize and prime shelf angles located in exterior walls.

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- C. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.
- D. Prime exterior miscellaneous steel trim with zinc-rich primer.

2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates.
- C. Prime plates with zinc-rich primer.

2.10 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.

2.11 BRAKE METAL

- A. Material: Galvanized steel formed in press brake.
- B. Thickness: As indicated.
- C. Finish: Field Painted.
- D. Texture: Smooth.
- E. Profile: As indicated.

2.12 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

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- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
 - C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 - D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
 - E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- 3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS
- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- 3.3 INSTALLATION OF BEARING AND LEVELING PLATES
- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
 - B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
- 3.4 REPAIRS
- A. Touchup Painting:
 - 1. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 Painting Sections.

END OF SECTION

SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rooftop equipment bases and support curbs.
 - 2. Wood blocking and nailers.
 - 3. Wood furring.
 - 4. Plywood backing panels.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
 - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Preservative-treated wood.
 - 2. Fire-retardant-treated wood.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory-mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 - 3. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

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2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 - 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664, and design value adjustment factors shall be calculated according to ASTM D6841.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat all miscellaneous carpentry unless otherwise indicated.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
 - 4. Furring.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
 - 1. Mixed southern pine or southern pine; SPIB.
 - 2. Spruce-pine-fir; NLGA.
 - 3. Western woods; WCLIB or WWPA.
 - 4. Northern species; NLGA.

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- 5. Eastern softwoods; NeLMA.
 - C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
 - D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.
- 2.5 PLYWOOD BACKING PANELS
- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.
- 2.6 FASTENERS
- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
 - B. Nails, Brads, and Staples: ASTM F1667.
 - C. Screws for Fastening to Metal Framing: ASTM C1002 or ASTM C954, length as recommended by screw manufacturer for material being fastened.
 - D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
 - E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC193 as appropriate for the substrate.
 - 1. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2 (ASTM F738M and ASTM F836M, Grade A1 or A4).
- 2.7 MISCELLANEOUS MATERIALS
- A. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.
 - B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

- 3.1 INSTALLATION, GENERAL
- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
 - B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
 - C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
 - D. Do not splice structural members between supports unless otherwise indicated.
 - E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
 - F. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

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- G. Comply with AWP M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
 - H. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
 - I. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
 - J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- 3.2 INSTALLATION OF WOOD BLOCKING AND NAILER
- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
 - B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- 3.3 INSTALLATION OF WOOD FURRING
- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring horizontally and vertically at 24 inches (610 mm) o.c.
 - C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.
- 3.4 PROTECTION
- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
 - B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 41 16

PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad architectural cabinets.
 - 2. Custom display cases.
 - 3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
 - 5. Apply AWI Quality Certification Program label to Shop Drawings.
- C. Samples for Verification: For the following:
 - 1. Plastic Laminates: 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to one edge.
 - 2. Thermoset Decorative Panels: 8 by 10 inches (200 by 250 mm), for each color, pattern, and surface finish.
 - a. Provide edge banding on one edge.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of product.
 - 1. Composite wood products.
 - 2. Thermoset decorative panels.
 - 3. High-pressure decorative laminate.
 - 4. Glass.
 - 5. Adhesives.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Manufacturer of products.

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1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Architectural Woodwork Standards Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Abet Laminati Inc.
 - b. Formica Corporation.
 - c. Lamin-Art, Inc.
 - d. Pionite; a Panolam Industries International, Inc. brand.
 - e. Wilsonart.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade VGS.
 - 4. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
 - 5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- G. Materials for Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
 - b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
 - c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - 2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
 - 3. Drawer Bottoms: Thermoset decorative panels.
- H. Dust Panels: 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

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- J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As selected by Architect from laminate manufacturer's full range.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 - 2. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- B. Back-Mounted Pulls: BHMA A156.9, B02011.
- C. Wire Pulls: Back mounted, solid metal, 5 inches (127 mm) long, 2-1/2 inches (63.5 mm) deep, and 5/16 inch (8 mm) in diameter.
- D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- E. Shelf Rests: BHMA A156.9, B04013; metal.
- F. Drawer Slides: BHMA A156.9.
 - 1. Grade 1 and Grade 2: Side mounted.
 - a. Type: Full extension.
 - b. Material: Epoxy-coated steel with polymer rollers.
 - 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full -extension type; zinc-plated-steel ball-bearing slides.
 - 3. For drawers not more than 3 inches (75 mm) high and not more than 24 inches (600 mm) wide, provide Grade 2.
 - 4. For drawers more than 3 inches (75 mm) high, but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1.
 - 5. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-100.
 - 6. For computer keyboard shelves, provide Grade 1.
 - 7. For trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide, provide Grade 1HD-100.
- G. Slides for Sliding Glass Doors: BHMA A156.9, B07063; aluminum.
- H. Door Locks: BHMA A156.11, E07121.
- I. Drawer Locks: BHMA A156.11, E07041.
- J. Door and Drawer Silencers: BHMA A156.16, L03011.
- K. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, 6 mm thick unless otherwise indicated.
 - 1. Unframed Glass Doors: Seam exposed edges seamed before tempering.
- L. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.
- M. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Stainless Steel: BHMA 630 unless noted otherwise.

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- N. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- D. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual."
 - 1. For glass in frames, secure glass with removable stops.
 - 2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c..

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION

SECTION 07 01 53

ROOF MODIFICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes the following:
 - 1. Modifications to existing roofing system in preparation for tie-in with new adjacent compatible roofing system.
 - 2. Patching of existing roofing system where existing openings are no longer required.
 - 3. Cutting in of new penetrations through existing roof system, and flashing with new materials into existing roofing system.
 - 4. Temporary roofing membrane.
 - 5. Protection of existing roofing system that is not to be modified or disturbed.

1.2 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Existing Membrane Roofing System: Roofing membrane, surfacing, and components and accessories between deck and roofing membrane.
- C. Substrate Board: Rigid board or panel products placed over the roof deck that serve as thermal barriers, provide a smooth substrate, or serve as a component of a fire-resistance-rated roofing system.
- D. Roof Re-Cover Preparation: Existing roofing membrane that is to remain and be prepared for reuse.
- E. Partial Roof Tear-Off: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system.
- F. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- G. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.4 SYSTEM DESCRIPTION

- A. Designated Roof Areas: Remove existing ballast (if any), perimeter flashings, base flashings, counter flashings, vent stack flashings, roofing membrane, insulation, and other system components as required for roofing work.
- B. Remove or relocate designated roof mounted mechanical and electrical equipment as required for roofing work.
- C. Provide products required by manufacturers to be fully compatible with each other and with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.
- D. Provide new roof membrane, insulation, and flashing to accommodate roof mounted equipment removal or relocation, penetrations, and new building addition.
- E. Performance Requirements: Prevent water infiltration through roof membrane penetrations or modifications resulting from work described in Contract Documents.
- F. Industry Standards: Conform to NRCA - Roofing and Waterproofing Manual, except where more stringent requirements are indicated.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.
 - 1. Include list of materials and data sheets describing physical characteristics and performance criteria for materials proposed for use as well as applicable standards met by each product.

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2. Temporary Roofing: Include Product Data and description of temporary roofing system. If temporary roof will remain in place, submit surface preparation requirements needed to receive permanent roof, and submit a letter from roofing membrane manufacturer stating acceptance of the temporary membrane, and that its inclusion will not adversely affect the roofing system's resistance to fire and wind.
- B. Shop Drawings: Submit details for this specific project indicating construction at penetrations, terminations, flashings, drains, and tie-in to existing roof.

1.6 INFORMATIONAL SUBMITTALS

- A. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by roofing modification operations. Submit before Work begins.
- B. Certifications specified in Quality Assurance article.
- C. Qualification Data: For Installer, including certificate that Installer is approved by warrantor of existing roofing system.
- D. Manufacturer's Installation Instructions: Submit manufacturer's printed installation instructions for each product.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in the maintenance manuals specified in Division 01.
- B. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roof installation.
- C. Warranty: Submit specified warranty in accordance with Division 01.

1.8 QUALITY ASSURANCE

- A. Applicator Qualifications: Approved by manufacturer for making modifications and repairs to existing warranted roofing prior to execution of this Contract.
 1. Minimum of 5 years documented experience in roofing repairs of this type of roof.
 2. Include list of completed projects having similar scope of work identified by name, location, date, reference name, and phone number.
- B. Materials Removal Firm: Company specializing in performing the work of this Section with minimum 5 years documented experience.
- C. Certifications:
 1. Submit manufacturer's certification stating materials ordered and supplied are compatible with existing roofing system and will not void existing warranty.
 2. Submit manufacturer's project registration form indicating that manufacturer has reviewed Project and will issue or extend existing warranty to cover repairs warranty upon successful completion of installation.
 3. Submit manufacturer's approval of applicator.
 4. Certify materials shipped to Project site meet roof manufacturer's published performance standards and requirements of this Specification.
 5. State that membrane manufacturer approves of insulation type and method of installation.
- D. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately below roofing modification area. Conduct roof modifications so Owner's operations will not be disrupted. Provide Owner with not less than 2 weeks notice of activities that may affect Owner's operations.
 1. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area if desired.
 2. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated prior to proceeding with work over the impaired deck area.

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- B. Protect building where roofing is scheduled to be modified, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from modification operations.
 - C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - D. Owner assumes no responsibility for condition of areas to be modified.
 - 1. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
 - E. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.
 - F. Weather Limitations: Proceed with roofing modification work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
 - 1. Emergency Equipment: Maintain on-site equipment necessary to apply emergency temporary edge seal in the event of sudden storms or inclement weather.
 - 2. Maintain continuous temporary protection prior to and during installation of new roofing system.
 - G. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work. Existing roof will be left no less watertight than before removal.
 - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- 1.10 SEQUENCING AND SCHEDULING
- A. Schedule work to coincide with commencement of installation of new roofing system.
 - B. Remove only existing roofing materials that can be replaced with new materials the same day.
 - C. Coordinate the work with other affected mechanical and electrical work associated with roof penetrations.
- 1.11 WARRANTY
- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during roof modification work, by methods and with materials so as not to void existing roofing system warranty. Notify warrantor before proceeding.
 - 1. Notify warrantor of existing roofing system on completion of roofing modifications, and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.
 - B. If roofing system manufacturer's warranty is no longer in effect on the existing roof system, upon completion of Work and prior to final payment, furnish written warranty signed by installer and Contractor stating that for 2 year period from date of Substantial Completion of Building repairs and maintenance will be made to maintain roofing and flashings in watertight condition.

PART 2 - PRODUCTS

- 2.1 INFILL AND PATCHING MATERIALS
- A. Use infill and patching materials, including sheet and adhesive materials, flashings, roof surfacing, fasteners, adhesives, and accessories, matching existing membrane roofing system materials, unless otherwise indicated.
- 2.2 TEMPORARY ROOFING MATERIALS
- A. Selection of materials and design of temporary roofing is responsibility of Contractor. Select only materials that are compatible with existing roofing system. For pipe penetrations, use flashing materials and techniques as recommended by NRCA, utilizing portals mounted to curbs.
- 2.3 RECOVER BOARDS
- A. Recover Board: ASTM C 1177, glass-mat, water-resistant gypsum substrate; 1/4 inch thick.
 - B. Fasteners: Factory-coated steel fasteners, listed in FMG's "Approval Guide," designed for fastening recover boards to deck.

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2.4 AUXILIARY MATERIALS

- A. General: Auxiliary preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system
- B. Insulation: Type used in original roof construction in thickness necessary to achieve satisfactory repair of membrane with no ponded water.
- C. Wood Blocking and Nailers: As specified in Division 06.
- D. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
- E. Mechanical Fasteners and Disks: Appropriate for purpose intended and approved by UL or FM; length required for thickness of materials, fluoropolymer finish complete with disks; manufacturer as required by membrane manufacturer.
- F. Ballast (if required): Type required to match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing modifications will be performed with Installer present for compliance with requirements.
- B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.
- C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thicknesses of insulation required.
- D. Do not proceed with installation until unsatisfactory conditions have been corrected.
- E. Do not apply roofing materials to damp, frozen, dirty, dusty or other surface conditions which are unacceptable to manufacturer or applicator.

3.2 PREPARATION

- A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prepare roof surfaces as recommended by manufacturer of original installation.
- C. Protect existing membrane roofing system that is indicated not to be modified.
 - 1. Loosely lay 1 inch minimum thick, molded expanded polystyrene (MEPS) insulation over the roofing membrane in areas indicated. Loosely lay 15/32-inch plywood or OSB panels over MEPS. Extend MEPS past edges of plywood or OSB panels a minimum of 1 inch.
 - 2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 - 3. Maintain temporary protection and leave in place until replacement roofing has been completed.
- D. Coordinate with Owner to shut down air intake equipment in the vicinity of the Work. Cover air intake louvers before proceeding with roof modification work that could affect indoor air quality or activate smoke detectors in the ductwork.
- E. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- F. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
 - 1. If roof drains will be temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.
- G. Verify that rooftop utilities and service piping have been shut off before commencing Work.

3.3 PROTECTION

- A. Protect existing building surfaces against damage from roofing installation.

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- B. Provide temporary seals to prevent water from entering completed sections of the roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 PARTIAL ROOF REMOVAL

- A. Partial Roof Tear-Off: Where indicated, remove existing roofing membrane and other membrane roofing system components down to the deck and as required to allow for proper patching of existing roof, and tie-in to new roofing system.
 - 1. Remove cover boards, roof insulation, and substrate boards.
 - 2. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.
 - 3. Remove excess asphalt from steel deck. A maximum of 15 lb/100 sq. ft. of asphalt is permitted to remain on steel decks.
 - 4. Remove fasteners from deck or cut fasteners off slightly above deck surface.

3.5 DECK PREPARATION

- A. Inspect deck after partial tear-off of membrane roofing system.
- B. Concrete Decks:
 - 1. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 - 2. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 or by pouring 1 pint of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if moisture condenses under the plastic sheet or if asphalt test sample foams or can be easily and cleanly stripped after cooling.
 - 3. Do not proceed with installation until after the minimum concrete curing period, and moisture and pH levels are within the acceptable range as recommended by roofing system manufacturer.
- C. Steel Decks: Verify infill deck is properly supported and secured, and that surface plane flatness and fastening of steel roof deck comply with requirements in Division 05 Section "Steel Decking."
 - 1. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
 - 2. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.
- D. If deck surface is not suitable for receiving new roofing, or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.6 INFILL MATERIALS INSTALLATION

- A. Immediately after removal of selected portions of existing membrane roofing system, and inspection and repair, if needed, of deck, fill in the tear-off areas to match existing membrane roofing system construction.
 - 1. Install new roofing membrane patch over roof infill area. If new roofing membrane is installed the same day tear-off is made, roofing membrane patch is not required.

3.7 FLASHING AND REPAIR WORK

- A. General: Perform work in accordance with instructions and recommendations of manufacturer of original installation materials.
- B. Remove loose aggregate from aggregate-surfaced, built-up bituminous roofing with a power broom.
- C. Clean substrate of contaminants such as dirt, debris, oil, and grease that can affect adhesion of roof patching materials.
- D. Cut holes for penetrations neatly and in accordance with Division 01 Section "Cutting and Patching."
- E. Where continuity of existing fastener pattern has been interrupted by cutting and patching work, provide additional uplift securement for existing roofing system with new screws and plates applied to each roof zone to comply with same wind uplift requirements as specified for new roofing work.
- F. Lay base flashing and seal down to membrane and penetration.

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- G. Strip in flashing with multiple layers of felt and bitumen on built up systems and with one layer of sheet material on single ply systems.
- H. Counterflash as required.
- I. Make watertight.
- J. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.

3.8 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect and Owner 48 hours in advance of the date and time of inspection.
- B. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

3.9 DISPOSAL

- A. Collect and place demolished materials in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
 - 1. Storage or sale of demolished items or materials on-site will not be permitted.
- B. Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 07 84 13

PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in horizontal assemblies.
 - 3. Penetrations in smoke barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.
- B. Product Certificates:
 - 1. Certifying the non-metallic plumbing piping system and the fire sprinkler piping system manufacturers evaluated and approved the firestopping products for installation with or near its piping system.
 - 2. Certifying the firestopping products comply with NFPA 13 requirements for material compatibility with non-metallic pipe and tubing.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by firestopping manufacturer.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

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- C. Ensure firestopping products are coordinated and compatible with the non-metallic plumbing piping system and the fire sprinkler piping system.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
 - 1. For penetrations involving CPVC piping, provide through-penetration firestop systems which include materials that have been tested to be compatible with CPVC piping.
- B. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."
 - 3) FM Global in its "Building Materials Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any. Provide firestopping, including products specified in Section 07 84 43 "Joint Firestopping," by same manufacturer as products of this section regardless of installer. All firestopping products within this section shall be of one manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. GCP Applied Technologies Inc.
 - d. Hilti, Inc.
 - e. Johns Manville.
 - f. Nelson Firestop Products.
 - g. RectorSeal Corporation.
 - h. Specified Technologies Inc.
 - i. Tremco, Inc.; Tremco Fire Protection Systems Group.
 - j. USG Corporation.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.

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- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- D. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Ensure penetration firestopping products are coordinated and compatible with one another, with the substrates forming openings, and with penetrating items.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

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2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.
1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

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- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where Intertek ETL SEMKO-listed systems are indicated, they refer to design numbers in Intertek ETL SEMKO's "Directory of Listed Building Products" under "Firestop Systems."
- C. Where FM Global-approved systems are indicated, they refer to design numbers listed in FM Global's "Building Materials Approval Guide" under "Wall and Floor Penetration Fire Stops."
- D. Refer to Drawings.

END OF SECTION

SECTION 07 84 43

JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Joints in or between fire-resistance-rated constructions.
 - 2. Joints in smoke barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.
- B. Product Certificates:
 - 1. Certifying the non-metallic plumbing piping system and the fire sprinkler piping system manufacturers evaluated and approved the joint firestopping products for installation with or near its piping system.
 - 2. Certifying the joint firestopping products comply with NFPA 13 requirements for material compatibility with non-metallic pipe and tubing.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by firestopping manufacturer.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.
- C. Ensure joint firestopping products are coordinated and compatible with the non-metallic plumbing piping system and the fire sprinkler piping system.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
 - 1. For penetrations involving CPVC piping, provide through-penetration firestop systems which include materials that have been tested to be compatible with CPVC piping.
- B. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."

2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases. Provide firestopping, including products specified in Section 07 84 13 "Penetration Firestopping," by same manufacturer as products of this section regardless of installer. All firestopping products within this section shall be of one manufacturer.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. GCP Applied Technologies Inc.
 - d. Hilti, Inc.
 - e. Johns Manville
 - f. Nelson Firestop Products.
 - g. RectorSeal Corporation.
 - h. Specified Technologies Inc.
 - i. Tremco, Inc.; Tremco Fire Protection Systems Group
 - j. USG Corporation.
- C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. GCP Applied Technologies Inc.
 - d. Hilti, Inc.
 - e. Johns Manville
 - f. Nelson Firestop Products.
 - g. RectorSeal Corporation.
 - h. Specified Technologies Inc.
 - i. Tremco, Inc.; Tremco Fire Protection Systems Group
 - j. USG Corporation.
 - 3. L-Rating: Not exceeding 5.0 cfm/ft. (0.00775 cu. m/s x m) of joint at both ambient and elevated temperatures.
- D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

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- E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
 - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

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3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

3.8 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.
- A. Where Intertek ETL SEMKO-listed systems are indicated, they refer to design numbers in Intertek ETL SEMKO's "Directory of Listed Building Products" under product category Firestop Systems.

3.9 FIRE-RESISTIVE JOINT SYSTEMS

- A. Refer to Drawings.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

1.1 SUMMARY

- A. Section Includes:
 - 1. Nonstaining silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Mildew-resistant joint sealants.
 - 4. Butyl joint sealants.
 - 5. Latex joint sealants.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- B. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- C. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- D. Product Certificates:
 - 1. Certifying the non-metallic plumbing piping system and the fire sprinkler piping system manufacturers evaluated and approved the joint sealant products for installation with or near its piping system.
 - 2. Certifying the joint sealant products comply with NFPA 13 requirements for material compatibility with non-metallic pipe and tubing.
- E. Field-Adhesion-Test Reports: For each sealant application tested.
- F. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

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1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with masonry substrates.
 4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
 5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
 7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 2. Conduct field tests for each kind of sealant and joint substrate.
 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 COORDINATION

- A. Ensure joint sealant products are coordinated and compatible with the non-metallic plumbing piping system and the fire sprinkler piping system.

1.9 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

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- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: From date of Substantial Completion.
 - a. Urethane Sealants: 10 years.
 - b. Silicone Sealants: 20 years.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
 - 1. For penetrations involving CPVC piping, provide through-penetration firestop systems which include materials that have been tested to be compatible with CPVC piping.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Products: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 795 Silicone Building Sealant (VOC: 28 g/L).
 - b. GE Construction Sealants; Momentive Performance Materials Inc; SCS9000 SilPruf NB (VOC: 37 g/L).
 - c. Pecora Corporation; 864NST (VOC: <100 g/L).
 - d. Sika Corporation Industry Products; Sikasil WS-295 FPS (VOC: 37 g/L)
 - e. Tremco Inc., Tremco CS&W Group; Spectrem 2 (VOC: 42 g/L).

2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Products: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Master Builders Solutions Construction Systems US, LLC; Aktiengesellschaft; MasterSeal TX1 (VOC: 36 g/L).
 - b. C.R. Laurence Co, Inc.; CRL M64 (VOC: 9 g/L).
 - c. Pecora Corporation; DynaTrol I-XL (VOC: <100 g/L).
 - d. Sika Corporation Industry Products; Sikaflex Textured Sealant.
 - e. Tremco Inc., Tremco CS&W Group; Vulkem 116 (49 g/L).
- B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Master Builders Solutions Construction Systems US, LLC; Aktiengesellschaft; MasterSeal SL 1 (VOC: 104 g/L).
 - b. Pecora Corporation; Urexpam NR-201 (VOC: <50 g/L).

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- c. Sika Corporation Industry Products; Sikaflex 1c SL (VOC: 40 g/L).
 - C. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. LymTal International, Inc.; Iso-Flex 888QC.
- 2.4 MILDEW-RESISTANT JOINT SEALANTS
- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
 - B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. C.R. Laurence Co, Inc.; CRL 33S Silicone (VOC: 30 g/L).
 - b. Dow Corning Corporation; 786 Silicone Sealant (VOC: 33 g/L).
 - c. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary (VOC: 20 g/L).
 - d. Pecora Corporation; Pecora 898NST (VOC: 50 g/L).
 - e. Sika Corporation Industry Products; Sikasil GP (VOC: 29 g/L).
 - f. Soudal Accumetric; Silirub RTV1 (VOC: 30 g/L).
 - g. Tremco Inc., Tremco CS&W Group; Tremsil 200 (VOC: 1 g/L).
- 2.5 BUTYL JOINT SEALANTS
- A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. C.R. Laurence Co, Inc.; CRL 777 Butyl Rubber (VOC: 240 g/L)..
 - b. Pecora Corporation; BC-158 (VOC: <250 g/L).
 - c. Tremco Inc., Tremco CS&W Group; Butyl Sealant (VOC: 232 g/L)
- 2.6 LATEX JOINT SEALANTS
- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. C.R. Laurence Co, Inc.; CRL 321 (VOC: 22 g/L).
 - b. Pecora Corporation; AC-20 (VOC: 20 g/L).
 - c. Tremco Incorporated; Tremflex 834 (VOC: 31 g/L).
 - 2. Basis-of-Design Product: Tremflex 834 (VOC: 31 g/L).
- 2.7 JOINT-SEALANT BACKING
- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Alcot Plastics Ltd.; Alcot Plastics Backer Rod.
 - b. Master Builders Solutions Construction Systems US, LLC; Aktiengesellschaft; MasterSeal 920.
 - B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

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2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

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- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
 - 4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
 - 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
 - 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

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3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, M, P, 50, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of openings.
 - e. Control and expansion joints in overhead surfaces.
 - f. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in ceramic tile flooring.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, P, 25, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Ceramic tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of walls and partitions.
 - d. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, NS, 25, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
 - 1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Acrylic latex.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

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- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

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ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Acoustical-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- B. Sample Warranties: For special warranties.

1.4 COORDINATION

- A. Ensure joint sealant products are coordinated and compatible with the non-metallic plumbing piping system and the fire sprinkler piping system.

1.5 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.
- B. Compatibility: Provide sealants composed of components that are compatible with each other, substrates forming openings, and items penetrating sealant under conditions of service and application.
 - 1. For penetrations involving CPVC piping, provide sealants which include materials that have been tested to be compatible with CPVC piping.

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Franklin International; Titebond GREENchoice Professional Acoustical Smoke & Sound Sealant.

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- b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Grabber Construction Products.
 - d. Hilti, Inc.
 - e. OSI Sealants; Henkel Corporation.
 - f. Pecora Corporation; Pecora AIS-919 Acoustical and Insulation Latex Sealant.
 - g. United States Gypsum Company; SHEETROCK Acoustical Sealant
2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

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3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Interior standard steel doors and frames.
 - 2. Exterior standard steel doors and frames.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 7. Details of anchorages, joints, field splices, and connections.
 - 8. Details of accessories.
 - 9. Details of moldings, removable stops, and glazing.
- C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
 - 1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
 - 2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
 - 3. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.
- B. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.
- C. Field quality control reports.

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1.7 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.
- B. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:
 - 1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.
- C. Egress Door Inspector Qualifications: Inspector for field quality control inspections of egress door assemblies shall meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
 - 1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jams and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 1. Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ceco Door; ASSA ABLOY.
 - b. Curries Company; ASSA ABLOY.
 - c. DE LA FONTAINE.
 - d. Fleming Door Products Ltd.; ASSA ABLOY.
 - e. Gensteel Doors, Inc.
 - f. Hollow Metal Xpress.
 - g. Mesker Door Inc.
 - h. Republic Doors and Frames.
 - i. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.
 - 2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
- B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.
- C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.50 deg Btu/F x h x sq. ft. (2.84 W/K x sq. m) when tested in accordance with ASTM C518.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

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- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B..
 - 1. Doors:
 - a. Thickness: 1-3/4 inches (44.5 mm).
 - b. Face: Uncoated steel sheet, minimum thickness of 0.042 inch (1.0 mm).
 - c. Edge Construction: Model 2, Seamless.
 - d. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - e. Core: Manufacturer's standard.
 - f. Fire-Rated Core: Manufacturer's standard core for fire-rated and temperature-rise-rated doors.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
 - b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Face welded.
 - 3. Exposed Finish: Prime.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A..
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm).
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Polyurethane.
 - i. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
 - 2. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
 - b. Construction: Full profile welded.
 - 3. Exposed Finish: Prime.

2.5 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
- B. Construction: Face welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.7 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

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2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.8 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.9 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.

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2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.10 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.11 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.
 1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 4. Solidly pack mineral-fiber insulation inside frames.
 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

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- b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
- 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
 - 3. Smoke-Control Doors: Install doors in accordance with NFPA 105.
- D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
- 3.3 FIELD QUALITY CONTROL
- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
- 1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
 - 2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.
- 3.4 REPAIR
- A. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Five-ply flush wood doors for opaque finish.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
 - 1. Door core materials and construction.
 - 2. Door edge construction
 - 3. Door face type and characteristics.
 - 4. Factory-machining criteria.
 - 5. Factory- finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
 - 1. Door schedule indicating door location, type, size, fire protection rating, and swing.
 - 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 - 3. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 4. Dimensions and locations of blocking for hardware attachment.
 - 5. Dimensions and locations of mortises and holes for hardware.
 - 6. Clearances and undercuts.
 - 7. Requirements for veneer matching.
 - 8. Doors to be factory finished and application requirements.
- C. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Special warranties.

1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
 - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.
- B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
 - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

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1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C.
 - 1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards." and ANSI/WDMA I.S. 1A.
 - 1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.4 SOLID-CORE FIVE-PLY FLUSH WOOD DOORS FOR OPAQUE FINISH

- A. Interior Solid-Core Doors:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Eggers Industries.
 - b. Lambton Doors.
 - c. Masonite Architectural.
 - d. Oshkosh Door Company.
 - e. VT Industries Inc.
 - 2. Performance Grade:
 - a. ANSI/WDMA I.S. 1A Heavy Duty unless otherwise indicated on Drawings.
 - b. ANSI/WDMA I.S. 1A Extra Heavy Duty: public toilets, janitor's closets, exits, and where indicated on Drawings.
 - 3. Architectural Woodwork Standards Grade: Custom.
 - 4. Faces: Any closed-grain hardwood of mill option.

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5. Exposed Vertical and Top Edges: Any closed-grain hardwood.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors: Provide formed-steel edges and astragals with intumescent seals.
 - 1) Finish steel edges and astragals with baked enamel same color as doors.
 - c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: 475 lbf (2110 N) in accordance with WDMA T.M. 10.
6. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, Grade LD-1 particleboard.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 - 2) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 08 71 00 "Door Hardware."
7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 LIGHT FRAMES AND LOUVERS

- A. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
 1. Locate hardware to comply with DHI-WDHS-3.
 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
 5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Factory cut and trim openings through doors.
 1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."

2.7 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 2. Finish faces, all four edges, edges of cutouts, and mortises.
 3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.

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- C. Opaque Finish:
 - 1. Architectural Woodwork Standards Grade: Custom.
 - 2. Finish: Architectural Woodwork Standards System-11, Polyurethane, Catalyzed.
 - 3. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 08 71 00 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
 - 1. Install fire-rated doors and frames in accordance with NFPA 80.
 - 2. Install smoke- and draft-control doors in accordance with NFPA 105.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
 - 2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

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ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For access doors and frames.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing and inspecting agency.
 - 1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, section 5.2.3.1.

1.4 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:
 - 1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. J. L. Industries; a division of Activar Construction Products Group.
 - d. Karp Associates, Inc.
 - e. Larsen's Manufacturing Company.
 - f. Milcor Inc.
 - g. Nystrom, Inc.
 - 2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
 - 3. Locations: Wall and ceiling.
 - 4. Door Size: As indicated.
 - 5. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage, factory primed.
 - 6. Stainless Steel Sheet for Door: Nominal 0.062 inch (1.59 mm), 16 gage, ASTM A480/A480M No. 4 finish.
 - 7. Frame Material: Same material and thickness as door.
 - 8. Latch and Lock: Cam latch, screwdriver operated.

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2.3 FIRE-RATED ACCESS DOORS AND FRAMES

- A. Fire-Rated, Flush Access Doors with Concealed Flanges:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. J. L. Industries; a division of Activar Construction Products Group.
 - d. Karp Associates, Inc.
 - e. Larsen's Manufacturing Company.
 - f. Milcor Inc.
 - g. Nystrom, Inc.
 2. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with concealed flange for gypsum board installation, self-closing door, and concealed hinge.
 3. Locations: Wall.
 4. Door Size: As indicated.
 5. Fire-Resistance Rating: Not less than that of adjacent construction.
 6. Temperature-Rise Rating: 450 deg F (250 deg C) at the end of 30 minutes.
 7. Uncoated Steel Sheet for Door: Nominal 0.036 inch (0.91 mm), 20 gage, factory primed.
 8. Frame Material: Same material, thickness, and finish as door.
 9. Latch and Lock: Self-closing, self-latching door hardware, operated by knurled-knob.

2.4 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Stainless Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.
- D. Frame Anchors: Same material as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
- D. Latch and Lock Hardware:
 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
- E. Stainless Steel Finishes:
 - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - 2. Polished Finish: ASTM A480/A480M No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 3. Run grain of directional finishes with long dimension of each piece.
 - a. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Owner will engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, section 5.2.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80.

3.4 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

3.5 SCHEDULE

- A. Provide access doors where indicated and in the following locations:
 - 1. Access required by code.
 - 2. Access required for servicing operable, adjustable, or resettable fire suppression, plumbing, mechanical, electrical, life safety, security, and communication systems.
- B. Sizes: Provide the following unless noted otherwise:
 - 1. Ceilings and Soffits: 24 inches by 24 inches minimum.
 - 2. Toilet Rooms: 12 inches by 12 inches minimum at each fixture chase wall.
- C. Materials:
 - 1. Uncoated steel sheet unless noted otherwise.
 - 2. Stainless Steel:
 - a. Toilet rooms,.
 - b. Walls scheduled to receive tile finish, epoxy paint, or FRP panels.

END OF SECTION

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ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Aluminum-framed storefront systems.
 - 2. Aluminum-framed entrance door systems.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 4. Include point-to-point wiring diagrams showing the following:
 - a. Power requirements for each electrically operated door hardware.
 - b. Location and types of switches, signal device, conduit sizes, and number and size of wires.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- A. Delegated Design: Provide shop drawings signed and sealed by a structural engineer licensed to practice in the location of the project, indicating ability of system and attachment to supporting construction to resist indicated or code required loads.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
 - 1. For Installer and field testing agency.
 - 2. For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Source quality-control reports.

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- E. Field quality-control reports.
- F. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 MOCKUPS

- A. Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Testing shall be performed on mockups in accordance with requirements in "Field Quality Control" Article.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- C. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing accessories, from single manufacturer.

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2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members Supporting Glass: At design wind load, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m).
 - 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch (3.2 mm).
 - a. Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.
 - 3. Cantilever Deflection: Limited to $2L/175$ at unsupported cantilevers.
- E. Structural: Test in accordance with ASTM E330/E330M as follows:
 - 1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:
 - 1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- G. Water Penetration under Dynamic Pressure: Test in accordance with AAMA 501.1 as follows:
 - 1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
 - 2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- H. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
 - 1. Thermal Transmittance (U-factor):
 - a. Fixed Glazing and Framing Areas: U-factor for the system of not more than that required by applicable building code as determined in accordance with NFRC 100.
 - b. Entrance Doors: U-factor of not more than that required by applicable building code as determined in accordance with NFRC 100.
 - 2. Solar Heat-Gain Coefficient (SHGC):
 - a. Fixed Glazing and Framing Areas: SHGC for the system of not more than that required by applicable building code as determined in accordance with NFRC 200.

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- b. Entrance Doors: SHGC of not more than that required by applicable building code as determined in accordance with NFRC 200.
 - 3. Air Leakage:
 - a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa) when tested in accordance with ASTM E283.
 - b. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
- I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
 - 2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested in accordance with AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F (82 deg C).
 - b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
 - c. Interior Ambient-Air Temperature: 75 deg F (24 deg C).
- J. Structural Sealant: ASTM C1184. Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed, aluminum-framed entrances and storefronts without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
 - 1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 - 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate, because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.3 STOREFRONT SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Arcadia.
 - 2. Kawneer North America; an Arconic company.
 - 3. Oldcastle BuildingEnvelope.
 - 4. Tubelite Inc.
 - 5. U.S. Aluminum; a brand of C.R. Laurence.
 - 6. YKK AP America, Inc.
- B. Basis-of-Design Product: Kawneer North America; an Arconic company; Trifab 451T Framing System.
- C. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Exterior Framing Construction: Thermally broken.
 - 2. Glazing System: Retained mechanically with gaskets on four sides.
 - 3. Glazing Plane: Center.
 - 4. Fabrication Method: Field-fabricated stick system.
 - 5. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 6. Steel Reinforcement: As required by manufacturer.
- D. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- E. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 ENTRANCE DOOR SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Arcadia.
 - 2. Kawneer North America; an Alcoa company.
 - 3. Oldcastle BuildingEnvelope.
 - 4. Tubelite Inc.
 - 5. U.S. Aluminum; a brand of C.R. Laurence.
 - 6. YKK AP America, Inc.
- B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

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1. Door Construction:
 - a. Exterior Doors: 2-1/4 -inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members, thermally broken. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded.
2. Door Design: As indicated, with minimum 10 inch bottom rail.
3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
4. Finish: Match adjacent storefront framing finish.

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door, to comply with requirements in this Section.
 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 3. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Cylinders:
 1. As specified in Section 08 71 00 "Door Hardware."
- E. Weather Stripping: Manufacturer's standard replaceable components.
 1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
- F. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- G. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).

2.6 GLAZING

- A. Glazing: Comply with Section 08 80 00 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.7 MATERIALS

- A. Sheet and Plate: ASTM B209 (ASTM B209M).
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221 (ASTM B221M).
- C. Structural Profiles: ASTM B308/B308M.

2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

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1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.
- E. Rigid PVC filler.

2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Physical and thermal isolation of glazing from framing members.
 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Storefront Framing: Fabricate components for assembly using screw-spline system.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.10 BRAKE METAL

- A. Material: Extruded Aluminum.
- B. Thickness: 0.090 inches (2.38mm) unless noted otherwise.
- C. Finish: Match storefront.
- D. Texture: Smooth.
- E. Profile: As indicated.

2.11 ALUMINUM FINISHES

- A. Match existing.

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2.12 SOURCE QUALITY CONTROL

- A. Structural Sealant: Perform quality-control procedures complying with ASTM C1401 recommendations, including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 07 92 00 "Joint Sealants," to produce weathertight installation.
- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

- A. Install glazing as specified in Section 08 80 00 "Glazing."

3.4 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A. Install entrance doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.5 ERECTION TOLERANCES

- A. Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
 - 1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
 - 2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
 - 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
 - c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
 - 4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

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3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested in accordance with AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of three tests in areas as directed by Architect.
 - b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.7 MAINTENANCE SERVICE

- A. Entrance Door Hardware Maintenance:
 - 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
 - 2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for fire-rated doors.
- B. Electrically operated and controlled hardware.
- C. Lock cylinders for doors with balance of hardware specified in other sections.
- D. Thresholds.
- E. Weatherstripping and gasketing.

1.02 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- C. BHMA A156.1 - Standard for Butts and Hinges 2021.
- D. BHMA A156.3 - Exit Devices 2020.
- E. BHMA A156.4 - Door Controls - Closers 2019.
- F. BHMA A156.5 - Cylinders and Input Devices for Locks 2020.
- G. BHMA A156.6 - Standard for Architectural Door Trim 2021.
- H. BHMA A156.7 - Template Hinge Dimensions 2016.
- I. BHMA A156.8 - Door Controls - Overhead Stops and Holders 2021.
- J. BHMA A156.13 - Mortise Locks & Latches Series 1000 2017.
- K. BHMA A156.16 - Auxiliary Hardware 2018.
- L. BHMA A156.18 - Materials and Finishes 2020.
- M. BHMA A156.21 - Thresholds 2019.
- N. BHMA A156.22 - Standard for Gasketing 2021.
- O. BHMA A156.26 - Standard for Continuous Hinges 2021.
- P. BHMA A156.28 - Recommended Practices For Mechanical Keying Systems 2018.
- Q. BHMA A156.30 - High Security Cylinders 2020.
- R. BHMA A156.115 - Hardware Preparation In Steel Doors And Steel Frames 2016.
- S. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames 2006.

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- T. DHI (H&S) - Sequence and Format for the Hardware Schedule 2019.
 - U. DHI (KSN) - Keying Systems and Nomenclature 2019.
 - V. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames 2004.
 - W. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors 1993; also in WDHS-1/WDHS-5 Series, 1996.
 - X. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - Y. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
 - Z. ITS (DIR) - Directory of Listed Products Current Edition.
 - AA. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - BB. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
 - CC. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - DD. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.
 - EE. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
 - FF. UL (DIR) - Online Certifications Directory Current Edition.
 - GG. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
 - HH. UL 294 - Access Control System Units Current Edition, Including All Revisions.
 - II. UL 437 - Standard for Key Locks Current Edition, Including All Revisions.
 - JJ. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.
- 1.03 ADMINISTRATIVE REQUIREMENTS
- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
 - B. Sequence installation to ensure facility services connections are achieved in an orderly and expeditious manner.
 - C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by affected installers and the following:
 - 1. Architect.
 - 2. Installer's Architectural Hardware Consultant (AHC).
 - 3. Hardware Installer.
 - 4. Owner's Security Consultant.
 - 5. dormakaba.
 - D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

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- E. Keying Requirements Meeting:
 - 1. Schedule meeting at project site prior to Contractor occupancy.
 - 2. Attendance Required:
 - a. Contractor.
 - b. Owner.
 - c. Architect.
 - d. Installer's Architectural Hardware Consultant (AHC).
 - e. Owner's Security Consultant.
 - f. dormakaba.
 - 3. Agenda:
 - a. Establish keying requirements.
 - b. Verify locksets and locking hardware are functionally correct for project requirements.
 - c. Verify that keying and programming complies with project requirements.
 - d. Establish keying submittal schedule and update requirements.
 - 4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
 - a. Access control requirements.
 - b. Key control system requirements.
 - c. Flow of traffic and extent of security required.
 - 5. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
 - 6. Deliver established keying requirements to manufacturers.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: A detailed listing that includes each item of hardware to be installed on each door.
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 - 2. Comply with DHI (H&S) using door numbering scheme and hardware set numbers as indicated in Contract Documents.
 - a. Submit in vertical format.
 - 3. List groups and suffixes in proper sequence.
 - 4. Include complete description for each door listed.
 - 5. Include manufacturer's and product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
 - 6. Include account of abbreviations and symbols used in schedule.
- D. Shop Drawings - Electrified Door Hardware: Include diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
 - 2. Elevations: Include front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
 - 3. Diagrams: Include point-to-point wiring diagrams that show each device in door opening system with related colored wire connections to each device.
- E. Samples for Verification:

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1. Submit minimum size of 2 by 4 inch (51 by 102 mm) for sheet samples, and minimum length of 4 inch (102 mm) for other products.
 2. Submit one (1) sample of hinge, latchset, lockset, closer, and _____ illustrating style, color, and finish.
 3. Include product description with samples.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Supplier's qualification statement.
- J. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- K. Keying Schedule:
 1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- L. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- M. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- N. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 1. See Section 01 60 00 - Product Requirements, for additional provisions.
- 1.05 QUALITY ASSURANCE
- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least five years of documented experience.
- D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) to assist in work of this section.
- 1.06 DELIVERY, STORAGE, AND HANDLING
- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.
- 1.07 WARRANTY
- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.
 1. Closers: Twenty-five years, minimum.
 2. Exit Devices: Five years, minimum.

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3. Locksets: Limited Lifetime
4. Cylinders: Three years, minimum.
5. Other Hardware: One year, minimum.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Locks: Provide a lock for each door, unless it's indicated that lock is not required.
 1. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's Series. As indicated in hardware sets.
 2. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.
 3. Strikes:
 - a. Finish: To match lock or latch.
 - b. Curved-Lip Strikes: Provide as standard, with extended lip to protect frame, unless otherwise indicated.
 - c. Center Strike at Pairs of Doors: 7/8-inch (22.2 mm) lip.
- D. Door Pulls and Push Plates:
 1. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
 2. On solid doors, provide matching door pull and push plate on opposite faces.
- E. Closers:
 1. Provide door closer on each exterior door, unless otherwise indicated.
 2. Provide door closer on each fire-rated and smoke-rated door.
 3. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.
- F. Overhead Stops and Holders (Door Checks).
 1. Provide stop for every swinging door, unless otherwise indicated.
 2. Overhead Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop, unless otherwise indicated.
 3. Overhead stop is not required if a floor or wall stop has been specified for the door.
- G. Drip Guards: Provide at head of outswinging exterior doors unless protected by roof or canopy directly overhead.
- H. Thresholds:
 1. Interior Applications: Provide when specified at interior doors for transition between two different floor types, unless otherwise indicated.
 2. Exterior Applications: Provide at each exterior door, unless otherwise indicated.
- I. Weatherstripping and Gasketing:
- J. Fasteners:
 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide Phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
 2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
 - a. Self-drilling (Tek) type screws are not permitted.

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3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
4. Provide wall grip inserts for hollow wall construction.
5. Fire-Resistance-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.
6. Concealed Fasteners: Do not use through or sex bolt type fasteners on door panel sides indicated as concealed fastener locations, unless otherwise indicated or required per manufacturer's testing requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Provide door hardware products that comply with the following requirements:
 1. Applicable provisions of federal, state, and local codes.
 - a. ICC (IBC).
 - b. NFPA 101.
 2. Accessibility: ADA Standards and ICC A117.1.
 3. Fire-Resistance-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 4. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 5. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
 6. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.

2.03 HINGES

- A. Manufacturers: Conventional butt hinges.
 1. BEST; dormakaba Group: www.bestaccess.com/#sle.
 2. Ives.
 3. McKinney.
- B. Properties:
 1. Butt Hinges: As applicable to each item specified.
 - a. Standard Weight Hinges: Minimum of two (2) permanently lubricated non-detachable bearings.
 - b. Heavy Weight Hinges: Minimum of four (4) permanently lubricated bearings on heavy weight hinges.
 - c. Template screw hole locations.
 - d. Bearing assembly installed after plating.
 - e. Bearings: Concealed fully hardened bearings.
 - f. Bearing Shells: Shapes consistent with barrels.
 - g. Pins: Easily seated, non-rising pins.
 - 1) Fully plate hinge pins.
 - 2) Non-Removable Pins: Slotted stainless steel screws.
 - h. UL 10C listed for fire-resistance-rated doors.
 2. Continuous Hinges: As applicable to each item specified.
 - a. Geared Continuous Hinges: As applicable to each item specified.
 - 1) Non-handed.
 - 2) Anti-spinning through-fastener.
 - 3) UL 10C listed for fire-resistance-rated doors.
 - a) Metal Door Installation: Rated up to 90 minutes.
 - b) Wood Door Installation: Rated up to 60 minutes.

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4) Sufficient size to permit door to swing 180 degrees.

- C. Sizes: See Door Hardware Schedule.
1. Hinge Widths: As required to clear surrounding trim.
 2. Sufficient size to allow 180-degree swing of door.
- D. Finishes: See Door Hardware Schedule.
1. Fully polish hinges, front, back, and barrel.
- E. Grades:
1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
 2. Comply with BHMA A156.18 Materials and Finishes.
 3. Comply with BHMA A156.1 Salt Spray Test.
 4. Comply with UL 294 Corrosion Test Outside Moist Hydrogen sulfide (H₂) air mixture.
 5. Comply with UL 294 Corrosion Test Outside Moist Carbon Dioxide (CO₂) sulfur dioxide (SO₂) air mixture.
 6. Comply with UL 294 Corrosion Test Outside Salt Spray.
 7. Continuous Hinges: Comply with BHMA A156.26, Grade 1.
- F. Material: Base metal as indicated for each item by BHMA material and finish designation.
- G. Types:
1. Butt Hinges: Include full mortise hinges.
 2. Continuous Hinges: Include geared hinges.
- H. Options: As applicable to each item specified.
- I. Quantities:
1. Butt Hinges: Three (3) hinges per leaves up to 90 inches (2286 mm) in height. Add one (1) for each additional 30 inches (762 mm) in height or fraction thereof.
 - a. Hinge weight and size unless otherwise indicated in hardware sets:
 - 1) For doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
 - 2) For doors from 36 inches (914 mm) wide up to 42 inches (1067 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.145 inch (3.7 mm) and a minimum of 4-1/2 inches (114 mm) in height.
 - 3) For doors from 42 inches (1067 mm) wide up to 48 inches (1219 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
 - 4) For doors greater than 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
 2. Continuous Hinges: One per door leaf.
- J. Applications: At swinging doors.
1. Provide non-removable pins at out-swinging doors with locking hardware and all exterior doors.
- K. Products:
1. Butt Hinges:
 - a. Concealed bearing, five (5) knuckles.
 2. Continuous Hinges:
 - a. Aluminum geared hinges.

2.04 BOLTS

- A. Manufacturers:
1. Trimco: www.trimcohardware.com/#sle.

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2. Ives.

B. Properties:

1. Flush Bolts:
 - a. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
 - b. Manual Flush Bolts: Manually latching upon closing of door leaf.
 - 1) Bolt Throw: 3/4 inch (19 mm), minimum.
 - c. Automatic Flush Bolts: Automatically latching upon closing of door leaf.
 - 1) Bolt Throw: 3/4 inch (19 mm), minimum.
 - d. Self-Latching Flush Bolts: Automatically latching upon closing of door; manually retracted; located on inactive leaf of pair.
 - 1) Bolt Throw: 3/4 inch (19 mm), minimum.
2. Dustproof Strikes: For bolting into floor, provide except at metal thresholds.

C. Options:

1. Extension Bolts: In leading edge of door, one bolt into floor, one bolt into top of frame.
2. Lever extensions: Provide for top bolt at oversized doors.

D. Products:

1. Manual flush bolts.
2. Automatic flush bolts.

2.05 EXIT DEVICES

A. Manufacturers:

1. BEST, dormakaba Group: www.bestaccess.com/#sle.
2. Substitutions: Not permitted.

B. Properties:

1. Actuation: Full-length touchpad.
2. Chassis:
 - a. Construction: Investment cast steel, zinc dichromate plated.
 - b. Compatibility: Standard Stile doors.
3. Touchpads: "T" style metal touchpads and rail assemblies with matching chassis covers end caps.
4. Latch Bolts: Stainless steel deadlocking with 3/4-inch (19 mm) projection using latch bolt.
5. Lever Design: Match project standard lockset trims.
6. Cylinder: Include where cylinder dogging or locking trim is indicated.
7. Strike as recommended by manufacturer for application indicated.
8. Sound dampening on touch bar.
9. Dogging:
 - a. Non-Fire-Resistance-Rated Devices: Cylinder 1/4-inch (6 mm) hex key dogging.
 - b. Fire-Resistance-Rated Devices: Manual dogging not permitted.
10. Touch bar assembly on wide style exit devices to have a 1/4-inch (6.3 mm) clearance to allow for vision frames.
11. All exposed exit device components to be of architectural metals and "true" architectural finishes.
12. Handing: Field-reversible.
13. Fasteners on Back Side of Device Channel: Concealed - exposed fasteners not allowed.
14. Vertical Latch Assemblies' Operation: Gravity, without use of springs.

C. Grades: Complying with BHMA A156.3, Grade 1.

1. Provide exit devices tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.

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- D. Standards Compliance:
 - 1. UL Listed for Panic and Fire for Class II Circuitry.
 - 2. Provide UL (DIR) listed exit device assemblies for fire-resistance-rated doors.
 - 3. Comply with UL 10C.
- E. Code Compliance: As required by authorities having jurisdiction in the State in which the Project is located.
- F. Options:
 - 1. Exit Device Intruder Function Visual Indicator in conjunction with the ANSI "10" Function,
 - a. Directional Indicator:
 - 1) Actuation: By a rim cylinder equipped with a keyed core or thumb-turn.
 - 2) Embossed into the active case cover.
 - b. Large status window integrated into the housing of the exit device, with directional pointers to indicated key turn direction to lock and unlock outside lever trim.
 - c. Use bright reflective materials capable of being seen in low light condition.
 - d. Labels or stickers are not permitted.
 - e. Impact resistant lens cover.
 - f. A quarter turn (90 degrees) of key or thumb turn to lock down or unlock.
 - g. Locked status indicated by a red indicator with an image of a locked padlock appearing under lens cover.
 - h. Unlocked status indicated by a green indicator with an image of an unlocked padlock appearing under lens cover.
 - 2. Vandal-Resistant Trim: Heavy-duty lever trim with heavy-duty investment-cast stainless steel components and extra strength shock absorbing overload springs.
 - a. Not requiring resetting.
 - b. Lever design to match locksets and latchsets.
- G. Products:
 - 1. 2000.

2.06 Removable Mullions

- A. Manufacturers:
 - 1. BEST, dormakaba Group: www.bestaccess.com/#sle.
 - 2. Substitutions: Not permitted.
- B. Properties:
 - 1. Rectangular shape 3 inches (76 mm) by 2 inches (51 mm) tubes with minimum 1/8 inch (3.2 mm) wall thickness.
 - 2. Furnished by the same manufacturer as exit devices.
 - 3. Pre-drilled holes for installation of exit device strikes.
 - 4. Spacers: Provide as required for proper installation, based on frame profile and dimensions.
- C. Grades: Complying with BHMA A156.3.
- D. Materials: Manufacturer's standard for items specified.
 - 1. Top and Bottom Brackets: Investment-cast steel.
- E. Options:
 - 1. Furnish Keyed Removable "KR" feature and corresponding cylinders as specified.
 - a. Mullions capable of being installed without physical key present.
 - b. Physical key required to operate.
- F. Applications: As indicated on drawings and in Door Hardware Schedule.

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- G. Products:
 - 1. 822 Series.

2.07 LOCK CYLINDERS

- A. Manufacturers:
 - 1. BEST, dormakaba Group: www.bestaccess.com/#sle.
 - 2. Substitutions: Not permitted.
- B. Properties:
 - 1. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
 - a. Provide cylinders from same manufacturer as locking device.
 - b. Provide cams and/or tailpieces as required for locking devices.
 - c. Provide cylinders with appropriate format interchangeable cores where indicated.
- C. Grades:
 - 1. Standard Security Cylinders: Comply with BHMA A156.5.
 - 2. High Security Cylinders: Comply with BHMA A156.30 or UL 437.
- D. Material:
- E. Types: As applicable to each item specified.
 - 1. Standard security small format interchangeable core (SFIC) type cylinders, with seven-pin, 1C - 7-pin cores.
 - 2. High security type cylinders with seven-pin cores.
- F. Applications: At locations indicated in hardware sets, and as follows
 - 1. As required for items with locking devices provided by other sections, including at elevator controls and cabinets.
 - a. When provisions for lock cylinders are referenced elsewhere in the Project Manual to this Section, provide compatible type of lock cylinder, keyed to building keying system, unless otherwise indicated.
- G. Products:
 - 1. Rim/mortise.

2.08 MORTISE LOCKS

- A. Manufacturers:
 - 1. BEST, dormakaba Group: www.bestaccess.com/#sle.
 - 2. Substitutions: Not permitted.
- B. Properties:
 - 1. Mechanical Locks: Manufacturer's standard.
 - a. Fitting modified ANSI A115.1 door preparation.
 - b. Door Thickness Coordination Fitting 1-3/4 inch (44 mm) to 2-1/4 inch (57 mm) thick doors.
 - c. Latch: Solid, one-piece, anti-friction, self-lubricating stainless steel.
 - 1) Latchbolt Throw: 3/4 inch (19 mm), minimum.
 - d. Auxiliary Deadlatch: One-piece stainless steel, permanently lubricated.
 - e. Deadbolt: Hardened stainless steel.
 - 1) Deadbolt Throw: 1 inch (25.4 mm), minimum.
 - f. Backset: 2-3/4 inch (70 mm).
 - g. Cylinders:
 - 1) Cylinder Security: Use concealed internal setscrew accessible only by removing the core with the control key from the cylinder body for securing the cylinder to the lockset.

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- 2) Cylinder Core Types: Locks capable of supporting manufacturers' cores, as applicable.
 - a) 7-pin, removable.
 - b) Small format interchangeable.
 - h. Lever Trim:
 - 1) Functionality: Allow the lever handle to move up to 45 degrees from horizontal position prior to engaging the latchbolt assembly.
 - 2) Strength: Locksets outside locked lever designed to withstand minimum 1,400 inch-lbs (158.2 Nm) of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
 - 3) Spindle: Designed to prevent forced entry from attacking of lever.
 - 4) Independent spring mechanism for each lever.
 - a) Trim to be self-aligning and thru bolted.
 - 5) Handles: Made of forged or cast brass, bronze, or stainless-steel construction. Levers that contain a hollow cavity are not acceptable.
 - 6) Levers to operate a roller bearing spindle hub mechanism.
 2. Electrified Locks: Same properties as standard locks, and as follows:
 - a. Voltage: 24 VDC.
 - b. Function: Electrically locked (Fail Safe) or unlocked (Fail Secure), as indicated for each lock in Door Hardware Schedule.
- C. Finishes: See Door Hardware Schedule.
1. Core Faces: Match finish of lockset.
- D. Grades:
1. Comply with BHMA A156.13, Grade 1, Security; Grade 2.
 - a. Durability: Passing 4 million cycles tests verified by third party testing agency.
- E. Options:
1. Provide locksets made in a manufacturing facility to compliant with ISO 9001-Quality Management and ISO 14001-Environmental Management.
 2. Temperature Control Module (TCM) at W-Series locks.
 3. Regulatory Compliance: As required by authorities having jurisdiction the State in which the Project is located.
- F. Products: Mortise locks, including standard and electrified types.
1. 40H.
- 2.09 DOOR PULLS AND PUSH PLATES
- A. Manufacturers:
1. Trimco: www.trimcohardware.com/#sle.
 2. Rockwood.
 3. Ives.
- B. Properties:
1. Pull Type: As specified in HW Sets.
 2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
 - a. Edges: Beveled, unless otherwise indicated.
- C. Grades: Comply with BHMA A156.6.
- D. Material: Stainless steel, unless otherwise indicated.
- E. Products:

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2.10 CLOSERS

- A. Manufacturers:
1. BEST, dormakaba Group www.bestaccess.com/#sle.
 2. dormakaba; dormakaba Group: www.dormakaba.com/us-en/#sle.
- B. Properties:
1. Surface Mounted Closers: Manufacturer's standard.
 - a. Construction: Cast iron.
 - b. Maximum Projection from Face of Door: 2-7/16 inches (62 mm).
 - c. Mechanism: Separate tamper-resistant adjusting valves for closing and latching speeds.
 - 1) Include advanced backcheck feature.
 - 2) Include delayed action feature.
 - d. Hydraulic Fluid: All-weather type.
 - e. Arm Assembly: Standard for product specified.
 - 1) Include hold-open, integral stop, or spring-loaded stop feature, as specified in Door Hardware Schedule.
 - 2) Parallel arm to be a heavy-duty rigid arm.
 - 3) Where "IS" or "S-IS" arms are specified in hardware sets, if manufacturer does not offer this arm provide a regular arm mount closer in conjunction with a heavy-duty overhead stop equal to a dormakaba 900 Series.
 - f. Covers:
 - 1) Type: Standard for product selected.
 - a) Full.
 - 2) Material: Plastic.
 - 3) Finish: Painted.
- C. Grades:
1. Closers: Comply with BHMA A156.4, Grade 1.
 - a. Underwriters Laboratories Compliance:
 - 1) Product Listing: UL (DIR) and ULC for use on fire-resistance-rated doors.
 - a) UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.
- D. Code Compliance: As required by authorities having jurisdiction in the State in which the Project is located.
1. Devices listed with California Department of Forestry and Fire Protection, Office of the State Fire Marshal.
- E. Types:
1. Rack-and-pinion, surface-mounted. 1-1/2 inches (38 mm) minimum bore.
 2. Cam-and-roller, surface-mounted, adjustable spring power.
- F. Options:
1. Delayed action, adjustable with an independent valve.
 2. Advanced backcheck.
 3. Adjustable, for force or angle of opening hold open.
 4. Cushion limit stay.
- G. Installation:
1. Mounting: Includes surface mounted installations.
 2. Mount closers on non-public side of door and stair side of stair doors unless otherwise noted in hardware sets.
 3. At outswinging exterior doors, mount closer on interior side of door.
 4. Provide adapter plates, shim spacers, and blade stop spacers as required by frame and door conditions.
 5. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.

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- H. Products:
 - 1. Surface Mounted:
 - a. HD8000.
 - b. TS93.

2.11 OVERHEAD STOPS AND HOLDERS

- A. Manufacturers:
 - 1. dormakaba; dormakaba Group: www.dormakaba.com/us-en/#sle.
 - 2. Architectural Builders Hardware Manufacturing: www.abhmfg.com/#sle.
 - 3. Rixson.
- B. Properties:
 - 1. Stop Settings: At 90 degrees opening.
 - a. Adjustable friction tension.
 - 2. Hold-Open Settings: At 90 degrees opening.
 - a. Provide nylon composites for proven friction resistance and durability.
 - b. Provide built-in cushion stop.
- C. Sizes: Manufacturer's standard for the application.
- D. Finishes:
 - 1. Arms and Brackets: Zinc-plated.
- E. Grades: As applicable to item specified.
 - 1. Comply with BHMA A156.8, Grade 1.
- F. Underwriters Laboratories Compliance:
 - 1. Product Listing: UL (DIR) and ULC for use on fire-resistance-rated doors.
- G. Material: Base metal as indicated for each item by BHMA material and finish designation.
 - 1. Track Channel: Extruded aluminum alloy.
 - 2. Slide Block: Machined from solid brass alloy.
- H. Types:
 - 1. Concealed.
- I. Products:
 - 1. Concealed Overhead Stops and Holders:
 - a. 710 Standard Duty.

2.12 PROTECTION PLATES

- A. Manufacturers:
 - 1. Trimco: www.trimcohardware.com/#sle.
 - 2. Rockwood.
 - 3. Ives.
- B. Properties:
 - 1. Plates:
 - a. Kick Plates: Provide along bottom edge of push side of every wood door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
 - 1) Size: 10 inches (254 mm) high by 2 inch (51 mm) less door width (LDW) on push side of door.

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- b. Mop Plates: Provide along bottom edge of pull side of doors to provide protection from cleaning liquids and equipment damage to door surface.
 - 1) Size: 6-inch (152 mm) high by 1-1/2 inch (38 mm) less door width (LDW) on pull side and 2 inch (51 mm) LDW on push side of door.
- c. Edges: Beveled, on four (4) unless otherwise indicated.

C. Grades: Comply with BHMA A156.6.

D. Material: As indicated for each item by BHMA material and finish designation.

- 1. Metal Properties: Stainless steel.
 - a. Metal, Standard Duty: Thickness 0.050 inch (1.27 mm), minimum.

E. Installation:

- 1. Fasteners: Countersunk screw fasteners

F. Products:

2.13 STOPS AND HOLDERS

A. Manufacturers:

- 1. Trimco: www.trimcohardware.com/#sle.
- 2. Rockwood.
- 3. Ives.

B. General: Provide overhead stop/holder when wall or floor stop is not feasible.

C. Properties:

- 1. Wall Bumpers:
- 2. Floor Stops:..

D. Grades:

- 1. Door Holders, Wall Bumpers, and Floor Stops: Comply with BHMA A156.16 and Resilient Material Retention Test as described in this standard.

E. Material: Base metal as indicated for each item by BHMA material and finish designation.

F. Types:

- 1. Wall Bumpers: Bumper, concave, wall stop.
- 2. Floor Stops: Provide with bumper floor stop.

G. Installation:

- 1. Non-Masonry Walls: Confirm adequate wall reinforcement has been installed to allow lasting installation of wall bumpers.

H. Products:

- 1. Wall Bumpers.
- 2. Floor Stops.

2.14 THRESHOLDS

A. Manufacturers:

B. Properties:

- 1. Threshold Surface: Fluted horizontal grooves across full width.

C. Grades: Thresholds: Comply with BHMA A156.21.

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D. Types: As applicable to project conditions. Provide barrier-free type at every location where specified.

E. Products:

2.15 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:

1. National Guard Products, Inc: www.ngpinc.com/#sle.
2. Pemko.
3. Zero.

B. Properties:

1. Weatherstripping Air Leakage Performance: Not exceeding 0.3 cfm/sq ft (____ l/sq m) of door opening at 0.3 inches of water pressure differential for single doors, and 0.5 cfm/sq ft (____ l/sq m) of door area at 0.3 inches of water pressure differential for double doors for gasketing other than smoke control, as tested according to ASTM E283/E283M; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
2. Adhesive-Backed Perimeter Gasketing: Silicone gasket material applied to frame with self-adhesive.

C. Grades: Comply with BHMA A156.22.

D. Products:

1. Smoke Seals: See Door Hardware Schedule.

2.16 MISCELLANEOUS ITEMS

A. Manufacturers:

B. Properties:

1. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
 - a. Single Door: Provide three on strike jamb of frame.
 - b. Pair of Doors: Provide two on head of frame, one for each door at latch side.
 - c. Material: Rubber, gray color.

C. Products:

1. Silencers.

2.17 Keys and Cores

A. Manufacturers:

1. BEST, dormakaba Group: www.bestaccess.com/#sle.
2. Substitutions: Not permitted.

B. Properties: Complying with guidelines of BHMA A156.28.

1. Provide small format interchangeable core.
2. Provide Patented CORMAX keys and cores.
3. Provide keying information in compliance with DHI (KSN) standards.
4. Keying Schedule: Arrange for a keying meeting, with Architect, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements.
5. Keying: Master keyed.
6. Include construction keying and control keying with removable core cylinders.
7. Key to existing keying system.

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8. Supply keys in following quantities:
 - a. Master Keys: 4 each.
 - b. Construction Master Keys: 6 each.
 - c. Construction Keys: 15 each.
 - d. Construction Control Keys: 2 each.
 - e. Control Keys if New System: 2 each.
9. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
10. Deliver keys with identifying tags to Owner by security shipment direct from manufacturer.
11. Permanent Keys and Cores: Stamped with applicable key marking for identification. Do not include actual key cuts within visual key control marks or codes. Stamp permanent keys "Do Not Duplicate."
12. Include installation of permanent cores and return construction cores to hardware supplier. Construction cores and keys to remain property of hardware supplier.

C. Products:

1. Patented:
 - a. CORMAX.

2.18 Key Cabinets

A. Manufacturers:

1. Lund Equipment Company, Inc: www.lundkey.com/#sle.
2. Telkee: www.telkee.com/#sle.

B. Properties:

1. Key Management System: For each keyed lock on project, provide one set of consecutively numbered duplicate key tags with hanging hole and snap catch.
2. Security Key Tags: For each keyed lock on project, provide one set of matching key tags for permanent attachment to one key of each set.
3. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
4. Mounting: Wall surface mounted.
5. Capacity: Actual quantity of keys, plus 25 percent additional capacity.
6. Key cabinet lock to facility's keying system.

C. Finishes: Baked enamel, manufacturer's standard color.

D. Material: Sheet steel.

2.19 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.

1. Finish: 630; satin stainless steel, with stainless steel 3000 series base material (former US equivalent 32D), 652; satin chromium plated over nickel, with steel base material (former US equivalent 26D), and 689; aluminum painted, with any base material (former US equivalent US28); BHMA A156.18.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

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- B. Correct all defects prior to proceeding with installation.
- C. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware using the manufacturer's fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.
- C. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- D. Install hardware for smoke and draft control doors in accordance with NFPA 105.
- E. Use templates provided by hardware item manufacturer.
- F. Do not install surface mounted items until application of finishes to substrate are fully completed.
- G. Wash down masonry walls and complete painting or staining of doors and frames.
- H. Complete finish flooring prior to installation of thresholds.
- I. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
 - 1. For Steel Doors and Frames: Install in compliance with DHI (LOCS) recommendations.
 - 2. For Steel Doors and Frames: See Section 6549.
 - 3. For Steel Door Frames: See Section 08 12 13.
 - 4. For Aluminum-Framed Storefront Doors and Frames: See Section 08 43 13.
 - 5. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
 - 6. Flush Wood Doors: See Section 08 14 16.
 - 7. Stile and Rail Wood Doors: See Section 08 14 33.
 - 8. Mounting heights in compliance with ADA Standards:
 - a. Locksets: 40-5/16 inch (1024 mm).
 - b. Push Plates/Pull Bars: 42 inch (1067 mm).
 - c. Deadlocks (Deadbolts): 36 inch (1219 mm).
 - d. Exit Devices: 40-5/16 inch (1024 mm).
 - e. Door Viewer: 43 inch (1092 mm); standard height 60 inch (1524 mm).
- J. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.
- K. Include in installation for existing doors and frames any necessary field modification and field preparation of doors and frames for new hardware. Provide necessary fillers, reinforcements, and fasteners for mounting new hardware and to cover existing door and frame preparations.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 01 40 00 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.

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- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

3.06 PROTECTION

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Glass for windows and doors.
 - 2. Glazing sealants and accessories.

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
 - 1. Insulating glass.
- C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch (300-mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated Design: Provide shop drawings signed and sealed by a structural engineer licensed to practice in the location of the project, indicating ability of system and attachment to supporting construction to resist indicated or code required loads.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For glass.
- C. Preconstruction adhesion and compatibility test report.
- D. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

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- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Install glazing in mockups specified in Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" to match glazing systems required for Project, including glazing methods.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

1.11 WARRANTY

- A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Cardinal Glass Industries.
 - 2. Guardian Industries Corp.
 - 3. Oldcastle BuildingEnvelope.

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4. McGrory Glass.
5. Pilkington North America.
6. Vitro.

- B. Basis-of-Design Product: Refer to Drawings.
- C. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- D. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Energy Performance: Meet 2015 IECC Code Requirements.
- C. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.
- D. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
 1. Design Wind Pressures: As indicated on Drawings.
 2. Design Snow Loads: As indicated on Drawings.
 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 1. GANA Publications: "Glazing Manual."
 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
 1. Minimum Glass Thickness for Exterior Lites: 6 mm.

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- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
 - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 - 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Technoform Glass Insulation NA, Inc.
 - 2) Thermix; a brand of Ensinger USA.
 - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 790.
 - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
 - c. Bondaflex Sil 290.
 - d. Pecora Corporation; 890NST.
 - e. Sikasil WS-290.
 - f. Tremco Incorporated; Spectrem 1
- C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 795.
 - b. GE Advanced Materials - Silicones; SilGlaze II SCS2800.
 - c. Pecora Corporation; 864.
 - d. Polymeric Systems, Inc.; PSI-641.
 - e. Tremco Incorporated; Spectrem 2.
 - 2.

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2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 - 1. AAMA 804.3 tape, where indicated.
 - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

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3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

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- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

- A. Glass Type : Clear annealed float glass.
 - 1. Minimum Thickness: 6 mm.
- B. Glass Type : Clear fully tempered float glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required.

3.9 INSULATING GLASS SCHEDULE

- A. Glass Type : Low-E-coated, clear insulating glass.
 - 1. Overall Unit Thickness: 1 inch (25 mm).
 - 2. Minimum Thickness of Each Glass Lite: 6 mm.
 - 3. Outdoor Lite: Heat-strengthened or fully tempered float glass as indicated or required by code.
 - 4. Interspace Content: Air.
 - 5. Indoor Lite: Heat-strengthened or fully tempered float glass as indicated or required by code.
 - 6. Low-E Coating: Sputtered on second surface.
 - 7. Safety glazing required as indicated or required by code.

END OF SECTION

SECTION 08 83 00

MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
 - 1. Tempered glass mirrors qualifying as safety glazing in fitness rooms or required by building code.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.
 - 1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Binswanger Mirror; a division of Vitro America, Inc.
 - 2. Gardner Glass, Inc.
 - 3. Glasswerks LA, Inc.
 - 4. Guardian Industries Corp..
 - 5. Virginia Mirror Company, Inc.
 - 6. Walker Glass Co., Ltd.

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- B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C 1503; manufactured using copper-free, low-lead mirror coating process.
- B. Tempered Glass Mirrors: Mirror Glazing Quality for blemish requirements and complying with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; clear.
 - 1. Nominal Thickness: 6.0 mm .
 - 2. Application: Fitness room, typical.

2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Palmer Products Corporation.
 - b. Pecora Corporation.

2.4 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
 - 1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch (9.5 and 22 mm) in height, respectively, and a thickness of not less than 0.04 inch (1.0 mm).
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Andscot Company, Inc.
 - 2) Laurence, C. R. Co., Inc.
 - 3) Stylmark, Inc.
 - 2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch (16 and 25 mm) in height, respectively, and a thickness of not less than 0.04 inch (1.0 mm).
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Andscot Company, Inc.
 - 2) Laurence, C. R. Co., Inc.
 - 3) Stylmark, Inc.
 - 3. Finish: Clear bright anodized.
- B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

- A. Fabricate mirrors in the shop to greatest extent possible.
- B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished.
 - 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 - 2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
 - 1. GANA Publications: "Glazing Manual" and "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- B. Provide a minimum airspace of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 - 1. Aluminum J-Channels: Provide setting blocks 1/8 inch (3 mm) thick by 4 inches (100 mm) long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch (6.4 mm) wide by 3/8 inch (9.5 mm) long at bottom channel.
 - 2. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch (3 mm) between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer.

END OF SECTION

SECTION 08 87 00
GLAZING SURFACE FILMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes film products applied to glass surfaces

1.2 DEFINITIONS

- A. Emissivity: The ability of a surface to absorb far-infrared heat and to reflect it. The lower the emissivity, the lower the far-infrared heat absorption and the greater the far-infrared heat reflectance.
- B. Low Emissivity (Low-E) Films: Films with improved far-infrared heat reflection, with the ability to reduce winter heat loss through windows. The reflection of far-infrared heat also reduces the need for summer cooling by reducing the transmission of far-infrared heat from outdoor objects through windows into the interior of a home or building.
- C. Low Reflectance Films: Films whose visible light reflectance values are very close to that of ordinary glass.
- D. Light to Solar Heat Gain Ratio: Ratio of visible light transmission to Solar Heat Gain Coefficient for a glazing system.
- E. Solar Heat Gain Coefficient: The fraction of incident solar radiation that actually passes through that window, including solar energy that is both directly transmitted and that which is absorbed and subsequently released inwardly by re-radiation and conduction.
 - 1. SHGC is expressed as a number between 0 and 1. The lower a window's solar heat gain coefficient, the less solar heat it transmits.
 - 2. This number is the mathematical complement of the TSER value: The sum of the TSER (Total Solar Energy Rejection, in decimal form) of a glazing system and its SHGC value is 1; therefore, $1 - TSER = SHGC$
- F. Fire Performance: Surface burning characteristics when applied to 1/4 inch, nominal clear glass and tested in accordance with ASTM E84:
 - 1. Flame Spread Index: 25 maximum.
 - 2. Smoke Developed: 50 maximum.
- G. Minimum Peel Strength: 2,000 grams per inch, average of two specimens when tested in accordance with ASTM D 3330.

1.3 ACTION SUBMITTALS

- A. Product Data: For each film product indicated.
- B. Samples for Color Selection: Manufacturer's standard sample sets showing the full range of colors available for each type of product indicated.
- C. Samples for Verification: 12-inch square samples of each type of glazing film specified, in color specified.
- D. Shop Drawings: Identify location for each type of film indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 CLOSEOUT SUBMITTALS

- A. Warranty: Special warranty specified in this Section.
- B. Maintenance Data and Replacement Instructions: For each type of film overlay to include in maintenance manuals.

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1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing systems similar to those indicated for this Project and meeting the standards of the International Standards Organization (ISO), ISO 9001 Quality Assurance in Production and Installation.
- B. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by film manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements.
- C. Source Limitations: Obtain each type of film overlay through one source from a single manufacturer to provide products of consistent quality in appearance and physical properties.
- D. Mockups: Apply glazing films in locations as directed to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Obtain approval of field samples before continuing with remainder of installation.
 - 2. Maintain field samples during remainder of installation in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approved field samples may become part of the completed Work.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
 - 1. Conduct pre-installation conference in conjunction with installation of mockup.
 - 2. Meet with Owner, Architect, glazing film Installer and glazing film manufacturer's representative.
 - 3. Review methods and procedures related to installation, including manufacturer's written instructions.
 - 4. Examine substrate conditions for compliance with requirements.
 - 5. Review temporary protection measures required during and after installation.
 - 6. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store and protect glazing films according to manufacturer's written instructions and as needed to prevent damage, condensation, temperature changes, direct exposure to sun, or other causes.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with film installation when ambient and substrate temperature conditions are outside limits permitted by manufacturer and when glass substrates are wet from frost, condensation, or other causes.

1.9 WARRANTY

- A. Manufacturer's Warranty: Fully executed warranty, written in favor of the Owner, agreeing to replace films that deteriorate as defined in "Definitions" Article, within 5 years from date of original installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CPFilms Inc.; LLumar Films.
 - 2. 3M
 - 3. Solyx , SimGlas
 - 4. Huper Optik

2.2 GLAZING SURFACE FILMS

- A. Film Overlay: Single-layered applied glazing film products, applied to interior glass surfaces, consisting of the following (from outboard surface to inboard surface), as applicable to each type of film indicated:
 - 1. Removable release liner.
 - 2. Pressure sensitive adhesive with integral ultraviolet absorbers.
 - 3. Clear, dyed, or printed pattern layer of polyester film.

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- 4. Possible layer of metallized or sputtered polyester film.
- 5. Possible scratch resistant coating.
- B. Colors: As scheduled.
- C. Basis-of-Design Product: As scheduled.

2.3 GLAZING FILM ACCESSORIES

- A. General: Provide products complying with requirements of glazing film manufacturer for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Adhesive: Pressure Sensitive acrylic adhesive system.
- C. Cleaners, Primers, and Sealers: Types recommended by glazing film manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass and surrounding adjacent surfaces for conditions affecting installation.
 - 1. Report conditions that may adversely affect installation. In report, include description of any glass that is broken, chipped, cracked, abraded, or damaged in any way.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Immediately before beginning installation of films, clean glass surfaces of substances that could impair glazing film's bond, including mold, mildew, oil, grease, dirt and other foreign materials.
- C. Blade the inside surface of window glass with industrial razors to ensure removal of foreign contaminants.
- D. Protect window frames and surrounding surfaces and materials from damage during installation.

3.3 INSTALLATION

- A. General: Comply with glazing film manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements are indicated.
- B. Install film continuously, but not necessarily in one continuous length. Install with no gaps or overlaps.
- C. If seamed, install with no gaps or overlaps. Install seams vertical and plumb. No horizontal seams allowed.
- D. Do not remove release liner from film until just before each piece of film is cut and ready for installation.
- E. Install film with mounting solution and custom cut to the glass with neat, square comers and edges to within 1/8 inch of the window frame.
- F. Remove air bubbles, wrinkles, blisters, and other defects.
- G. After installation, view film from a distance of 10 feet against a bright uniform sky or background. Film shall appear uniform in appearance with no visible streaks, banding, thin spots or pinholes.
 - 1. If installed film does not meet this criteria, remove and replace with new film.

3.4 CLEANING

- A. Remove excess mounting solution at finished seams, perimeter edges, and adjacent surfaces.
- B. After application of film, wash film using cleaning methods recommended by glazing film manufacturer. Do not use abrasive-type cleaning agents or bristle brushes.
- C. Replace films that cannot be cleaned.

END OF SECTION

SECTION 09 05 61.13

MOISTURE VAPOR EMISSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fluid-applied, resin-based, membrane-forming systems that control the moisture-vapor-emission rate of high-moisture, interior concrete to prepare it for floor covering installation.

1.2 UNIT PRICES

- A. Work of this Section is affected by Moisture Vapor Emission Control Unit Price.

1.3 DEFINITIONS

- A. MVE: Moisture vapor emission.
- B. MVER: Moisture vapor emission rate.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Product Test Reports: For each MVE-control system, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Preinstallation testing reports.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Employs factory-trained personnel who are available for consultation and Project-site inspection.
- B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with MVE-control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.
 - 1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 deg F (18 deg C) and not more than 85 deg F (29.4 deg C) at least 48 hours before use.
 - 2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE-control system manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29.4 deg C) and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 3. Install MVE-control systems where concrete surface temperatures will remain a minimum of 5 deg F (3 deg C) higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:
 - 1. MVER: Maximum 25 lb of water/1000 sq. ft. (11.34 kg of water/92.9 sq. m) when tested according to ASTM F 1869.
 - 2. Relative Humidity: Maximum 100 percent when tested according to ASTM F 2170 using in situ probes.
- B. Water-Vapor Transmission: Through MVE-control system, maximum 0.10 perm (5.75 ng/Pa x s x sq. m) when tested according to ASTM E 96/E 96M.
- C. Tensile Bond Strength: For MVE-control system, greater than 200 psi (1.38 MPa) with failure in the concrete according to ASTM D 7234.

2.2 MVE-CONTROL SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. ARDEX Americas; ARDEX MC RAPID One-Coat Moisture Control System For Concrete to Receive ARDEX Underlayments.
 - 2. Floor Seal Technology, Inc.; MES 100.
 - 3. H.B. Fuller Construction Products Inc. / TEC; LiquiDam.
 - 4. KOSTER American Corporation; VAP I 2000 FS.
 - 5. LATICRETE SUPERCAP, LLC; LATICRETE SUPECAP Moisture Vapor Control.
 - 6. MAPEI Corporation; Planseal VS.
 - 7. Synthetics International; Synthetic30.
 - 8. USG Corporation; USG Durock Brand RH-100 Moisture Vapor Reducer.
- B. MVE-Control System: ASTM F 3010-qualified, fluid-applied, two-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives.
 - 1. Substrate Primer: Provide MVE-control system manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.
 - 2. Cementitious Underlayment Primer: If required for subsequent installation of cementitious underlayment products, provide MVE-control system manufacturer's primer to ensure adhesion of products to MVE-control system.

2.3 ACCESSORIES

- A. Patching and Leveling Material: Moisture-, mildew-, and alkali-resistant product recommended in writing by MVE-control system manufacturer and with minimum of 3000-psi (20.68-MPa) compressive strength after 28 days when tested according to ASTM C 109/C 109M.
- B. Crack-Filling Material: Resin-based material recommended in writing by MVE-control system manufacturer for sealing concrete substrate crack repair.
- C. Cementitious Underlayment: If required to maintain manufacturer's warranty, provide MVE-control system manufacturer's hydraulic cement-based underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of system indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Preinstallation Testing:
 - 1. Testing Agency: Engage a qualified testing agency to perform tests.

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2. Alkalinity Testing: Perform pH testing according to ASTM F 710. Install MVE-control system in areas where pH readings are less than 7.0 and in areas where pH readings are greater than 8.5.
 3. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Install MVE-control system in locations where concrete substrate MVER exceeds 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Internal Relative Humidity Test: Using in situ probes, ASTM F 2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.
 4. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install minimum 100-sq. ft. (9.29-sq. m) area of MVE-control system to prepared concrete substrate and test according to ASTM D 7234.
 - a. Proceed with installation only where tensile bond strength is greater than 200 psi (1.38 MPa) with failure in the concrete.
- B. Concrete Substrates: Prepare and clean substrates according to MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.
1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
 2. Provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 3. After shot blasting, repair damaged and deteriorated concrete according to MVE-control system manufacturer's written instructions.
 4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
 5. Fill surface depressions and irregularities with patching and leveling material.
 6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
 7. Allow concrete to dry, undisturbed, for period recommended in writing by MVE-control system manufacturer after surface preparation, but not less than 24 hours.
 8. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.
- C. Protect walls, floor openings, electrical openings, door frames, and other obstructions during installation.

3.3 INSTALLATION

- A. General: Install MVE-control system according to ASTM F 3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.
1. Install primers as required to comply with manufacturer's written instructions.
- B. Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.
- C. Apply system, including component coats if any, in thickness recommended in writing by MVE-control system manufacturer for MVER indicated by preinstallation testing.
- D. Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.
- E. After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.
- F. Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty and in thickness required to maintain the warranty.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform installation inspections.
- B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.
1. Verify that surface preparation meets requirements.
 2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.

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3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.
 - C. MVE-control system will be considered defective if it does not pass inspections.
- 3.5 PROTECTION
 - A. Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE-control system manufacturer.
 - B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.
 - 3. Grid suspension systems for gypsum board ceilings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Span and Deflection Design Criteria: Provide height to load deflection charts showing studs supplied conform to deflection limit scheduled and allowed per ASTM C 754.
 - 1. Mark on chart(s) showing all major partitions scheduled conformance with criteria.
 - 2. Submit manufacturer's certification of stud size, thickness, and spacing complying with performance requirements and selections made by architect are correct for application shown.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For embossed steel studs and tracks, post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

1.5 SEQUENCING

- A. Coordinate placement of concealed internal wall reinforcement, such as backing plates, for items to be attached to metal support systems.
- B. Coordinate installation of ceiling and soffit suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorage to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.
- C. Furnish concrete inserts, and other devices indicated, to other trades for installation well in advance of time needed for coordination with other construction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202 "Code of Standard Practice."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design framing systems in accordance with AISI S220, "North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members" and ASTM C645, Section 10, unless otherwise indicated.
- B. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

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- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- D. Horizontal Deflection:
 - 1. Minimum Base-Metal Thickness: 25 gage unless indicated otherwise on Drawings or below.
 - 2. Interior Metal Stud/Gypsum Board Assemblies, Typical Locations: Withstand lateral loading (air pressure) of 5 psf with deflection limit not more than L/240 of partition height.
 - 3. Interior Metal Stud/Gypsum Board Assemblies at Atriums, Lobbies, Service Corridors, Exit Corridors, Elevator Lobbies, Vertical Shafts, and walls receiving plaster veneer: Withstand lateral loading (air pressure) of 7.5 psf with deflection limit not more than L/360 of partition height.
 - 4. Interior Metal Stud/Gypsum Board Assemblies at Locations with Ceramic Tile or Other Hard Surface Finishes: Withstand typical lateral loading (air pressure) with deflection limit not more than L/360 of partition height, minimum 22 gage studs at 16 inches on center.
 - 5. Where wall mounted equipment, woodwork, and casework items are indicated or elsewhere as shown on Drawings, provide minimum 16 gage studs.
 - 6. At jambs of openings provide two minimum 20 gage studs.
 - 7. Ceilings: At ceilings using mold-mildew resistant gypsum framing to be 16 inches o.c. for 5/8 inch gypsum.
 - 8. Refer to Division 05 for stud framing which is exposed to wind loads and for studs carrying heavy vertical loads, such as, cement plaster, manufactured stone masonry, stone tile thicker than 3/4 inch, etc.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with AISI S220 and ASTM C645 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Comply with AISI S220 and ASTM A 653/A 653M, G40 (Z120) or coating with equivalent corrosion resistance of ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated. ,
 - a. Coating roll-formed from steel complying with mechanical and chemical requirements of ASTM A1003 with a zinc-based coating.
 - b. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction
- B. Studs and Tracks: AISI S220 and ASTM C 645, Section 10 Use either steel studs and tracks or embossed steel studs and tracks.
 - 1. Steel Studs and Tracks:
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) CEMCO.
 - 2) ClarkDietrich
 - 3) Custom Stud.
 - 4) MarinoWARE.
 - 5) MBA Building Supplies.
 - 6) MRI Steel Framing, LLC.
 - 7) Phillips Manufacturing Co.
 - 8) SCAFCO Steel Stud Company.
 - 9) Steel Network, Inc. (The).
 - 10) Telling Industries
 - b. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection .
 - c. Depth: As indicated on Drawings .
 - 2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645, Section 10 steel studs and tracks.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.
 - 2) ClarkDietrich.
 - 3) MarinoWARE.

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- 4) MBA Building Supplies.
 - 5) Phillips Manufacturing Co.
 - 6) SCAFCO Steel Stud Company.
 - 7) Steel Network, Inc. (The).
 - 8) Telling Industries.
- b. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements .
 - c. Depth: As indicated on Drawings .
- C. Slip-Type Head Joints: Where studs are continuous from floor to structure above, provide one of the following:
1. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) BlazeFrame Industries.
 - 2) CEMCO; California Expanded Metal Products Co.
 - 3) ClarkDietrich Building Systems.
 - 4) MarinoWARE.
 - 5) MBA Building Supplies.
 - 6) Metal-Lite.
 - 7) Perfect Wall, Inc.
 - 8) SCAFCO Steel Stud Company.
 - 9) Steel Network, Inc. (The).
 - 10) Telling Industries.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BlazeFrame Industries.
 - b. CEMCO; California Expanded Metal Products Co.
 - c. ClarkDietrich Building Systems.
 - d. Fire Trak Corp.
 - e. MarinoWARE.
 - f. Metal-Lite.
 - g. Perfect Wall, Inc.
 - h. SCAFCO Steel Stud Company.
 - i. Steel Network, Inc. (The).
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ClarkDietrich Building Systems.
 - b. MarinoWARE.
 - c. MRI Steel Framing, LLC.
 - d. SCAFCO Steel Stud Company.
 2. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ClarkDietrich Building Systems.
 - b. MarinoWARE.
 - c. MRI Steel Framing, LLC.
 - d. SCAFCO Steel Stud Company

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2. Depth: As indicated on Drawings.
 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ClarkDietrich Building Systems.
 - b. MarinoWARE.
 - c. MRI Steel Framing, LLC.
 - d. SCAFCO Steel Stud Company
 2. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).
 3. Depth: 7/8 inch (22.2 mm).
- H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ClarkDietrich Building Systems.
 - b. MarinoWARE.
 - c. MRI Steel Framing, LLC.
 - d. SCAFCO Steel Stud Company
 2. Configuration: Asymmetrical.
- I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 3/4 inch (19 mm).
 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or AC193 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Type: Torque-controlled, expansion anchor.
 - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: As indicated on Drawings.
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 2. Steel Studs and Tracks: AISI S220 and ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).
 - b. Depth: 1-5/8 inches (41 mm).
 3. Embossed Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: As required .
 - b. Depth: As indicated on Drawings.
 4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).

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5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical.
 - G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armstrong World Industries, Inc.
 - b. ROCKWOOL International (formerly Chicago Metallic Corporation).
 - c. United States Gypsum Company.
- 2.4 AUXILIARY MATERIALS
- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
 - B. Isolation Strip at Exterior Walls: Provide the following:
 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 1. Single-Layer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
 2. Multilayer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
 3. Tile Backing Panels: As required by horizontal deflection performance requirements unless otherwise indicated.

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- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches (1219 mm) o.c.
 - 2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
 - 3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 5. Do not attach hangers to steel roof deck.

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6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

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2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C 1396/C 1396M.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Gypsum; 5/8 inch FireBloc Type X Gypsum Wallboard.
 - b. CertainTeed Corporation; Type X Gypsum Board.
 - c. Continental Building Products, LLC; Firecheck Type X.
 - d. Georgia-Pacific Building Products; ToughRock Fireguard X Gypsum Board.
 - e. National Gypsum Company; Gold Bond Brand Fire-Shield Gypsum Board.
 - f. PABCO Gypsum; Flame Curb Type X.
 - g. United States Gypsum Company; USG Sheetrock Brand Firecode X Gypsum Panels.
 - 2. Basis-of-Design Product: Refer to Drawings.
 - 3. Long Edges: Tapered.
- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. American Gypsum; 1/2" Interior Ceiling Board.
 - b. CertainTeed Corporation; Interior Ceiling Gypsum Board.
 - c. Continental Building Products, LLC; Sagcheck.
 - d. Georgia-Pacific Building Products; ToughRock Span 24 Ceiling Board.
 - e. PABCO Gypsum; Interior Ceiling Sag-Resistant Ceiling Panel.
 - f. United States Gypsum Company; Imperial Sag-Resistant Interior Ceiling Gypsum Base.
 - 2. Thickness: 1/2 inch (12.7 mm).
 - 3. Long Edges: Tapered.

2.4 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; DiamondBack Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 - c. National Gypsum; eXP Tile Backer.
 - d. United States Gypsum Company; USG Durock Glass-Mat Tile Backerboard.
 - 2. Core: 5/8 inch (15.9 mm), Type X.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
 - 3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.

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- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- C. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- D. Electrical Box Pads: Putty Pads: Moldable non-curing one component, intumescent, fire-rated material for through-penetration fire stop systems and sound attenuation systems; self-adhering; 1/8-inch thick minimum.
- E. Acoustical Sealant: Refer to Section 07 92 19 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ELECTRICAL BOX PADS FOR SMOKE / FIRE-RATED AND STC-RATED WALLS

- A. Prior to installing wallboards, install electrical box pads in accordance with manufacturer's written instructions.
- B. Overlap front edge of box so that pad will be compressed around edges of box as gypsum panels are installed.

3.3 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

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- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.4 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Vertical surfaces unless otherwise indicated.
 - 2. Tile Backer, Glass-Mat Type:
 - a. Walls in toilet room with shower.
 - b. Tiled walls in showers and bathtubs.
 - c. Tiled walls in toilet rooms and kitchens.
 - d. Behind prefabricated shower or bathtub units.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

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3.5 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
 - 1. Do not install screws within 6 inches of the shower wall base so as to not penetrate shower pan waterproofing.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. Bullnose Bead: Use where indicated.
 - 3. LC-Bead: Use at exposed panel edges.
 - 4. L-Bead: Use where indicated.
 - 5. U-Bead: Use where indicated.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Where indicated on Drawings.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
- E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.8 RATED PARTITION IDENTIFICATION

- A. At fire-rated wall and smoke partition assemblies, provide an identification of wall rating in 4-inch high stenciled block letters in red paint. Space identifications 12 feet on center maximum, 4 feet from corners maximum, above ceiling. Provide identification on both sides of wall.
- B. Partition Identification Text: Apply the following, as applicable:
 - 1. WARNING: SMOKE PARTITION – PROPERLY SEAL ALL OPENINGS.
 - 2. WARNING: 1-HOUR SMOKE BARRIER – PROPERLY SEAL ALL OPENINGS.
 - 3. WARNING: 1-HOUR FIRE PARTITION – PROPERLY SEAL ALL OPENINGS.
 - 4. WARNING: 1-HOUR FIRE BARRIER – PROPERLY SEAL ALL OPENINGS.
 - 5. WARNING: 2-HOUR FIRE WALL – PROPERLY SEAL ALL OPENINGS.
 - 6. WARNING: 2-HOUR FIRE BARRIER – PROPERLY SEAL ALL OPENINGS.
- C. Refer to Section 09 91 23 "Interior Painting" for painting requirements.
 - 1. Use interior semi-gloss, latex, low VOC paint.

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3.9 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before installing gypsum board ceilings, conduct an above-ceiling inspection, and report and correct deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
 - 1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for Contractor's above-ceiling inspection. Provide Architect with copy of deficiencies report. Architect reserves the right to supplement Contractor's deficiency report with other incomplete or incorrect items that might be observed during Architect's site visit.
 - 2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of ceiling support framing.
 - g. Touch-up/patching of spray fire-resistive materials (SFRM).
 - h. Installation of penetration firestopping in fire- and smoke-rated partitions.
 - i. Installation of fire-resistant joint sealants in fire-rated partitions.
 - j. Installation of acoustical sealants at adjacent sound-rated partitions.
 - a. Application of fire- and smoke-rated partition identification.

3.10 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 30 13

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ceramic tile.
 - 2. Porcelain tile.
 - 3. Waterproof membrane for thinset applications.
 - 4. Crack isolation membrane.
 - 5. Metal edge strips.

1.2 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, ANSI A108.17, and ANSI A108.19 which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.
- E. Large format gauged porcelain tiles are 8 mm or less in thickness, and having a face dimension up to 60 inches wide and 118 inches long.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches (300 mm) square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory for each color and finish required.
 - 4. Metal edge strips in 6-inch (150-mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

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2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
4. the U.S. Department of Labor as Journeyman Tile Layers.
5. Installer of large format gauged porcelain tile panels shall have completed advanced certification training (ACT)

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.10 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace components of tile system that fail in materials or workmanship within specified warranty period, when the products are installed within their shelf life and according to governmental regulations and manufacturer's written materials which are in effect at the time installation.

1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Waterproof membrane.

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2. Crack isolation membrane.
3. Metal edge strips.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 (and A137.3 for large format tiles) for types, compositions, and other characteristics indicated.
 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Dynamic Coefficient of Friction (level interior tiles that will be walked on when wet) per ANSI A137.1: DCOF (Dynamic Coefficient of Friction) of 0.42, DCOF, per DCOF AcuTestSM method.
- F. Large format gauged porcelain tiles shall meet material and installation standards of ANSI A137.3 Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs.

2.3 TILE PRODUCTS

- A. Tile:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Marazzi Tile, Inc.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Crossville, Inc.
 - d. Daltile.
 - e. Deutsche Steinzeug America, Inc.
 - f. Grupo Porcelanite.
 - g. Interceramic.
 - h. Iris US.
 - i. Jeffrey Court Inc.
 - j. Lone Star Ceramics; Elgin Butler.
 - k. Portobello America, Inc.
 - l. Seneca Tiles, Inc.
 2. Basis-of-Design Manufacturer: As scheduled.
 3. Composition: Vitreous or impervious natural clay or porcelain.
 4. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
 5. Module Size: As scheduled.
 6. Dynamic Coefficient of Friction: Not less than 0.42.
 7. Finish: As scheduled.
 8. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
 9. Grout Color: As selected by Architect from manufacturer's full range.
 10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

2.4 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

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- B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Noble Company (The); Nobleseal TS.
 - 2. Nominal Thickness: 0.030 inch (0.76 mm), minimum.
- C. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch (0.2-mm) nominal thickness.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Schluter Systems L.P.; KERDI.
- D. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - b. H.B. Fuller Construction Products Inc. / TEC; Hydraflex Waterproofing Crack Isolation Membrane with Waterproofing Mesh.
 - c. LATICRETE SUPERCAP, LLC; Laticrete 9235 Waterproof Membrane.
 - d. MAPEI Corporation; Fiberglass Mesh with Mapelastic Waterstop.

2.5 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch (0.76-mm) nominal thickness.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Noble Company (The); Nobleseal CIS.
 - b. Mapei Corporation Mapeguard 2,
- C. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - b. H.B. Fuller Construction Products Inc. / TEC; Hydraflex Waterproofing Crack Isolation Membrane.
 - c. LATICRETE SUPERCAP, LLC; Laticrete 9235 Waterproof Membrane.
 - d. MAPEI Corporation; Mapelastic CI.

2.6 SETTING MATERIALS

- A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15, A118.11, and ISO 13007 C2ES1P1.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Custom Building Products; Megaflex Crack Prevention Mortar.
 - b. H.B. Fuller Construction Products Inc. / TEC; Ultimate 6 Plus Mortar
 - c. LATICRETE SUPERCAP, LLC; LATICRETE® SUPERCAP™ Moisture Vapor Control.
 - d. MAPEI Corporation; Floor Tile Mortar.
 - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

2.7 GROUT MATERIALS

- A. Standard Cement Grout: ANSI A118.6, unsanded.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; Polyblend Non-Sanded.
 - b. H.B. Fuller Construction Products Inc. / TEC; AccuColor Premium Unsanded Grout.
 - c. LATICRETE SUPERCAP, LLC; 1600 Unsanded Grout.
 - d. MAPEI Corporation; Keracolor U.
- B. Standard Cement Grout: ANSI A118.6, sanded.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; Polyblend Sanded.

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- b. H.B. Fuller Construction Products Inc. / TEC; AccuColor Sanded Grout.
 - c. LATICRETE SUPERCAP, LLC; 1500 Sanded Grout.
 - d. MAPEI Corporation; Keracolor S.
 - C. High-Performance Tile Grout: ANSI A118.7 and ISO 13007 CG2FAW.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; Prism Color Consistent Grout.
 - b. H.B. Fuller Construction Products Inc. / TEC; TEC Power Grout.
 - c. LATICRETE SUPERCAP, LLC; Permacolor.
 - d. MAPEI Corporation; Ultracolor Plus.
 - 2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 - D. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; CEG Lite 100% Solids Commercial Epoxy Grout.
 - b. H.B. Fuller Construction Products Inc. / TEC; AccuColor EFX Epoxy Special Effects Grout.
 - c. LATICRETE SUPERCAP, LLC; SpectraLOCK Pro Premium.
 - d. MAPEI Corporation; Kerapoxy CQ.
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F (60 and 100 deg C), respectively, and certified by manufacturer for intended use.
 - E. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.
- 2.8 MISCELLANEOUS MATERIALS
- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
 - B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
 - C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
 - D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout as approved by grout manufacturer.
- 2.9 MIXING MORTARS AND GROUT
- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
 - B. Add materials, water, and additives in accurate proportions.
 - C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

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2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.
 - c. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 1. Porcelain Tile: 1/4 inch (6.4 mm) unless scheduled otherwise.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

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- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - J. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
 - K. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- 3.4 WATERPROOFING INSTALLATION
- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
 - B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.
- 3.5 CRACK ISOLATION MEMBRANE INSTALLATION
- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
 - B. Allow crack isolation membrane to cure before installing tile or setting materials over it.
- 3.6 ADJUSTING AND CLEANING
- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
 - B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- 3.7 PROTECTION
- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
 - B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
 - C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.
- 3.8 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE
- A. Interior Floor Installations, Concrete Subfloor:
 - 1. Ceramic Tile Installation: TCNA F113; thinset mortar.
 - a. Ceramic Tile Type: As scheduled.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: High-performance sanded grout.
 - 2. Ceramic Tile Installation: TCNA F115; thinset mortar; epoxy grout.
 - a. Ceramic Tile Type: As scheduled.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy grout.
 - 3. Ceramic Tile Installation: TCNA F122; thinset mortar on waterproof membrane.
 - a. Ceramic Tile Type: As scheduled.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: High-performance sanded grout.
 - 4. Ceramic Tile Installation: TCNA F125-Full; thinset mortar on crack isolation membrane.
 - a. Ceramic Tile Type: As scheduled.

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- b. Thinset Mortar: Medium-bed, modified dry-set mortar.
 - c. Grout: High-performance sanded grout.
- B. Interior Wall Installations, Masonry or Concrete:
 - 1. Ceramic Tile Installation: TCNA W202; thinset mortar.
 - a. Ceramic Tile Type: As scheduled.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: High-performance unsanded grout.
- C. Interior Wall Installations, Wood or Metal Studs or Furring:
 - 1. Ceramic Tile Installation: TCNA W243; thinset mortar on gypsum board.
 - a. Ceramic Tile Type: As scheduled.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: High-performance unsanded grout.
 - 2. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.
 - a. Ceramic Tile Type: As scheduled.
 - b. Thinset Mortar: Improved modified dry-set mortar.
 - c. Grout: High-performance unsanded grout.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Samples of each type, color, pattern, and texture in manufacturer's standard sample size, minimum 6 inches square.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - 5. Size and location of initial access modules for acoustical panels.
 - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
 - 7. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).
- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 - 3. Hold-Down Clips: Equal to 2percent of quantity installed.

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1.6 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as directed by Architect.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E 1264.
 - 2. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL PANELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corp.
 - 3. Rockfon (Roxul, Inc.)
 - 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. ACT-1:
 - 1. Basis-of-Design Product: As scheduled.
 - 2. Classification: Provide fire-resistance-rated panels complying with ASTM E 1264 for type, form, and pattern as follows:
 - a. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted.
 - b. Pattern: E (lightly textured).
 - 3. Color: As scheduled.
 - 4. LR: Not less than 0.88.
 - 5. NRC: Not less than 0.80.
 - 6. CAC: Not less than 35.
 - 7. Edge/Joint Detail: Beveled.
 - 8. Modular Size: As scheduled.
 - 9. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

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- D. ACT-2:
1. Basis-of-Design Product: As scheduled.
 2. Classification: Provide fire-resistance-rated panels complying with ASTM E 1264 for type, form, and pattern as follows:
 - a. Type and Form: Type IV, mineral base with membrane-faced overlay: Form 2, water felted.
 - b. Pattern: E (lightly textured).
 3. Color: As scheduled.
 4. LR: Not less than 0.77.
 5. NRC: Not less than 0.65.
 6. CAC: Not less than 35.
 7. Edge/Joint Detail: Beveled.
 8. Modular Size: As scheduled.
 9. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.
- E. ACT-3:
1. Basis-of-Design Product: As scheduled.
 2. Classification: Provide fire-resistance-rated panels complying with ASTM E 1264 for type, form, and pattern as follows:
 - a. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted.
 - b. Pattern: E (lightly textured).
 3. Color: As scheduled.
 4. LR: Not less than 0.88.
 5. NRC: Not less than 0.80.
 6. CAC: Not less than 35.
 7. Edge/Joint Detail: Beveled.
 8. Modular Size: As scheduled.
 9. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Armstrong World Industries, Inc.
 2. CertainTeed Corp.
 3. Chicago Metallic Corporation.
 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
- C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.
1. Structural Classification: Intermediate -duty system.
 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 3. Face Design: Flat, flush.
 4. Cap Material: Cold-rolled steel or aluminum.
 5. Cap Finish: Painted white.

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2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- (2.69-mm-) diameter wire.
- C. Hold-Down Clips: Manufacturer's standard hold-down.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation.
 - 3. Chicago Metallic Corporation.
 - 4. Fry Reglet Corporation.
 - 5. Gordon, Inc.
 - 6. United States Gypsum Company.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
 - 1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

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- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 7. Do not attach hangers to steel deck tabs.
 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 6. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
 - a. Hold-Down Clips: Space 24 inches (610 mm) o.c. on all cross runners.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

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3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermoset-rubber base.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.
- C. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Coordinate mockups in this Section with mockups specified in other Sections.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 2. Flexco.

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3. Johnsonite; a Tarkett company.
 4. Roppe Corporation, USA.
 - B. Basis-of-Design Product: As scheduled.
 - C. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 1. Style and Location: As scheduled
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient floor coverings.
 - D. Thickness: 0.125 inch (3.2 mm).
 - E. Height: As indicated on Drawings.
 - F. Lengths: Coils in manufacturer's standard length.
 - G. Outside Corners: Job formed or preformed.
 - H. Inside Corners: Job formed or preformed.
 - I. Colors: As scheduled .
- 2.2 INSTALLATION MATERIALS
- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
 - B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. Preformed Corners: Install preformed corners before installing straight pieces.

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- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Miter corners to minimize open joints.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 65 19
RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid vinyl floor tile.
 - 2. Performance rubber tile.
 - 3. Vinyl composition floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient floor tile.
 - 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.
- C. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- D. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Coordinate mockups in this Section with mockups specified in other Sections.
 - a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern in locations directed by Architect.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.

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2. During installation.
 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 SOLID VINYL FLOOR TILE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. American Biltrite.
 2. Armstrong World Industries, Inc.
 3. Congoleum Corporation.
 4. Johnsonite; a Tarkett company.
 5. Mannington Mills, Inc.
- B. LVT-1:
1. Basis-of-Design Product: As scheduled.
 2. Size: As scheduled.
 3. Colors and Patterns: As scheduled.
- C. LVT-2:
1. Basis-of-Design Product: As scheduled.
 2. Tile Standard: ASTM F 1700.
 - a. Class: Class III, Printed Film Vinyl Tile.
 - b. Type: A, Smooth Surface, or B, Embossed Surface.
 3. Size: As scheduled.
- D. LVT-3:
1. Basis-of-Design Product: As scheduled.
 2. Tile Standard: ASTM F 1700.
 3. Size: As scheduled.

2.2 RUBBER FLOOR TILE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Biltrite.
 2. Ecore.
 3. Flexco.
 4. Johnsonite; a Tarkett company.
 5. Mannington Mills, Inc.
 6. Nora Systems, Inc.
 7. R.C.A. Rubber Company (The).
 8. VPI Corporation.
- B. PVT-1
- C. Basis-of-Design Product: As scheduled.
- D. Vulcanized composition rubber fusion bonded to surface layer.
- E. Thickness: 5 mm.

2.3 VINYL COMPOSITION FLOOR TILE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. American Biltrite.
 2. Armstrong World Industries, Inc.
 3. Congoleum Corporation.

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4. Johnsonite; a Tarkett company.
 5. Mannington Mills, Inc.
- B. VCT-1:
1. Basis-of-Design Product: As scheduled.
 2. Tile Standard: ASTM F 1066.
- C. Wearing Surface: Smooth.
1. Thickness: 0.125 inch (3.2 mm).
 2. Size: 12 by 12 inches (305 by 305 mm).
 3. Colors and Patterns: As scheduled.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Floor Polish for VCT: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.

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- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.
 - C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes indicated.
 - D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
 - E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
 - F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
 - G. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- 3.4 CLEANING AND PROTECTION
- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
 - B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
 - D. Floor Polish for VCT: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply three coat(s).
 - E. Cover floor tile until Substantial Completion.

END OF SECTION

SECTION 09 65 66

RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rubber sheet flooring.

1.2 COORDINATION

- A. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show installation details and locations of the following:
 - 1. Floor patterns.
 - 2. Layout and colors.
 - 3. Locations of floor inserts for athletic equipment installed through flooring.
 - 4. Seam locations for sheet flooring.
- C. Samples: For each exposed product and for each type, color, and pattern specified, 6-inch- (150-mm-) square in size and of the same thickness indicated for the Work.
- D. Samples for Initial Selection: For each type of resilient athletic flooring.
- E. Samples for Verification: For each type, color, and pattern of flooring specified, 6-inch- (150-mm-) square in size and of same thickness and material indicated for the Work.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resilient athletic flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sheet Flooring: Furnish full-width rolls of not less than 10 linear feet (3 linear m) for each 500 linear feet (150 linear m) or fraction thereof, of each type, color, and pattern of flooring installed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.
- B. Store materials to prevent deterioration.
 - 1. Store rolls upright.

1.7 FIELD CONDITIONS

- A. Adhesively Applied Products:
 - 1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
 - 3. Close spaces to traffic during flooring installation.
 - 4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.
- B. Install flooring after other finishing operations, including painting, have been completed.

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PART 2 - PRODUCTS

2.1 RUBBER SHEET FLOORING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Acer Flooring, LLC.
 2. Action Floor Systems, LLC.
 3. Amarco Products.
 4. American Floor Products Company, Inc.
 5. Conner Sports Surface Solutions.
 6. Flexco.
 7. Horner Flooring Company, Inc.
 8. Johnsonite; a Tarkett company.
 9. Mateflex.
 10. Mondo America Inc.
 11. Nora Systems, Inc.
 12. Regupol America.
 13. Robbins Sports Surfaces.
 14. Roppe Corporation, USA.
 15. Sport Court.
 16. Surface America Incorporated.
 17. Tarkett Sports; a division of the Tarkett Group.
- B. SF-1:
1. Basis-of-Design Product: As scheduled.
 2. Description: Rubber athletic flooring provided as rolled goods for adhered installation.
 3. Material: Recycled-rubber compound.
 4. If applicable, insert fire-test-response characteristics. See "Fire-Test-Response Characteristics" Article in the Evaluations.
 5. Traffic-Surface Texture: Smooth.
 6. Roll Size: Not less than 48 inches (1219 mm) wide by longest length that is practical to minimize splicing during installation.
 7. Thickness: 0.315 inch (8 mm). If retaining second option in "Color and Pattern" Paragraph below, indicate colors and patterns with manufacturers' product designations in "Basis-of-Design Product" Paragraph or in a separate schedule.
 8. Color and Pattern: As scheduled.
 9. Border: Interlocking, beveled-edge tiles, of same material as sheet flooring; with bevels that transition from thickness of sheet flooring to surface below it; with straight outside edges; for use where flooring corners and edges do not abut vertical surfaces.
 10. Border Color and Pattern: Matching sheet flooring.

2.2 ACCESSORIES

- A. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by flooring manufacturer.
- B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of flooring.

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- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Alkalinity Testing: Perform pH testing according to ASTM F 710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.
 - 1. Do not install flooring until it is the same temperature as space where it is to be installed.
- F. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 FLOORING INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions.
- B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.
- C. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on flooring. Use nonpermanent, nonstaining marking device.

3.4 SHEET FLOORING INSTALLATION

- A. Unroll sheet flooring and allow it to stabilize before cutting and fitting.
- B. Lay out sheet flooring as follows:
 - 1. Maintain uniformity of flooring direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (150 mm) away from parallel joints in flooring substrates.
 - 3. Match edges of flooring for color shading at seams.
 - 4. Locate seams according to approved Shop Drawings.
- C. Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
 - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing flooring installation:
 - 1. Remove adhesive and other blemishes from flooring surfaces.
 - 2. Sweep and vacuum flooring thoroughly.
 - 3. Damp-mop flooring to remove marks and soil after time period recommended in writing by manufacturer.
- B. Protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 - 1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION

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TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- B. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of edge, transition, and other accessory strips.
 - 9. Transition details to other flooring materials.
- C. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Full-size Sample.
 - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups at locations and in sizes shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

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1.7 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.8 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Basis-of-Design Product: As scheduled.
- B. Color: As scheduled.
- C. Pattern: Match Architect's samples.
- D. Fiber Content: 100 percent solution dyed polyester.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

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- b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns indicated on Drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 09 81 16

ACOUSTICAL BLANKET INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Concealed building insulation.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Glass-Fiber Insulation:
 - a. CertainTeed Corporation.
 - b. Johns Manville Corporation.
 - c. Owens Corning.
 - 2. Slag-Wool-/Rock-Wool-Fiber Insulation:
 - a. Fibrex Insulations Inc.
 - b. Owens Corning.
 - c. Thermafiber.

2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
 - 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Unfaced Mineral-Fiber Blanket Insulation (in walls): ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- C. Unfaced, Flexible Glass-Fiber Blanket Insulation (above ceilings): ASTM C 612, Type IA; ASTM C 553, Types I, II, and III; or ASTM C 665, Type I; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; and of the following properties:
 - 1. Nominal density of 1.0 lb/cu. ft., thermal resistivity of 3.7 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - 2. Nominal density of not less than 1.5 lb/cu. ft. nor more than 1.7 lb/cu. ft., thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - 3. Combustion Characteristics: Passes ASTM E 136.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. Apply single layer of insulation to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.

3.5 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 09 84 33

SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
 - 1. Sound-absorbing wall panels.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include panel edge and mounting indicated.
- B. Samples for Verification: For the following products:
 - 1. Panel Edge: 12-inch- (300-mm-) long Sample(s) showing each edge profile, corner, and finish.
 - 2. Mounting Devices: Full-size Samples.
 - 3. Assembled Panels: Approximately 36 by 36 inches (900 by 900 mm), including joints and mounting methods.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Electrical outlets, switches, and thermostats.
 - 2. Items penetrating or covered by units including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Alarms.
 - e. Sprinklers.
 - f. Access panels.
 - 3. Show operation of hinged and sliding components covered by or adjacent to units.
- B. Product Certificates: For each type of unit.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of unit to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

1.7 QUALITY ASSURANCE

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

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- B. Lighting: Do not install units until a lighting level of not less than 50 fc (538 lx) is provided on surfaces to receive the units.
- C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to the following:
 - a. Acoustical performance.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.2 SOUND-ABSORBING WALL UNITS

- A. Sound-Absorbing Wall Panel: Manufacturer's standard panel construction consisting of 100 percent polyester.
 - 1. Basis-of-Design Product: As scheduled.
 - a. Panel Shape: As indicated on Drawings.
 - b. Mounting: Back mounted with manufacturer's standard metal clips or bar hangers, secured to substrate.
 - c. Acoustical Performance: Sound absorption NRC of not less than 0.25 according to ASTM C 423 for Type A mounting according to ASTM E 795.
 - d. Nominal Overall Panel Thickness: 1/4 inch (6mm).
 - e. Panel Width: 48 inches (1220 mm).
 - f. Panel Height: 120 inches (3048 mm).

2.3 MATERIALS

- A. Panels: 100 percent polyester with 60 percent post-consumer recycled content and 40 percent pre-consumer recycled content.
- B. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:
 - 1. Metal Clips or Bar Hangers: Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of unit and the other part to substrate, designed to permit unit removal.

2.4 FABRICATION

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated.
- B. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch (1.6 mm) for the following:
 - 1. Thickness.
 - 2. Edge straightness.
 - 3. Overall length and width.
 - 4. Squareness from corner to corner.
 - 5. Chords, radii, and diameters.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch (1.6 mm) in 48 inches (1200 mm), noncumulative.

3.4 CLEANING

- A. Remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on exterior substrates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
1. Indicate VOC content.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 2. Apply coats on Samples in steps to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.3 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in the Exterior Painting Schedule for the paint category indicated.

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2.2 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Colors: As scheduled.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

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3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Ferrous Metal, Semigloss, Exterior Acrylic-Enamel Finish: Primer is not required on shop-primed items; touch up shop primer where provided.
 - 1. PPG:
 - a. First Coat: Primer 4020 Pitt-Tech Plus Int./Ext. Primer DTM, 2.5 mils DFT.
 - b. Finish Coat: 4216 Pitt-Tech Plus Int./Ext. Semi-Gloss DTM, 2.5 mils DFT.

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2. Sherwin-Williams:
 - a. Primer: Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series 2.0 - 4.0 mils DFT.
 - b. Second Coat: Pro Industrial Acrylic Semi-Gloss, B66-650 Series 2.5 mils DFT.
 3. Behr:
 - a. First Coat: Behr Premium Plus Multi-Surface Primer & Sealer 436, 1.7 mil DFT.
 - b. Second Coat: Behr Direct To Metal Semi-Gloss Enamel 3200, 1.45 mils DFT
- B. Zinc-Coated (Galvanized) Metal, Semigloss, Exterior Acrylic-Enamel Finish:
1. PPG:
 - a. Primer: 4020 Pitt-Tech Int./Ext. Primer/Finish DTM, 2.5 mils DFT.
 - b. Second Coat: 4216 Pitt-Tech Plus Int./Ext. Semi-Gloss DTM, 2.5 mils DFT
 - c. Third Coat: Same as second coat.
 2. Sherwin-Williams:
 - a. Primer: Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series 2.0 - 4.0 mils DFT.
 - b. Second Coat: Pro Industrial Acrylic Semi-Gloss, B66-650 Series 2.5 mils DFT.
 - c. Third Coat: Same as second.
 3. Behr:
 - a. Primer: Behr Premium Plus Multi-Surface Primer & Sealer 436, 1.7 mil DFT.
 - b. Second Coat: Behr Direct To Metal Semi-Gloss Enamel 3200, 1.45 mils DFT
 - c. Third Coat: Same as second coat.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
1. Indicate VOC content.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 2. Apply coats on Samples in steps to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.3 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in the Interior Painting Schedule for the paint category indicated.

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2.2 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Colors: As scheduled.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Masonry (Clay and CMUs): 12 percent.
 2. Wood: 15 percent.
 3. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

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- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 SURFACE PREPARATION OF PREVIOUSLY COATED SURFACES

- A. General:
 - 1. Remove cracked and deteriorated sealants and caulking.
 - 2. Remove chalk deposits and loose, blistered, peeling, scaling, or crazed finish to bare base material or sound substrate by scraping and sanding.
 - 3. Wash surfaces with solution of TSP to remove wax, oil, grease, and other foreign material; rinse, and allow to dry. Exercise caution that TSP solution does not soften existing coating.
 - 4. Abrade glossy surfaces by sanding or wiping with liquid de-glosser.
 - 5. Remove mildew as specified above.
 - 6. Test compatibility of existing coatings by applying new coating to small, inconspicuous area. If new coatings lift or blister existing coatings, request recommendation from Architect.
 - 7. Apply specified primer to surfaces scheduled to receive coatings.
- B. Gypsum Wallboard:
 - 1. Fill cracks and voids with spackling compound.
 - 2. Apply primer over bare surfaces and newly applied texture coatings.
- C. Metal:
 - 1. Remove rust from surfaces to bare metal in accordance with SP3 "Power Tool Cleaning".
 - 2. Exercise care not to remove galvanizing.
 - 3. Complete preparation as specified for new work.
- D. Wood:
 - 1. Fill cracks, crevices and nail holes with putty or wood filler.
 - 2. Apply primer over bare surfaces and filler material.

3.4 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

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- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
- F. Rated Wall Assemblies Identification:
1. Identify fire-rated wall assemblies with stenciled lettering on wall surface above ceiling line.
 2. Provide stenciled block letters in red to identify each rated wall assembly.
 3. Refer to Section 09 29 00 "Gypsum Board" and Life Safety Legend on Code Compliance Plan.

3.5 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.6 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board, Flat Latex-Based Acrylic Finish: 2 finish coats over a primer.
1. Behr:
 - a. Primer: Behr Premium Plus Interior Drywall Primer & Sealer 73, .09 mils DFT
 - b. Second Coat: Behr Pro i300 Interior Flat 310, 1.65 mils DFT.
 - c. Third Coat: Same as second coat.

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2. PPG:
 - a. Primer: 6-2 Speedhide Interior Latex Sealer
 - b. Second Coat: Speedhide Zero Interior Latex Flat 6-4110XI, 1.4 mils DFT.
 - c. Third Coat: Same as second coat.
 3. Sherwin-Williams:
 - a. Primer: Roller applied latex texturing compound, ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
 - b. Second Coat: PorMar 200 Zero VOC Interior Latex Flat, B30-2600 Series 1.6 mils DFT.
 - c. Third Coat: Same as second coat.
 - 1) Note: Apply final coat by spray application followed by rolling with short nap roller to create an "orange peel" texture on gypsum board walls. No other texture allowed.
- B. Gypsum Board, Semigloss, Latex-Based Acrylic-Enamel Finish: 2 finish coats over a primer.
1. Behr:
 - a. Primer: Behr Premium Plus Interior Drywall Primer & Sealer 73, .09 mils DFT
 - b. Second Coat: Behr Pro i300 Interior Semi-Gloss 370, 1.45 mils DFT.
 - c. Third Coat: Same as second coat.
 2. PPG:
 - a. Primer: 6-2 Speedhide Interior Latex Sealer
 - b. Second Coat: Speedhide Zero Interior Latex semi-Gloss 6-4510XI, 1.3 mils DFT.
 - c. Third Coat: Same as second coat.
 3. Sherwin-Williams:
 - a. Primer: Roller applied latex texturing compound, ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
 - b. Second Coat: ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series 1.6 mils DFT.
 - c. Third Coat: Same as second coat.
- C. Woodwork and Hardboard, Low-Luster (eggshell or satin), Acrylic Enamel Finish: Two finish coats over a primer.
1. Behr:
 - a. Primer: Behr Premium Plus All-In-One Primer & Sealer 75, 1.6 mils DFT
 - b. Second Coat: Behr Pro i300 Interior Eggshell 330, 1.45 mils DFT.
 - c. Third Coat: Same as second coat.
 2. PPG:
 - a. Primer: 17-9517 Seal Grip Latex Wood Undercoat, 1.7 mils DFT.
 - b. Second Coat: Speedhide Zero Interior Latex semi-Gloss 6-4510XI, 1.3 mils DFT.
 - c. Third Coat: Same as second coat.
 3. Sherwin-Williams:
 - a. Primer: Premium Wall & Wood Latex Primer, B28W8111 1.6 mils DFT.
 - b. Second Coat: PorMar 200 Zero VOC Interior Latex Eg-Shel, B20-2600 Series 1.7 mils DFT.
 - c. Third Coat: Same as second coat.
- D. Ferrous Metal, Eggshell, Acrylic-Enamel Finish: Two finish coats over a primer.
1. Behr:
 - a. Primer: Behr Premium Plus Multi-Surface Primer & Sealer 436, 1.7 mils DFT
 - b. Second Coat: Behr Direct To Metal Semi-Gloss Enamel 3200, 1.75 mils DFT
 - c. Third Coat: Same as second coat.
 2. PPG:
 - a. Primer: 4020 Pitt Tech Plus Acrylic Primer/finish DTM, 3.0 mils DFT.
 - b. Second Coat: 90-1110 Pitt-Tech Plus Int./Ext. Satin DTM Industrial Enamel. 2.0 mils DTM.
 - c. Third Coat: Same as second coat.
 3. Sherwin-Williams:
 - a. Primer: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series 2.0 - 4.0 mils DFT.
 - b. Second Coat: Pro Industrial Acrylic Eg-Shel, B66-660 Series 2.5 mils DFT.
 - c. Third Coat: Same as second coat.
- E. Ferrous Metal, Epoxy, Semi-Gloss, Low VOC: 2 finish coats over a primer. Wherever wall surfaces are scheduled to receive epoxy paint, paint doors and frames within the wall with epoxy.
1. Behr:
 - a. Primer: Behr Premium Plus Multi-Surface Primer & Sealer 436, 1.7 mils DFT
 - b. Second Coat: Behr Pro Pre-Catalyzed Waterborne Epoxy Semi-Gloss HP150, 1.5 mils DFT
 - c. Third Coat: Same as second coat.

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2. PPG:
 - a. Primer: 4020 Pitt Tech Plus Acrylic Primer/finish DTM Industrial, 3.0 mils DFT.
 - b. Second Coat: Pitt-Glaze WB1 Pre-Catalyzed Acrylic Epoxy Semigloss, 16-510, 3.0 mils DFT.
 - c. Third coat: Same as second coat.
 3. Sherwin-Williams:
 - a. Primer: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series 2.0 - 4.0 mils DFT.
 - b. Second Coat: Water Based Catalyzed Epoxy, B70-200 Series, 3.0 mils DFT.
 - c. Third Coat: Same as second coat.
- F. Concrete Masonry Units, Acrylic, Semi-Gloss:
1. Behr:
 - a. Primer: Behr Pro Block Filler Primer 50, 5.4 mils DFT
 - b. Second Coat: Behr pro i300 Interior Semi-Gloss 370, 1.45 mils DFT
 - c. Third Coat: Same as second coat.
 2. PPG:
 - a. Primer: 6-7 Speedhide Int./Ext. Masonry Block Filler, 7.0-15.0 mils DFT.
 - b. Second Coat: Speedhide Zero Interior Latex Semi-Gloss 6-4510XI, 1.3 mils DFT.
 - c. Third Coat: Same as second coat.
 3. Sherwin-Williams:
 - a. Primer: PrepRite Block Filler, B25W25 8 mils DFT.
 - b. Second Coat: PorMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series 1.6 mils DFT.
 - c. Third Coat: Same as second coat.
- G. Decking (Preprimed/Prefinished), Bar Joists (Shop Primed):
1. Water-Based Acrylic Dry Fall:
 - a. Sherwin-Williams:
 - 1) First Coat: Low VOC Waterborne Acrylic Dryfall Flat B42W81 over prepared substrate.
 - 2) Second Coat: Same as first coat.

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Identifying devices where shown on the Drawings complete and as specified including the following:
 - a. Interior code required signs.

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.
- B. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, accessories, layout, and installation details.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.
- B. Manufacturer shall have a minimum of five years experience in the manufacturing of signs specified.
- C. Codes and Standards:
 - 1. Panel signs shall have 1/32-inch raised copy and grade 2 Braille, and shall comply with all existing federal, state, and local accessibility standards.
 - 2. Code and Standards: Comply with American with Disabilities Act of 1990, Title 3 Provisions, Public Accommodations and Commercial Facilities. Updated March 15, 2012.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Best Sign Systems, Montrose, Colorado.
 - 2. Mohawk Sign Systems, Schenectady, New York.
 - 3. Nelson-Harkins, Chicago, Illinois.
 - 4. ASI Signs, Dallas, Texas.

2.2 ROOM SIGNAGE SYSTEMS

- A. Basis-of-Design Product: ASI Unframed SP Series Signs with requirements indicated for materials, thickness, finish colors, designs, shapes, sizes and details.
- B. Sign Face: Clear acrylic, 0.080-inch thick, matte first surface.
 - 1. Adhesive: Pressure sensitive adhesive film, second surface.
- C. Tactile Graphics and Text:
 - 1. Fabrication: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer's stratification process as follows:
 - a. Basis-of-Design Product: ASI Intouch, photo-mechanical method.
 - 2. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.
- D. Non-Tactile Graphics and Text:
 - 1. Fabrication options:
 - a. Basis-of-Design Product: ASI; Series SPE/SPJ: Non-tactile graphic plaque, no back plate.
 - 2. Text or graphic technique:
 - a. Screen process using subsurface method.

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3. Provide lettering and graphics precisely formed, uniformly opaque, and consistent in size, style, spacing, content, position, and colors.
- E. Overall Panel Size: Refer to Drawings.
- F. Panel Colors: As selected by Architect.
- G. Text or Graphic Colors: As selected by Architect.
- H. Letter styles, colors, letter sizes and layout position: As selected by Architect.
- I. Installation Method: System SA, silicone adhesive.

PART 3 - EXECUTION

3.1 DELIVERY AND STORAGE

- A. Deliver and store identifying devices in protective wrappings until ready for installation. Install letters in protective wrappings and remove wrappings just prior to substantial completion.

3.2 INSTALLATION

- A. Install signs plumb, level and square and in proper planes with other work, at heights required by accessibility codes and standards.
- B. Anchor each plastic laminate sign with adhesive.
- C. Install signs with sufficient amount of foam tape for proper installation.
- D. Attach as recommended by sign manufacturer.
- E. Anchor each sign with adhesive.
- F. Coordinate arrival and installation of graphic signs with hardware installation. Graphic signs function as and are coordinated with the hardware as shown on the Drawings.
- G. Room name signs shall be placed on the public side of the door except where noted otherwise.
- H. Single Door Sign: Provide one sign as specified above, mounted to wall adjacent to door on knob side.
- I. Pair of Doors: Provide one sign as specified above, mounted to adjacent wall closest to active leaf of door. Do not install sign where it will be obstructed by door when door is in the 'open' position.
- J. Attachment: Mounting to surfaces shall be done by pressure sensitive frame double-faced tape. Signs shall be delivered to the project site with the tape in place and trimmed on each sign, but with the protective paper layer not removed. Paper layer shall be removed just prior to installation of signs.

3.3 COORDINATION

- A. Coordinate the installation of the identifying devices with the hardware manufacturer for lockset and knob leave outs as detailed and scheduled.

3.4 DAMAGE

- A. Any identifying device which is scratched or defaced will be rejected.

3.5 CLEANING

- A. Remove protective materials and clean all signs. Clean surfaces with plain water or water with soap or household detergent.

END OF SECTION

SECTION 10 18 50
SHOWER AND TUB ENCLOSURES

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
- A. Shower and tub wall enclosures.
 - B. Shower pans.
- 1.2 SUBMITTALS
- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - B. Shop Drawings: Show dimensions and method of attachment and required supports. Show intended clear finished dimension wall-to-wall.
 - C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
 - D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
 - E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- 1.3 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A manufacturer with a minimum of ten years' experience manufacturing bath and shower components.
 - B. Installer Qualifications: An installer who has demonstrated experience installing bath and shower components and as recommended by the manufacturer.
- 1.4 DELIVERY, STORAGE, AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
- 1.5 PROJECT CONDITIONS
- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- 1.6 WARRANTY
- A. Provide manufacturer's standard 5-year limited warranty.

PART 2 - PRODUCTS

- 2.1 ENCLOSURES AND SHOWER PANS
- A. Acceptable Product: As scheduled.
- 2.2 SOLID SURFACE MATERIALS
- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. Type: Provide Standard type unless Special Purpose type is indicated.
 - 2. Colors and Patterns: As scheduled.
- 2.3 INSTALLATION MATERIALS
- A. Adhesive: Product recommended by solid surface material manufacturer.
- 2.4 SOLID SURFACING FABRICATION
- A. Fabricate solid surfacings according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Premium.

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- B. Solid Surfacing: 1/2-inch- (12.7-mm-) thick, solid surface material.
- C. Fabricate with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- D. Joints: Fabricate countertops in sections for joining in field.
 - 1. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.
 - 2. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

- A. Install solid surfacings level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.
- B. Fasten solid surfacings by screwing through corner blocks of base units into underside of solid surfacing. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match solid surfacing, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Install metal splines in kerfs in countertop edges at joints[**where indicated**]. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
 - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- D. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- E. Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants."

END OF SECTION

SECTION 10 21 13.19

PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid-plastic toilet compartments configured as toilet enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.
- B. Shop Drawings: For toilet compartments.
 - 1. Include plans, elevations, sections, details, and attachment details.
 - 2. Show locations of cutouts for compartment-mounted toilet accessories.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show locations of floor drains.
 - 5. Show overhead support or bracing locations.
- C. Samples for Initial Selection: For each type of toilet compartment material indicated.
 - 1. Include Samples of hardware and accessories involving material and color selection.
- D. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.
 - 1. Door Hinges: One hinge(s) with associated fasteners.
 - 2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
 - 3. Door Bumper: One bumper(s) with associated fasteners.
 - 4. Door Pull: One door pull(s) with associated fasteners.
 - 5. Fasteners: Ten fasteners of each size and type.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities for toilet compartments designated as accessible.

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2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bradley Corporation; Mills Partitions.
 - 2. General Partitions Mfg. Corp.
 - 3. Global Steel Products Corp.
 - 4. Hadrian Manufacturing Inc.
 - 5. Scranton Products.
- B. Basis-of-Design Product: As scheduled.
- C. Toilet-Enclosure Style: Overhead braced.
- D. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.
 - 1. Heat-Sink Strip: Manufacturer's standard continuous, stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 - 2. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.
- E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.
- F. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.
 - 1. Hinges: Manufacturer's minimum 0.062-inch- (1.59-mm-) thick stainless-steel- continuous, cam type that swings to a closed or partially open position-, allowing emergency access by lifting door. Mount with through-bolts.
 - 2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless-steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
 - 3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless-steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
 - 4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless-steel bumper at out-swinging doors-. Mount with through-bolts.
 - 5. Door Pull: Manufacturer's heavy-duty cast-stainless-steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- B. Stainless-Steel Castings: ASTM A 743/A 743M.

2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

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- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch (13 mm).
 - b. Panels and Walls: 1 inch (25 mm).
 - 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 10 26 00

WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Corner guards.
 - 2. Abuse-resistant wall coverings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
 - 1. Include plans, elevations, sections, and attachment details.
- C. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
 - 1. Corner Guards: 12 inches (300 mm) long. Include example top caps.

1.3 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type of exposed plastic material.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
 - 2. Keep plastic materials out of direct sunlight.
 - 3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).
 - a. Store corner-guard covers in a vertical position.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products from single source from single manufacturer.

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2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities.

2.3 CORNER GUARDS

- A. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard, PVC-free assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Floor Products Co., Inc.
 - b. Arden Architectural Specialties, Inc.
 - c. Balco, Inc.
 - d. Construction Specialties, Inc.
 - e. IPC Door and Wall Protection Systems; Division of InPro Corporation.
 - f. Korogard Wall Protection Systems; a division of RJF International Corporation.
 - g. Musson Rubber Company.
 - h. Pawling Corporation.
 - i. Tepomark International, Inc.
 - j. WallGuard.com.
 - 2. Cover: Extruded rigid plastic, minimum 0.100-inch (2.5-mm) wall thickness; in dimensions and profiles indicated on Drawings.
 - a. Color and Texture: As selected by Architect from manufacturer's full range.
 - 3. Continuous Retainer: Minimum 0.060-inch- (1.5-mm-) thick, one-piece, extruded aluminum-.
 - 4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
 - 5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
- B. PVC-free plastic; with formed edges; fabricated with 90- or 135-degree turn to match wall condition.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arden Architectural Specialties, Inc.
 - b. Balco, Inc.
 - c. Construction Specialties, Inc.
 - d. IPC Door and Wall Protection Systems; Division of InPro Corporation.
 - e. Korogard Wall Protection Systems; a division of RJF International Corporation.
 - f. Pawling Corporation.
 - 2. Wing Size: Nominal 1-1/8 by 1-1/8 inches (30 by 30 mm).
 - 3. Mounting: Adhesive.
 - 4. Color and Texture: As selected by Architect from manufacturer's full range.

2.4 ABUSE-RESISTANT WALL COVERINGS

- A. Decorative Wall Protection: Decorative high-impact semirigid vinyl sheet with polyvinyl fluoride film.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Balco, Inc.
 - b. Construction Specialties, Inc.
 - c. IPC Door and Wall Protection Systems; Division of InPro Corporation.
 - d. Korogard Wall Protection Systems; a division of RJF International Corporation.
 - e. Pawling Corporation.
 - f. Wolf-Gordon, Inc.
 - 2. Basis-of-Design Products: As scheduled.
 - 3. Fire Rating: Class A.
 - 4. Dimensions: As scheduled.
 - 5. Color and Texture: As scheduled.
 - 6. Trim and Joint Moldings: Manufacturer's standard that matches wall-covering color.
 - 7. Mounting: Adhesive.

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2.5 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
- B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- C. Adhesive: As recommended by protection product manufacturer.

2.6 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.7 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than 20 feet (6.1 m), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches (305 mm) apart.
 - 3. Adjust end and top caps as required to ensure tight seams.

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3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.
 - 2. Adult changing room accessories.
 - 3. Warm-air dryers.
 - 4. Childcare accessories.
 - 5. Custodial accessories.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

- A. Toilet Tissue (Jumbo-Roll) Dispenser:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.

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2. Basis-of-Design Product: American Specialties, Inc.; ASI-0046.
 3. Description: One-roll unit.
 4. Mounting: As indicated on drawings.
 5. Capacity: 12-inch diameter rolls.
 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 7. Lockset: Tumbler type.
 8. Refill Indicator: Pierced slots at front.
- B. Automatic Liquid-Soap Dispenser:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Sloan Valve Company.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-2012.
 3. Description: Automatic dispenser with infrared sensor to detect presence of hands; battery powered; designed for dispensing liquid soap, alcohol gel, liquid alcohol, hand sanitizers, and iodine.
 4. Mounting: Wall-mounted.
 5. Capacity: 30 fl. oz. (850 ml).
 6. Refill Indicator: Clear window.
 7. Low Battery Indicator: LED indicator.
- C. Grab Bar:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-5806.
 3. Mounting: Flanges with concealed fasteners.
 4. Material: Stainless steel, 0.05 inch (1.2 mm) thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
 5. Outside Diameter: 1-1/4 inches (32 mm).
 6. Configuration and Length: As indicated on Drawings.
- D. Drink Fountain Grab Bar:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; 819298.
 3. Mounting: Flanges with concealed fasteners.
 4. Material: Stainless steel, 0.05 inch (1.2 mm) thick.
 - a. Finish: Smooth, No. 4 finish (satin).
 5. Outside Diameter: 1-1/2 inches (38 mm).
 6. Configuration and Length: As indicated on Drawings.
- E. Mirror Unit:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.

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- d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-165 2448.
 3. Frame: Stainless-steel channel.
 - a. Corners: Manufacturer's standard.
 4. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
 5. Size: 24 by 48 inches (61 by 122 cm).
 - F. Coat Hook:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-9542.
 3. Description: Single-prong unit.
 4. Material and Finish: Stainless steel, No. 4 finish (satin).
 - G. Sanitary Napkin Disposal:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-254 Classic Series.
 3. Description: 18-gauge, type 304, satin-finish stainless steel, all-welded construction.
 4. Door: 22-gauge with full-length stainless steel piano hinge, keyed tumbler lock.
 5. Mounting: Surface.
 6. Waste Receptacle: Removable, leak-proof, 1/2 gallon plastic receptacle.
 7. Disposal Panel: Self-closing.
- 2.2 ADULT CHANGING ROOM ACCESSORIES
- A. Standards: Comply with ADA, OSHA, IBC, State of Maryland applicable building codes, ANSI/ASSE A10.6 and NFPA 241.
 - B. Adult Changing Station:
 1. Basis-of-Design Product: Astor Bannerman; Astor Invincible Wall Mounted Changing and Showering Table.
 2. Description and Requirements: Wall mounted, height adjustable, no exposed wires, fixings, or controls, ID10 tested, non-tamper embedded control panel, emergency stop button.
 - a. Maximum Working Load: 500 lbs (227 kg).
 - b. Height Adjustable Range: 11.8-inches to 40.9 inches.
 - c. Cut and graffiti resistant bed/stretcher.
 - d. Power operated with battery backup.
 - e. Split front guard.
 - C. Paper Towel (Folded) Dispenser:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.

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- e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-262.
 3. Mounting: Surface mounted.
 4. Minimum Capacity: 400 C-fold or 525 multifold towels.
 5. Material and Finish: Stainless steel, No. 4 finish (satin).
 6. Lockset: Tumbler type.
 7. Refill Indicator: Pierced slots at sides or front.
- D. Folding Shower Seat:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-5181.
 3. Configuration: L-shaped seat, designed for wheelchair access.
 4. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
 5. Mounting Mechanism: Stainless steel, No. 4 finish (satin).
 6. Dimensions: Manufacturer's standard.
- E. Shower Grab Bar:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-6861.
 3. Mounting: Flanges with concealed fasteners.
 4. Material: Stainless steel, 0.05 inch (1.2 mm) thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
 5. Outside Diameter: 1-1/2 inches (38 mm).
 6. Configuration and Length: As indicated on Drawings.
- F. Shower Curtain Rod:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-6047x36.
 3. Outside Diameter: 1-1/4 inches (32 mm).
 4. Rod Material and Finish: Stainless steel, No. 4 finish (satin).
 5. Flange Material and Finish: Stainless steel, No. 4 finish (satin).
 6. Accessories: Integral chrome-plated brass glide hooks.
- G. Waste Receptacle:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.

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- e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: American Specialties, Inc.; 20826-T.
 3. Mounting: Surface mounted.
 4. Minimum Capacity: 12.8 gal. (48.4 L).
 5. Material and Finish: Stainless steel, No. 4 finish (satin).
 6. Liner: Reusable vinyl liner.
- H. Seat-Cover Dispenser:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-3013.
 3. Mounting: Recessed.
 4. Minimum Capacity: 500 seat covers.
 5. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
 6. Lockset: Tumbler type.

2.3 WARM-AIR DRYERS

- A. Source Limitations: Obtain warm-air dryers from single source from single manufacturer.
- B. High-Speed Warm-Air Dryer:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Sloan Valve Company.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-7125.
 3. Description: High-speed, warm-air hand dryer for rapid hand drying.
 4. Mounting: As indicated on drawings.
 5. Operation: Electronic-sensor activated.
 6. Cover Material and Finish: Stainless steel, No. 4 finish (satin).
 7. Electrical Requirements: Manufacturer's standard.

2.4 CHILDCARE ACCESSORIES

- A. Source Limitations: Obtain childcare accessories from single source from single manufacturer.
- B. Diaper-Changing Station:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Specialties, Inc.
 - b. Diaper Deck & Company, Inc.
 - c. Foundations Children's Products.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
 - e. Koala Kare Products.
 - f. SafeStrap Company, Inc. (SSC, Inc.).
 - g. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Koala Kare Products; KB300-SS.
 3. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
 - a. Engineered to support minimum of 250-lb (113-kg) static load when opened.
 4. Mounting: Surface mounted, with unit projecting not more than 4 inches (100 mm) from wall when closed.
 5. Operation: By pneumatic shock-absorbing mechanism.

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6. Material and Finish: HDPE in manufacturer's standard color.
7. Liner Dispenser: Built in.

2.5 CUSTODIAL ACCESSORIES

- A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.
- B. Mop and Broom Holder:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AJW Architectural Products.
 - b. American Specialties, Inc.
 - c. Bobrick Washroom Equipment, Inc.
 - d. Bradley Corporation.
 - e. Brey-Krause Manufacturing Co.
 - f. Tubular Specialties Manufacturing, Inc.
 2. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-233x24.
 3. Length: Manufacturer's standard.
 4. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
 5. Material and Finish: Stainless steel, No. 4 finish (satin).

2.6 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.7 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

TOILET, BATH, AND LAUNDRY ACCESSORIES

SECTION 10 44 13

FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
- B. Shop Drawings: For fire-protection cabinets.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
- C. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.3 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Babcock-Davis.
 - 2. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - 3. Larsens Manufacturing Company.
 - 4. Nystrom, Inc.
 - 5. Potter Roemer LLC.
 - 6. Strike First Corporation of America (The).

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
- B. Cabinet Construction: Nonrated and rated to match adjacent wall construction.
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch- (1.09-mm-) thick cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm-) thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Cold-rolled steel sheet.

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- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 - 1. Rolled-Edge Trim: 2-1/2-inch (64-mm) backbend depth.
- E. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.
- F. Cabinet Trim Material: Same material and finish as door.
- G. Door Material: Steel sheet.
- H. Door Style: Vertical duo panel with frame.
- I. Door Glazing: Tempered float glass (clear).
- J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch.
 - 2. Provide continuous hinge, of same material and finish as trim,, permitting door to open 180 degrees.
- K. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
 - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.
- L. Materials:
 - 1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Color: As selected by Architect from manufacturer's full range.
 - 2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Miter corners and grind smooth.
 - 3. Provide factory-drilled mounting holes.
 - 4. Prepare doors and frames to receive locks.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
 - 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
 - 2. Fabricate door frames of one-piece construction with edges flanged.
 - 3. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

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- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C. Identification:
 - 1. Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 10 44 16
FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers that may be incorporated into the Work include, but are not limited to, the following:
 - a. Babcock-Davis.
 - b. Amerex Corporation.
 - c. Brooks Equipment Co., Inc.
 - d. Buckeye Fire Equipment Co.
 - e. Fire-End & Croker Corporation.
 - 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
 - 3. Valves: Manufacturer's standard.
 - 4. Handles and Levers: Manufacturer's standard.

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5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
 - B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3-A:40-B:C, 5-lb (2.3-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
- 2.3 MOUNTING BRACKETS
- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 1. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
 - B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- A. Examine fire extinguishers for proper charging and tagging.
 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
 - B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 INSTALLATION
- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 1. Mounting Brackets: Top of fire extinguisher to be at height to meet requirements of authorities having jurisdiction.
 - B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

SECTION 12 24 13

ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Manually operated roller shades with single rollers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Samples for Verification: For each type of roller shade.
 - 1. Shadeband Material: Not less than 10 inches (250 mm) square. Mark interior face of material if applicable.
 - 2. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.
- C. Product Schedule: For roller shades.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of shadeband material.
- C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CACO, Inc., Window Fashions.
 - 2. Draper Inc.
 - 3. Hunter Douglas Contract.
 - 4. Insolroll Window Shading Systems.
 - 5. Lutron Electronics Co., Inc.
 - 6. MechoShade Systems, Inc.
 - 7. Qmotion Shades.
 - 8. Silent Gliss.
 - 9. Springs Window Fashions; SWFcontract.
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Manufacturer's standard.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Clip, jamb mount.
 - 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
 - a. Provide for shadebands that weigh more than 10 lb (4.5 kg) or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Drive-End Location: As indicated on Drawings.
 - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
 - 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- F. Shadebands:
 - 1. Shadeband Material: Light-filtering fabric.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.
- G. Installation Accessories:
 - 1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - a. Shape: L-shaped.
 - b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches (102 mm).
 - 2. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
 - 1. Source: Roller shade manufacturer.

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2. Type: PVC-coated fiberglass.
3. Color: As selected by Architect from manufacturer's full range.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.
- B. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION

SECTION 12 36 61.16

SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid surface material countertops.
 - 2. Solid surface material backsplashes.
 - 3. Solid surface material end splashes.
 - 4. Solid surface material apron fronts.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
 - 1. Show locations and details of joints.
 - 2. Show direction of directional pattern, if any.
- C. Samples for Verification: For the following products:
 - 1. Countertop material, 6 inches (150 mm) square.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.
- C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
 - 1. Build mockup of typical countertop as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.6 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Affinity Surfaces; a brand of Domain Industries, Inc.
 - b. Avonite Surfaces.
 - c. E. I. du Pont de Nemours and Company.
 - d. Formica Corporation.
 - e. LG Chemical, Ltd.

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- f. Meganite Inc.
 - g. Samsung Chemical USA, Inc.
 - h. Swan Corporation (The).
 - i. Transolid Div of Trumbull Industries.
 - j. Wilsonart.
 2. Basis-of-Design Products: As scheduled.
 3. Type: Provide Standard type unless Special Purpose type is indicated.
 4. Colors and Patterns: As scheduled.
- B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- C. Wire-Management Grommets: Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Doug Mockett & Company, Inc.: TG Flip-Top Series.
 2. Outside Diameter: 2 inches (51-mm).
 3. Color: As selected by Architect from Manufacturer's full range.
- D. Countertop Support Brackets: Aluminum, 18 by 24 inches, minimum 1,000 lb. load limit.
1. Acceptable Products:
 - a. Rangine Corporation; Rakks, EH 1824.
 - 1) Finish: As scheduled

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
1. Grade: Custom.
- B. Countertops: 1/2-inch- (12.7-mm-) thick, solid surface material.
- C. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material with wood-trimmed edges.
- D. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
1. Fabricate with loose backsplashes for field assembly.
- E. Joints: Fabricate countertops without joints.
- F. Cutouts and Holes:
1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch (5 mm) into fixture opening.
 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- F. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Pre-drill holes for screws as recommended by manufacturer.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- H. Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants."

END OF SECTION

SECTION 22 05 00

COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
 2. Transition fittings.
 3. Dielectric fittings.
 4. Mechanical sleeve seals.
 5. Sleeves.
 6. Escutcheons.
 7. Grout.
 8. Plumbing demolition.
 9. Equipment installation requirements common to equipment sections.
 10. Painting and finishing.
 11. Concrete bases.
 12. Supports and anchorages.

1.2 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces, mechanical equipment rooms, electrical rooms, penthouses, air handling rooms, and mechanical mezzanines.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations and outdoor above ground locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
1. ABS: Acrylonitrile-butadiene-styrene plastic.
 2. CPVC: Chlorinated polyvinyl chloride plastic.
 3. PE: Polyethylene plastic.
 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

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1.3 SUBMITTALS

A. Product Data: For the following:

1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates.

1.4 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code-Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.6 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

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1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
 1. ABS Piping: ASTM D 2235.
 2. CPVC Piping: ASTM F 493.
 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 4. PVC to ABS Piping Transition: ASTM D 3138.
- I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.4 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
 1. Available Manufacturers:
 - a. Cascade Waterworks Mfg. Co.

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- b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
2. Underground Piping NPS 1-1/2 (DN 40) and Smaller: Manufactured fitting or coupling.
 3. Underground Piping NPS 2 (DN 50) and Larger: AWWA C219, metal sleeve-type coupling.
 4. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: CPVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
1. Available Manufacturers:
 - a. Eslon Thermoplastics.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
1. Available Manufacturers:
 - a. Thompson Plastics, Inc.
- D. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
1. Available Manufacturers:
 - a. NIBCO INC.
 - b. NIBCO, Inc.; Chemtrol Div.
- E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
1. Available Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Fernco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).
1. Available Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.

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- c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.

 - D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.
 - 1. Available Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.

 - E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Available Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.

 - 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig (1035- or 2070-kPa) minimum working pressure where required to suit system pressures.

 - F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
 - 1. Available Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.

 - G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
 - 1. Available Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.
- 2.6 MECHANICAL SLEEVE SEALS
- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Available Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.

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- c. Metraflex Co.
- d. Pipeline Seal and Insulator, Inc.

- 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- 3. Pressure Plates: Carbon steel. Include two for each sealing element.
- 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With spring clips and chrome-plated finish.
- F. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- G. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

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1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
 2. Existing Piping: Use the following:
 - a. Chrome-Plated Piping: Split-casting, cast-brass type with chrome-plated finish.
 - b. Insulated Piping: Split-plate, stamped-steel type with concealed hinge and spring clips.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
 - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
 - e. Bare Piping in Unfinished Service Spaces: Split-casting, cast-brass type with polished chrome-plated finish.
 - f. Bare Piping in Equipment Rooms: Split-casting, cast-brass type.
 - g. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 - b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

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- O. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches (150 mm) in diameter.
 2. Install cast-iron "wall pipes" for sleeves 6 inches (150 mm) and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- P. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- R. Verify final equipment locations for roughing-in.
- S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

COMMON WORK RESULTS FOR PLUMBING

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- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.6 PAINTING

- A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."

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- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 - 7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Miscellaneous Cast-in-Place Concrete."

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.9 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.10 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.

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H. Cure placed grout.

END OF SECTION

SECTION 22 05 17

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves.
2. Stack-sleeve fittings.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.

1.2 ACTION SUBMITTALS

- A. Submit complete penetration layout drawings showing openings in building structural members including floor slabs, bearing walls, shear walls, etc. Indicate and locate and locate, by dimensions, all required openings, including those sleeved, formed or core drilled. Drawings shall be approved prior to preparing openings in structural members.
- B. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

2.2 STACK-SLEEVE FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Smith, Jay R. Mfg. Co.
 2. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

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- B. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. Metraflex Company (The).
4. Pipeline Seal and Insulator, Inc.
5. Proco Products, Inc.

- B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel or Stainless steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating or Stainless steel of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Presealed Systems.

- B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

- B. Characteristics: Nonshrink; recommended for interior and exterior applications.

- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

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- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch (25-mm) annular clear space between piping and concrete slabs and walls.
 - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 - 2. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.
 - 3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."
- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
 - 1. Install fittings that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
 - 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
 - 3. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level.
 - 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 5. Using grout, seal the space around outside of stack-sleeve fittings.
- B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal

system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves, Galvanized-steel wall sleeves or Sleeve-seal fittings.
 - b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves, Galvanized-steel wall sleeves or Galvanized-steel-pipe sleeves.
 - 2. Exterior Concrete Walls below Grade:
 - a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel wall sleeves with sleeve-seal system or Galvanized-steel-pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system, Galvanized-steel wall sleeves with sleeve-seal system or Galvanized-steel-pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - 3. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel wall sleeves with sleeve-seal system or Galvanized-steel-pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system, Galvanized-steel wall sleeves with sleeve-seal system or Galvanized-steel-pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

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4. Concrete Slabs above Grade:
 - a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-pipe sleeves.

5. Interior Partitions:
 - a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION

SECTION 22 05 18

ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated and rough-brass finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

2.2 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type.

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- d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished, chrome-plated or rough-brass finish.
 - i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.
 - j. Bare Piping in Equipment Rooms: One-piece, cast-brass type with polished, chrome-plated or rough-brass finish.
 - k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
- 1. New Piping: One-piece, floor-plate type.
 - 2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION

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GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general duty valves common to several mechanical piping systems.

1.2 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each valve type. Include body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions. Include list indicating valve and its application.
- C. Maintenance data for valves to include in the operation and maintenance manual specified in Division 1. Include detailed manufacturer's instructions on adjusting, servicing, disassembling, and repairing.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Comply with the requirements specified in Division 1 Section "Materials and Equipment," under "Source Limitations" Paragraph.
- B. ASME Compliance: Comply with ASME B31.9 for building services piping and ASME B31.1 for power piping.
- C. MSS Compliance: Comply with the various MSS Standard Practice documents referenced.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set globe and gate valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Set butterfly valves closed or slightly open.
 - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store indoors and maintain valve temperature higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use a sling to handle large valves. Rig to avoid damage to exposed parts. Do not use handwheels and stems as lifting or rigging points.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. Gate Valves:
 - a. Crane Company; Valves and Fitting Division.
 - b. Kitz Corp. of America.
 - c. NIBCO Inc.
 2. Ball Valves:
 - a. Milwaukee Valve Company, Inc.
 - b. NIBCO Inc.
 - c. Victaulic Company of America.
 3. Plug Valves:
 - a. NIBCO Inc.
 - b. Stockham Valves & Fittings, Inc.
 - c. Victaulic Company of America.
 4. Globe Valves:
 - a. Crane Company; Valves and Fitting Division.
 - b. Kitz Corp. of America.
 - c. NIBCO Inc.
 5. Swing Check Valves:
 - a. Crane Company; Valves and Fitting Division.
 - b. NIBCO Inc.
 - c. Victaulic Company of America.

2.2 BASIC, COMMON FEATURES

- A. Design: Rising stem or rising outside screw and yoke stems, except as specified below.
1. Nonrising stem valves may be used only where headroom prevents full extension of rising stems.
- B. Pressure and Temperature Ratings: As indicated in the "Application Schedule" of Part 3 of this Section and as required to suit system pressures and temperatures.
- C. Sizes: Same size as upstream pipe, unless otherwise indicated.
- D. Operators: Use specified operators and handwheels, except provide the following special operator features:
1. Handwheels: For valves other than quarter turn.
 2. Lever Handles: For quarter-turn valves 6 inches (DN150) and smaller, except for plug valves, which shall have square heads.
- E. Extended Stems: Where insulation is indicated or specified, provide extended stems arranged to receive insulation.
- F. Bypass and Drain Connections: Comply with MSS SP-45 bypass and drain connections.
- G. Threads: ASME B1.20.1.

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H. Flanges: ASME B16.1 for cast iron, ASME B16.5 for steel, and ASME B16.24 for bronze valves.

I. Solder Joint: ASME B16.18.

1. Caution: Where soldered end connections are used, use solder having a melting point below 840 deg F (450 deg C) for gate, globe, and check valves; below 421 deg F (216 deg C) for ball valves.

2.3 GATE VALVES

A. Gate Valves, 2-1/2 Inches and Smaller: MSS SP-80; Class 125, 200-psi (1380 – Kpa) cold working pressure (CWP), or Class 150, 300-psi (2070 – Kpa) CWP; ASTM B 62 cast-bronze body and bonnet, solid-bronze wedge, copper-silicon alloy rising stem, teflon-impregnated packing with bronze packing nut, threaded or soldered end connections; and with aluminum or malleable-iron handwheel.

2.4 BALL VALVES

A. Ball Valves, 4 Inches (DN100) and Smaller: MSS SP-110, Class 150, 600-psi (4140 – Kpa) CWP, ASTM B 584 bronze body and bonnet, 2-piece construction; chrome-plated brass ball, standard port for 1/2-inch (DN15) valves and smaller and conventional port for 3/4-inch (DN20) valves and larger; blowout proof; bronze or brass stem; teflon seats and seals; threaded or soldered end connections:

1. Operator: Steel handwheel.
2. Stem Extension: For valves installed in insulated piping.
3. Memory Stop: For operator handles.

2.5 PLUG VALVES

A. Plug Valves: MSS SP-78, 175-psi (1200 – Kpa) CWP, ASTM A 126 cast-iron body and bonnet, cast-iron plug, Buna N, Viton, or teflon packing, flanged or grooved end connections:

1. Operator: Lever.

2.6 GLOBE VALVES

A. Globe Valves, 2-1/2 Inches (DN65) and Smaller: MSS SP-80; Class 125, 200-psi (1380 – Kpa) CWP, or Class 150, 300-psi (2070 – Kpa) CWP; ASTM B 62 cast-bronze body and screwed bonnet, rubber, bronze, teflon disc, silicon bronze-alloy stem, teflon-impregnated packing with bronze nut, threaded or soldered end connections; and with aluminum or malleable-iron handwheel.

2.7 CHECK VALVES

A. Swing Check Valves, 2-1/2 Inches (DN65) and Smaller: MSS SP-80; Class 125, 200-psi (1380 – Kpa) CWP, or Class 150, 300-psi (2070 – Kpa) CWP; horizontal swing, Y-pattern, ASTM B 62 cast-bronze body and cap, rotating bronze disc with rubber seat or composition seat, threaded or soldered end connections:

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance of valves. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

- C. Operate valves from fully open to fully closed positions. Examine guides and seats made accessible by such operation.
- D. Examine threads on valve and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Check gasket material for proper size, material composition suitable for service, and freedom from defects and damage.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 INSTALLATION

- A. Install valves as indicated, according to manufacturer's written instructions.
- B. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate the general arrangement of piping, fittings, and specialties.
- C. Install valves with unions or flanges at each piece of equipment arranged to allow servicing, maintenance, and equipment removal without system shutdown.
- D. Locate valves for easy access and provide separate support where necessary.
- E. Install valves in horizontal piping with stem at or above the center of the pipe.
- F. Install valves in a position to allow full stem movement.
- G. Installation of Check Valves: Install for proper direction of flow as follows:
 - 1. Swing Check Valves: Horizontal position with hinge pin level.

3.3 SOLDERED CONNECTIONS

- A. Cut tube square and to exact lengths.
- B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket.
- C. Apply proper soldering flux in an even coat to inside of valve socket and outside of tube.
- D. Open gate and globe valves to fully open position.
- E. Remove the cap and disc holder of swing check valves having composition discs.
- F. Insert tube into valve socket, making sure the end rests against the shoulder inside valve. Rotate tube or valve slightly to ensure even distribution of the flux.
- G. Apply heat evenly to outside of valve around joint until solder melts on contact. Feed solder until it completely fills the joint around tube. Avoid hot spots or overheating valve. Once the solder starts cooling, remove excess amounts around the joint with a cloth or brush.

3.4 THREADED CONNECTIONS

- A. Note the internal length of threads in valve ends and proximity of valve internal seat or wall to determine how far pipe should be threaded into valve.

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- B. Align threads at point of assembly.
- C. Apply appropriate tape or thread compound to the external pipe threads, except where dry seal threading is specified.
- D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

3.5 FLANGED CONNECTIONS

- A. Align flange surfaces parallel.
- B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.
- C. For dead-end service, butterfly valves require flanges both upstream and downstream for proper shutoff and retention.

3.6 VALVE END SELECTION

- A. Select valves with the following ends or types of pipe/tube connections:
 - 1. Copper Tube Size, 2-1/2 Inches (DN65) and Smaller: Solder ends, except provide threaded ends for heating hot water and low-pressure steam service.
 - 2. Steel Pipe Sizes, 2-1/2 Inches (DN65) and Smaller: Threaded or grooved end.

3.7 APPLICATION SCHEDULE

- A. General Application: Use gate, ball, and butterfly valves for shutoff duty; globe, ball, and butterfly for throttling duty. Refer to piping system Specification Sections for specific valve applications and arrangements.
- B. Heating Water Systems: Use the following valve types:
 - 1. Gate Valves: Class 150, bronze or cast-iron body to suit piping system.
 - 2. Ball Valves: Class 150, 600-psi CWP, with stem extension and memory stop.
 - 3. Plug Valves: Viton or teflon packing.
 - 4. Globe Valves: Class 150, bronze or cast-iron body to suit piping system, and bronze disc.
 - 5. Bronze Swing Check: Class 150, with composition seat.
 - 6. Check Valves: Iron swing, wafer, or lift type, as indicated. Swing check shall be Class 150 with bronze seat ring.
- C. Chilled-Water Systems: Use the following valve types:
 - 1. Gate Valves: Class 150, bronze body; or Class 125, cast-iron body.
 - 2. Ball Valves: Class 150, 600-psi CWP, with stem extension and memory stop.
 - 3. Plug Valves: Buna N packing.
 - 4. Globe Valves: Class 125, bronze body with bronze or teflon disc; or Class 125, cast-iron body.
 - 5. Check Valves: Class 125, bronze body swing check with rubber seat; Class 125, cast-iron body swing check; Class 125, cast-iron body wafer check; or Class 125, cast-iron body lift check.

3.8 ADJUSTING

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- A. Adjust or replace packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves if leak persists.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Perform all Work required to provide and install supports, hangers, anchors, sleeves and bases for all pipe, equipment, system components and accessories, indicated by the Contract Documents with all supplementary items necessary for complete, code compliant and approved installation

1.2 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and Workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. 2006 Edition of the National Standard Plumbing Code.
 - 2. ANSI/ASME B31.9 or ANSI/ASME B31.1 Building Services Piping.
 - 3. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
 - 4. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 - 5. MSS SP69 - Pipe Hangers and Supports - Selection and Application.
 - 6. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
 - 7. MSS SP-90 - Guidelines on Terminology for Pipe Hangers and Supports.

1.3 QUALITY ASSURANCE

- A. Materials and application of pipe hangers and supports shall be in accordance with MSS-SP-58 and SP-69 unless noted otherwise.
- B. Support and sleeve materials and installation shall not interfere with the proper functioning of equipment.
- C. Contractor shall be responsible for structural integrity of all hangers, supports, anchors, guides, inserts and sleeves. All structural hanging materials shall have a minimum safety factor of five.
- D. Installer Qualifications: Utilize an installer experienced in performing Work of this Section who is experienced in installation of Work similar to that required for this Project and per the minimum requirements of MSS SP-89. Field welding of supports shall be by certified welders qualified in accordance with ASME Boiler and Pressure Vessel Code, Section IX using welding procedures per the minimum requirements of MSS SP-58.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog data including code compliance, load capacity, and intended application.

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- B. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.
- C. Shop Drawings: Submit detailed Drawings of all shop or field fabricated supports, anchors and sleeves, signed and sealed by a qualified State of Maryland registered professional engineer. Indicate size and characteristics of components and fabrication details and all loads exceeding 250 pounds imposed on the base building structure.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Maintain in place until installation.
- C. Store materials protected from exposure to harmful weather conditions.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 MANUFACTURERS

- A. Hangers and Supports:
 - 1. Anvil International.
 - 2. Kinder.
 - 3. Cooper B-Line.
 - 4. Hilti
 - 5. C & S Mfg. Corp.
 - 6. Hubbard Enterprises/Holdrite
 - 7. National Pipe Hanger Corporation.
 - 8. Power Strut.

2.3 HANGERS AND SUPPORTS

- A. General:
 - 1. Refer to individual system and equipment Specification Sections for additional support requirements. Comply with MSS SP-69 for support selections and applications that are not addressed within these Specifications.
 - 2. Utilize hangers and supports to support systems under all conditions of operation, allowing free expansion and contraction, and to prevent excessive stresses from being introduced into the structure, piping or connected equipment.
 - 3. All pipe supports shall be of the type and arrangement to prevent excessive deflection, to avoid excessive bending stresses between supports, and to eliminate transmission of vibration.
 - 4. Design hangers to impede disengagement by movement of supported pipe.

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5. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping.
 6. Utilize stainless steel hanger and supports in compliance with MSS-58.
 7. Wire or perforated strap iron will not be acceptable as hanger material.
 8. Hanger rods shall be threaded on both ends, threaded one end, or continuous threaded, complete with adjusting and lock nuts.
 9. Fasteners requiring explosive powder (shooting) or pneumatic-driven actuation will not be acceptable under any circumstances.
 10. Plastic anchors or plastic expansion shields will not be permitted under any circumstances.
 11. Powder-actuated anchors are not acceptable. All anchors supporting piping and equipment shall be in accordance with IBC 2018 requirements and loadings for cracked concrete and undercut cut anchors. Use only wedge-type anchors by Hilti, Kwik-bolt 3, Simpson Strong. Drop-in anchors are not acceptable.
 12. Hangers and clamps supporting and contacting individual non-insulated brass or copper lines shall be copper or copper plated. Where non-insulated brass or copper lines are supported on trapeze hangers or channels, the pipes shall be isolated from these supports with approved flexible elastomeric/thermoplastic isolation cushion material to completely encircle the piping and avoid contact with the channel or clamp. Plastic tape is not acceptable.
 13. Hangers and clamps supporting and contacting glass piping shall be in accordance with the piping manufacturer's published recommendations and shall be fully lined with minimum 1/4 inch neoprene padding. The padding material and the configuration of its installation shall be submitted for approval.
 14. Hangers and clamps supporting and contacting plastic piping shall be in accordance with the piping manufacturer's published recommendations and shall be factory coated or padded to prevent damage to piping.
 15. Field fabricated supports shall be constructed from ASTM A36/A36M, steel shapes selected for loads being supported. Weld steel according to AWS D-1.1.
- B. Finishes: All ferrous hangers, rods, inserts, clamps, stanchions, and brackets on piping within interior non-corrosive environments, shall be dipped in Zinc Chromate Primer before installation. Rods may be galvanized or cadmium plated after threading, in lieu of dipping zinc chromate. All hangers and supports exposed to the weather, including roofs and building crawl space areas, shall be galvanized or manufactured from materials that will not rust or corrode due to moisture. All hangers and supports located within corrosive environments shall be constructed from or coated with materials manufactured for installation within the particular environment.
- C. Vertical Piping: Supports for vertical riser piping in concealed areas shall utilize double bolt riser clamps, with each end having equal bearing on the building structure at each floor level. Two-hole rigid pipe clamps or four-hole socket clamps with washers may be used to support pipe directly from adequate structural members where floor-to-floor distance exceeds required vertical support spacing and lines are not subject to expansion and contraction. Supports for vertical riser piping at floor levels in exposed areas shall be attached to the underside of the penetrated structure utilizing drilled anchors, two hanger rods (sized as specified), and socket clamp with washers.
- D. Trapezes: Where multiple lines are run horizontally at the same elevation and grade, they may be supported on manufactured channel, suspended on rods or pipes. Trapeze members including suspension rods shall be properly sized for the quantity, diameters, and loaded weight of the lines they are to support.
- E. Fixture and Equipment Service Piping:
1. Piping at local connections to plumbing fixtures and equipment shall be supported to prevent the weight of the piping from being transmitted to fixtures and equipment.
 2. Makeshift, field-devised methods of plumbing pipe support, such as with the use of scrap framing materials, are not allowed. Support and positioning of piping shall be by means of engineered methods that comply with IAPMO PS 42-96. These shall be Hubbard Enterprises/Holdrite support systems, C & S Mfg. Corp. or Owner-approved equivalent.

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

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3. Supports within chases and partitions shall be corrosion resistant metal plate, clamps, angles or channels, and aligned with structure in the vertical or horizontal position. Plastic supports are not allowed unless approved by Owner.
 4. Horizontal supports within chases and partitions that are attached to studs shall be attached at both ends. Drywall shall not be relied upon to support the piping.
 5. Supports for plumbing fixture water service piping within chases and partitions may be attached to cast iron drain and vent pipe with approved brackets and pipe clamps.
 6. Piping exposed on the face of drywall shall be supported with corrosion resistant metal channels that are attached to wall studs. Drywall shall not be relied upon to support the piping.
 7. Piping supported from the floor shall utilize corrosion resistant metal channels or brackets that are anchored to the floor slab.
 8. All water piping shall be isolated from building components to prevent the transmission of sound.
 9. All copper or brass lines shall be isolated from ferrous metals with dielectric materials to prevent electrolytic action. Plastic tape is not an acceptable isolation material.
 10. All piping with cellular glass insulation shall be provide with inserts as to interference with pipe supports.
 11. Sanitary, Storm and Corrosive resistant piping shall be provided with sway brazing 4 inches and larger per IPC 2015 and DRM requirements. Also, joint restraints shall be provided.
- F. Inserts:
1. Cast-in-place concrete inserts shall comply with MSS-SP-69, U.L. and F.M. approved, and sized to suit threaded hanger rods.
 2. Inserts shall have malleable iron case with galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods. Suitable concrete inserts for pipe and equipment hangers shall be set and properly located for all pipe and equipment to be suspended from concrete construction. If the inserts are later found not to be in the proper location for the placement of hangers, then drilled anchors shall be installed. Drilled anchors in concrete or masonry shall be submitted for the approval.
 3. Manufactured inserts for metal deck construction shall have legs custom fit to rest in form valleys.
 4. Shop fabricated inserts shall be submitted and approved by Owner prior to installation.
 5. Inserts shall be of a type that will not interfere with structural reinforcing and that will not displace excessive amounts of structural concrete.
- G. Pipe Shields: Provide pipe shields in accordance with insulation manufacturer's published recommendations. Install MSS SP-58, Type 39 protection saddles, if insulation without vapor barrier is indicated. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier.
- H. Housekeeping Pads:
1. Provide minimum 4 inch reinforced concrete pads with chamfered corners and equipment bases for all outdoor equipment on grade, floor mounted equipment in main central plant area, mechanical rooms, areas with floors below grade, penthouse equipment rooms, floor mounted air handling units, and where shown on Drawings.
 2. Housekeeping pads shall extend minimum of 4 inch on all sides beyond the limits of the mounted equipment unless otherwise noted.
 3. Provide galvanized anchor bolts for all equipment placed on concrete pads or on concrete slabs of the size and number recommended by the equipment manufacturer.

2.4 PIPE PENETRATIONS

- A. General:
1. Seal penetrations through all rated partitions, walls and floors with U.L. tested assemblies to provide and maintain a rating equal to or greater than the partition, wall or floor.
 2. Inside diameter of all sleeves or cored holes shall provide sufficient annular space between outside diameter of pipe, or insulation to allow proper installation of required fire and water proofing materials and allow for movement due to expansion and contraction.

3. Exposed ceiling, floor and wall pipe penetrations within finished areas (including exterior wall faces) shall be provided with chrome plated, brass or stamped steel, hinged, split-ring escutcheon with set screw or snap-on type. Inside diameter shall closely fit pipe outside diameter or outside of pipe insulation where pipe is insulated. Outside diameter shall completely cover the opening in floors, walls, or ceilings. In exterior, damp, or corrosive environments, use Type 302 stainless steel escutcheons.
- B. Floor Pipe Penetrations:
1. Seal penetrations through all floors to provide and maintain a watertight installation.
 2. Sleeves cast in the slab for pipe penetrations shall be Schedule 40 steel, ASTM A53, with 2 inch wide annular fin water-stop continuously welded at midpoint. Entire assembly shall be hot-dipped galvanized after fabrication. Water-stop shall be same thickness as sleeve.
 3. Cored holes in the slab for pipe penetrations shall be provided with a Schedule 40 steel, ASTM A53, sleeve with 2 inch wide annular fin water-stop continuously welded at point on sleeve to allow countersinking into slab and waterproofing. Entire sleeve assembly shall be hot-dipped galvanized after fabrication. Water-stop shall be same thickness as sleeve.
 4. All sleeves shall extend a minimum of two inches above finished floor.
 5. Where job conditions prevent the use of a sleeve that extends two inches above the slab, Link-Seal mechanical casing seals manufactured by Thunderline Corporation may be installed to provide a watertight penetration. Mechanical casing seals can be used only for relatively small diameter pipe penetrations. Verify that slab thickness allows proper installation of the link-seal assembly and the required fire stopping prior to applying this exception.
- C. Wall Penetrations:
1. Where piping passes through non-rated partition, close off space between pipe and construction with gypsum wallboard and repair plaster smoothed and finished to match adjacent wall area.
 2. Pipe penetrations through interior rated partitions shall be provided with adjustable prefabricated U.L. listed fire rated galvanized sheet metal sleeves having gauge thickness as required by wall fire rating, 20 gauge minimum.
 3. Pipe penetrations through exterior walls and walls below grade shall be provided with "Link-Seal" mechanical casing seal manufactured by Thunderline Corporation.
- D. Flashing:
1. Coordinate flashing material and installation required for pipe roof penetrations with Owner and roofing Contractor.
 2. Provide acoustical flashing around pipes penetrating equipment rooms, with materials and installation in accordance with manufacturer's instructions for sound control.
- E. Roof Curbs: Coordinate roof curb material and installation with Owner and roofing Contractor.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Conduct a pre-installation meeting prior to commencing Work of this Section to verify Project requirements, coordinate with other trades, establish condition and completeness of substrate, review manufacturer's installation instructions and manufacturer's warranty requirements.

3.2 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

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- B. Application, sizing and installation of piping, supports, anchors and sleeves shall be in accordance with manufacturer's printed installation instructions.
- C. Provide for vertical adjustments after erection and during commissioning, where feasible, to ensure pipe is at design elevation and slope.
- D. Install hangers and supports to allow controlled thermal movement of piping systems, permitting freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- E. Install hanger so that rod is vertical under operating conditions.
- F. Supports, hangers, anchors, and guides shall be fastened to the structure only at such points where the structure is capable of restraining the forces in the piping system.
- G. The load and spacing on each hanger and/or insert shall not exceed the safe allowable load for any component of the support system, including the concrete that holds the inserts. Reinforcement at inserts shall be provided as required to develop the strength required. Contractor shall be responsible for engaging a structural engineer as required for design and review at support systems.
- H. Do not hang pipe, or any mechanical/plumbing item directly from a metal deck or locate on the bottom chord of any truss or joist unless approved by the Structural Engineer of Record.
- I. All supports shall be designed and installed to avoid interference with other piping, hangers, ducts, electrical conduit, supports, building structures, equipment, etc.
- J. Piping supports shall be independent from ductwork supports. Combining supports is not permitted.
- K. Provide all supporting steel required for the installation of mechanical equipment and materials, including angles, channels, beams, etc. to suspended or floor supported tanks and equipment. All of this steel may not be specifically indicated on the Drawings.
- L. All piping and supports shall be designed and installed to allow the insulation to be continuous through the hangers.
- M. Adjustable clevis hangers shall be supported at rods with a nut above and below the hanger.
- N. All hanger rods shall be trimmed neatly so that 1 inch of excess hanger rod protrudes beyond the hanger nut. In the event a rod is intentionally but temporarily left excessively long (for sloped or insulated lines for example), the Contractor shall take appropriate measures to protect the pipe or other materials from damage.
- O. Install hangers to provide minimum ½ inch space between finished covering and adjacent structures, materials, etc.
- P. Horizontal and vertical piping in chases and partitions shall be supported to prevent movement and isolated from the supports to prevent transmission of sound.
- Q. Locate hangers within 12 inches of each horizontal elbow.
- R. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- S. Support riser piping independently of connected horizontal piping. Riser piping is defined as vertical piping extending through more than one floor level.

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- T. Support vertical piping with clamps secured to the piping and resting on the building structure or secured to the building structure below at each floor. Use method of securing the vertical risers to the building structure below in stairwells and exposed locations. Installation of riser clamps and welded steel riser supports shall not allow weight of piping to be transmitted to floor sleeves. Exception: Schedule 40 steel floor sleeves with continuously welded 2 inch minimum water-stop ring.
- U. Steel Bar Joists: Hanger rods shall be secured to angle irons of adequate size; each angle shall span across two or more joists as required to distribute the weight properly and shall be welded or otherwise permanently fixed to the top of joists.
- V. Steel Beams: Where pipes and loads are supported under steel beams, approved type beam clamps shall be used.
- W. Pre-Cast Tee Structural Concrete: Hanger supports, anchors, etc. attached to the precast, double tee, structural concrete system shall be installed in accordance with approved Shop Drawings only. Holes required for hanger rods shall be core drilled in the "flange" of the double tee only; impact type tools are not allowed under any circumstances. Core drilling in the "stem" portions of the double tee is not allowed. Holes core drilled through the "flange" for hanger rods shall be no greater than 1/4 inch larger than the diameter of the hanger rod. Hanger rods shall supported by means of bearing plates of size and shape acceptable to the Architect/Engineer, with welded double nuts on the hanger rod above the bearing plate. Cinch anchors, lead shields, expansion bolts, and studs driven by explosion charges are not allowed under any circumstances in the lower 15 inches of each stem and in the "shadow" of the stem on the top side of the "double tees".
- X. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- Y. Inserts:
 - 1. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 2. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 - 3. Install anchors in concrete after concrete is placed and completely cured. Install anchors according to manufacturer's written instructions..
- Z. Flashing:
 - 1. Coordinate all roof flashing with requirements of Division 07.
- AA. Pipe Shields:
 - 1. Provide shields at each hanger supporting insulated pipe.
 - 2. Provide shields of the proper length to distribute weight evenly and to prevent compression of insulation at hanger.
 - 3. Install shield so that hanger is located at the center of the shield.
 - 4. Attach shield to insulation with adhesive to prevent slippage or movement.
- BB. Equipment Anchor Bolts:
 - 1. Foundation bolts shall be placed in the forms when the concrete is poured, the bolts being correctly located by means of templates. Each bolt shall be set in a sleeve of sufficient size to provide 1/2 inch clearance around bolt.

END OF SECTION

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IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.

1.2 SUBMITTAL

- A. Product Data: For each type of product indicated.

1.3 MISCELLANEOUS IDENTIFICATION

- A. Provide laminated identification sign that reads "LABORATORY WATER – DO NOT DRINK" at each lab water outlet faucets served by non-potable water system.
- B. Provide laminated identification sign that reads "LABORATORY ICE – DO NOT EAT" at each lab ice machine.
- C. Identification shall be specific, potable or domestic cold water, industrial or laboratory cold water, hot water in compliance with DRM 2015 requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032-inch (0.8-mm) Aluminum, 0.032-inch (0.8-mm) or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
 - 3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 4. Fasteners: Stainless-steel rivets.
 - 5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:

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1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
 2. Letter Color: Black.
 3. Background Color: White.
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
 6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Fasteners: Stainless-steel rivets.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Red.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
- F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

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- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches (38 mm) high.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Piping label placement: piping label shall be placed around each pipe, with or without insulation, every 9 mm (30 feet). Additional piping label shall be placed within a room smaller than 4.5 m (15 ft.), and on each of a wall or floor penetration.
- B. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting."
- C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 25 feet (15 m) along each run. Reduce intervals to 15 feet (7.6 m) in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- D. Pipe Label Color Schedule:
 - 1. Domestic Water Piping:
 - a. Background Color: Blue.
 - b. Letter Color: White.
 - 2. Sanitary Waste and Storm Drainage Piping:

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- a. Background Color: Yellow.
 - b. Letter Color: Blue.
- E. Valve Tag: Valve tag shall be provide for all valves. Valve tag shall consist of colored plastic, brass or aluminum valve tag with stamped-in numbers. Tags shall be secured to the valve with metal chain. Valve tag is not required on shutoff valve for individual fixture or equipment where their function is obvious, or where the fixture and equipment is immediately adjacent. Valve tag shall be round of at least 38 mm (1.5 inch).

3.4 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION

SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Perform all Work required to provide and install piping insulation, jackets and accessories indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and Workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2. ASTM C168 - Terminology Relating to Thermal Insulation Materials.
 - 3. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded- Hot-Plate Apparatus.
 - 4. ASTM C195 - Mineral Fiber Thermal Insulating Cement.
 - 5. ASTM C335 - Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
 - 6. ASTM C449 - Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - 7. ASTM C518 - Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 8. ASTM C534 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
 - 9. ASTM C547 - Mineral Fiber Pipe Insulation.
 - 10. ASTM C552 - Cellular Glass Thermal Insulation.
 - 11. ASTM C578 - Rigid, Cellular Polystyrene Thermal Insulation.
 - 12. ASTM C585 - Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
 - 13. ASTM C591 - Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
 - 14. ASTM C610 - Molded Expanded Perlite Block and Pipe Thermal Insulation.
 - 15. ASTM C921 - Jackets for Thermal Insulation.

16. ASTM C1126 - Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.
17. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
18. ASTM D1667 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed Cell Foam).
19. ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
20. ASTM C795 - Insulation For Use Over Austenitic Steel.
21. ASTM E84 - Surface Burning Characteristics of Building Materials.
22. ASTM E96 - Water Vapor Transmission of Materials.
23. NFPA 255 - Surface Burning Characteristics of Building Materials.
24. UL 723 - Surface Burning Characteristics of Building Materials.

1.3 DEFINITIONS

- A. Concealed: Areas that cannot be seen by the building occupants.
- B. Interior Exposed: Areas that are exposed to view by the building occupants, including underneath countertops, inside cabinets and closets, and all equipment rooms.
- C. Interior: Areas inside the building exterior envelope that are not exposed to the outdoors.
- D. Exterior: Areas outside the building exterior envelope that are exposed to the outdoors, including building crawl spaces and loading dock areas.

1.4 QUALITY ASSURANCE

- A. All piping requiring insulation shall be insulated as specified herein and as required for a complete system. In each case, the insulation shall be equivalent to that specified and materials applied and finished as described in these Specifications.
- B. All insulation, jacket, adhesives, mastics, sealers, etc., utilized in the fabrication of these systems shall meet NFPA for fire resistant ratings (maximum of 25 flame spread and 50 smoke developed ratings) and shall be approved by the insulation manufacturer for guaranteed performances when incorporated into their insulation system, unless a specific product is specified for a specific application and is stated as an exception to this requirement.
 1. Certificates to this effect shall be submitted along with Contractor's submittal data for this Section of the Specifications.
 2. No material shall be used that, when tested by the ASTM E84-89 test method, is found to melt, drip or delaminate to such a degree that the continuity of the flame front is destroyed, thereby resulting in an artificially low flame spread rating.
- C. Application Company Qualifications: Company performing the Work of this Section must have minimum three (3) years experience specializing in the trade.
- D. All insulation shall be applied by mechanics skilled in this particular Work and regularly engaged in such occupation.
- E. All insulation shall be applied in strict accordance with these Specifications and with factory printed recommendations on items not herein mentioned. Unsightly, inadequate, or sloppy Work will not be acceptable.

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1.5 SUBMITTALS

A. Product Data:

1. Provide product description, list of materials, "k" value, "R" value, mean temperature range, and thickness for each service and location.
2. Samples: When requested, submit three (3) samples of any representative size illustrating each insulation type.

B. Operation and Maintenance Data:

1. Indicate procedures that ensure acceptable standards will be achieved. Submit certificates to this effect.

1.6 DELIVERY, STORAGE and HANDLING

- A. Deliver materials to the Project Site in original factory packaging, labeled with manufacturer's identification including product thermal ratings and thickness.
- B. Store insulation in original wrapping and protect from weather and construction traffic. Protect insulation against dirt, water, chemical, and mechanical damage.
- C. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics and insulation cements.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 MANUFACTURERS

A. Insulation:

1. Owens-Corning (Type P1).
2. Certainteed Corporation (Type P1).
3. Johns Manville Corporation (Type P1).
4. Knauf Corporation (Type P1).
5. Resolco International by (Insul-Phen) (Type P2).
6. FOAMGLAS (Cellular Glass) by Pittsburgh Corning (Type P3).

B. Jackets:

1. Childers Products Company.
2. PABCO.
3. RPR Products, Inc.
4. Alpha.

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5. Venture Tape Corporation
6. Foam glass

2.3 INSULATION

- A. Type P1: Fiberglass preformed insulation; ASTM C 547; minimum 3.0 lb/cu ft density, ASTM C335, 'k' value of 0.23 at 75 degrees F; noncombustible.
- B. Type P2: Phenolic closed cell, ASTM C1126 rigid foam, 2.2 lbs. nominal density, CFC free; ASTM C518, 'k' value of 0.13 at 75 degrees F. (Note material thickness limit is 3 inches as tested in accordance with ASTM E84).
- C. Type P3: Cellular Glass, ASTM C552, 7.5 lbs./cu.ft, density, ASTM E96 (Wet Cup Method) 0.00 water vapor perm, ASTM C518 'k' value of 0.29 at 75 degrees F.

2.4 JACKETS

A. Jacket Materials:

1. Factory Applied Jackets: White kraft bonded to reinforced foil vapor barrier with self-sealing adhesive joints.
2. PVC Jackets: UL listed 25/50 rated per ASTM E 84, UV resistant, minimum insulation thickness 0.020 inches for piping outside diameters up to 18 inches and 0.030 inches for piping outside diameters above 18 inches. Standard manufactured PVC cover fittings cover system consisting of one-piece, pre-molded, PVC covers with fiberglass inserts manufactured from 20-mils thick, high-impact, ultraviolet-resistant. Use ultraviolet resistant adhesive as recommended by the manufacturer.
3. Fiberglass Cloth Reinforcing Mesh: #10 glass cloth with minimum weight of 3.9 ounces per square yard.
4. Aluminum Jackets: ASTM B 209; 0.020 inch thick; smooth finish with factory applied moisture barrier.
5. Stainless Steel Jackets: Type 304 stainless steel; 0.010 inch thick; smooth finish.
6. Factory Applied Jacket (like Alpha Style: VR-RHD): Provide factory applied ASJ White triple ply laminate polypropylene, mold resistant, metallized polyester vapor barrier film backing.
7. Venture 1577 W/U, 0 perm and mold resistant jacket material, 5 ply laminate with 6 mil film on with adhesive on one side.. This mold resistant jacket is to be used with Phenolic closed cell insulation used for applications where Type 5A and 5B insulation is used on existing chilled piping being repaired or being modified.

B. Interior Concealed Applications:

1. Type P1 Insulation: Provide factory applied ASJ white kraft foil vapor barrier.
2. Type P2 Insulation: Provide Venture jacketing material on piping where condensation can occur or where it is used on cold water piping.
3. Type P2 Jacketing material is not required when insulation is used on hot water piping.
4. Type P3 Insulation: Provide Pittcoat 404 or pre-molded PVC covers per manufacturer's recommendations. Jacketing material is not required when this type of piping insulation is concealed within a piping chase.

C. Interior - Exposed Applications:

1. Type P1 Insulation: Provide factory applied ASJ white kraft foil vapor barrier. Also finish with canvas jacket or #10 glass membrane with Childers CP-50 or approved equal finish. Apply sizing for finish painting. Verify jacket is suitable for applications.
2. Type P2 Insulation is used on hot water piping: Provide factory applied ASJ white kraft foil vapor barrier
3. Type P2 Insulation: Provide Venture jacketing material on piping where it is used on cold water piping..
4. Type P3 Insulation: Provide triple ply laminate polypropylene, mold resistant with a metal foil and polyester vapor barrier film backing.
5. All exposed insulated piping within six feet of the floor shall be protected with an aluminum or stainless jacket material to protect the insulation jacketing material from being torn or punctured.

2.5 INSERTS SUPPORTS AND SHEILDS

- A. Application: Piping ½ inch diameter or larger for all systems except direct buried.
- B. Shields shall be made of galvanized steel or made of black iron painted on both sides with a minimum two coats of aluminum paint. Required metal shield sizes are as follows:

| Nominal IPS (inches) | Metal Thickness (gage) | Minimum Lengths of Shield (inches) |
|----------------------|------------------------|------------------------------------|
| ½ to 1½ | 18 | 12 |
| 2 | 14 | 12 |
| 2-½ to 6 | 12 | 16 |
| 8 and above | 10 | 20 |

- C. Depending on the type of pipe support design, stainless steel bands or aluminum bands may be required to keep shield material next to the jacketing material.
- D. Inserts for shields shall be manufactured of 7.5 lb/cu. ft. density cellular glass or 5.0 lb/cu. ft. density cellular phenolic insulating material suitable for the planned temperature range. Provide factory fabricated inserts with integral galvanized pipe saddles. Inserts shall be the same thickness as the adjacent insulation.

2.6 INSULATION ACCESSORIES

- A. Insulation Bands: 3/4 inch wide; 0.007 inch thick galvanized steel when exposed to interior environment, .010 inch thick stainless steel or 0.015 inch thick aluminum when exposed to harsh humid interior environment or outside environment.
- B. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum or 0.010 inch thick stainless steel to match jacket.
- C. Insulating Cement: ASTM C 195; hydraulic setting mineral wool; Ryder One-Coat.
- D. Sealants: Use at valves, fittings and where insulation is terminated. Brush apply sealant to end of insulation and continue along pipe surface. Provide Childers CP-70/CP-76 or equivalent sealant.
- E. Adhesives: Use to adhere the longitudinal lap seam of vapor barrier jackets and at butt joints between insulation or fitting covers. Provide Childers CP-82 or approved equal as general purpose adhesive. Use Childers CP-97 fibrous adhesive for calcium silicate or when adhering pipe saddles and shields to the insulation. For indoor applications, adhesive shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Primers: Provide Childers CP-50 diluted 50 percent with water or Pittcoat 300 primer thinned with mineral spirits to cover insulating cements prior to finish coating.

- G. Finish: Provide Childers CP-30 L.O. as a general purpose finish to coat the longitudinal seams and butt joints of vapor barrier jackets or glass cloth jackets. Use Childers CP-50 reinforced with glass cloth as an adhesive and sizing for canvas and in other locations as indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that piping has been pressure tested before applying paint and insulation materials.
- B. Thoroughly clean all surfaces to be insulated as required to remove all oil, grease, loose scale, rust, and foreign matter. Piping must be completely dry at the time of application of primer paint. Painting on piping where condensation is occurring on the pipe surface is strictly prohibited.
- C. Provide primer coat on all piping, to include field welds and over factory applied paint/coating, in total compliance with Contract Documents and compatible with and approved by the insulation manufacturer. Painting must be completed and approved prior to installation of insulation. Paint shall be applied in accordance with the paint manufactures instructions, environment, and pipe surface temperatures.
- D. Painting is not required for piping insulated with P6 cellular glass insulation however piping needs to be dry when using PITTSEAL® CW Sealant, a high performance, MS Polymer based sealant for P6 cellular glass insulation for chilled water applications.

3.2 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. Installation of insulation and jacket materials shall be in accordance with manufacturer's published instructions.
- C. Handle and install materials in accordance with manufacturer's instructions in the absence of specific instructions herein.
- D. On exposed piping, locate insulation cover seams with the ridge of the lap joint is directed down.
- E. Exposed Insulated piping within six feet of the floor shall be protected with an aluminum or stainless jacket material to protect the insulation.
- F. Insulate fittings, joints and valves with molded insulation of the same material and thickness as adjoining pipe. Open voids and cracks insulation shall be kept at a minimum when placing insulation on abnormal or irregular shapes. Use closed cell or recommended fill material as instructed by the insulation manufacturer to close openings. Fiberglass insulation shall not be used as a fill material on chilled water piping or fittings.
- G. Continue insulation through walls, sleeves, pipe hangers, floors, and other pipe penetrations.
- H. Provide dams in insulation at intervals not to exceed 20 feet on cold piping systems to prevent migration of condensation or fluid leaks. Indicate visually where the dams are located for maintenance personnel to identify and also provide dams at butt joints of insulation at fittings, flanges, valves, and hangers.
- I. Insulate entire system including fittings, valves, flanges and strainers. Use closed cell insulation on cold piping system flexible connections, expansion joints and unions, bevel and seal ends of insulation and continue sealant a minimum of 4 inches along the piping, unless stated otherwise.
- J. For hot piping conveying fluids 180 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation. Continue sealant a minimum of 4 inches along the piping.

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- K. All sections of molded pipe covering shall be firmly butted together. Where an insulation covering is applied, it shall lap the adjoining section of insulation by at least three inches (3 inches). Where insulation terminates, it shall be neatly beveled and finished. All materials used shall be fire retardant or non-flammable.
- L. Where vapor barriers are required, the vapor barrier shall be on the outside. Extreme care shall be taken that the vapor barrier is unbroken. Joints, etc., shall be sealed. Where insulation with a vapor barrier terminates, seal off with vapor barrier continuous to the surface being insulated. Ends shall not be left raw.
- M. Where pipe chases are tight, adequate provision shall be made at the rough-in stage using offset fittings or other means (except springing the pipe) to ensure that insulation can be applied throughout the length of the pipe.
- N. Paint exposed pipe insulation per Specification 09 91 00.
- O. Where canvas finish is specified, use lagging adhesive to prevent mildew in securing canvas. Do not use wheat paste. In addition, cover all canvas insulation with a fire retardant coating. Where canvas finish is specified, use lagging adhesive to prevent mildew in securing canvas. Do not use wheat paste. In addition, cover all canvas insulation with a fire retardant coating.
 - 1. On canvas jacketed systems where seam joints at fittings are rough, they shall be covered with an application of insulating cement and smoothed with a trowel before the canvas is applied with adhesive. The canvas must be free of wrinkles and have a smooth, neat appearance.

3.3 INSERTS, SUPPORTS, AND SHIELDS

A. Shields

- 1. Install between pipe hangers or pipe hanger rolls and inserts. Curved metal shields shall be used between the hangers or support points and at the bottom of insulated pipe.
- 2. Hangers shall support the load of the insulated pipe section on the outside of the insulation and shall not be in direct contact with the pipe.
- 3. Manufacturer shall be responsible to size the length of shield required to prevent insulation from breaking.
- 4. Provide rigid insulation at each support point, a minimum of 2 inches longer than shield length.
- 5. Curved metal shields shall be designed to limit the bearing stress on the insulation to 35 psi and shall be curved to fit up to mid-perimeter of the insulated pipe.
- 6. When installing phenolic insulation provide a 5 lb. density insert of same thickness and contour as adjoining 3.75 lb. density insulation, between the support shield and piping, and under the finish jacket, on piping 1½ inch diameter or larger, to prevent insulation from sagging at support points. Provide inserts for 180-degree arc and not less than 2 inches more than the length of the pipe support shield or minimum 12 inches long (whichever is greater). Adhere the pipe support shield to insulation with a UL approved adhesive that meets E-84 requirements.
- 7. Seal all insulation at supports, protrusions and interruptions. Maintain vapor barrier with finish coat.

3.4 PIPING INSULATION APPLICATION AND THICKNESS SCHEDULE

- A. In no case shall installed piping insulation have insulation thicknesses that are less than what is required by local energy codes and ASHRAE 90.1 (whichever is more stringent), based on comparable insulation conductivity values at the specified mean rating temperature.

B. Type 5A and 5B insulation is only used where it is being replaced on existing pipe and thickness of the replacement insulation shall match the existing insulation thickness.

| Piping Systems | Location | Type | Pipe Size | Insulation Thickness |
|--|---------------------|------|------------------|----------------------|
| Domestic Cold Water, Soft Water, Make-Up Water | Interior Con-cealed | P1 | 1-1/2" & Smaller | 1/2" |
| | | | 2" to 4" | 1/2" |
| | | | 5" & Larger | 1/2" |
| | Interior Ex-posed | P5 | 1-1/2" & Smaller | 3/4" |
| | | | 2" to 4" | 3/4" |
| | | | 5" & Larger | 1" |
| | Interior Ex-posed | P6 | 1-1/2" & Smaller | 1" |
| | | | 2" to 4" | 1" |
| | | | 5" & Larger | 1-1/2" |
| Domestic/ Lab/BSL Hot Water, Tempered Water (Maximum 200 Degrees F) | Interior Con-cealed | P1 | 2" & Smaller | 1" |
| | | | 2-1/2" & Larger | 1-1/2" |
| | Interior Ex-posed | P5 | 1-1/2" & Smaller | 3/4" |
| | | | 2" to 4" | 1" |
| | | | 5" & Larger | 1-1/2" |
| | | P6 | 4" and Smaller | 1" |
| | | | 5" & Larger | 1-1/2" |

END OF SECTION

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes water piping from locations indicated to fixtures and equipment inside the building.

1.2 SUBMITTALS

- A. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 61, "Drinking Water System Components-Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Transition Couplings: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Soft Copper Tube: ASTM B 88, Type K (ASTM B 88M, Types A and B), water tube, annealed temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
- C. Hard Copper Tube: ASTM B 88, Type K (ASTM B 88M, Types B and C), water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

2.2 VALVES

- A. Refer to Division 15 Section "Valves"

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground piping, unless otherwise indicated.
- C. Domestic or nonpotable Water Piping: Use the following piping materials for each size range:
 - 1. NPS 1-1/2 (DN 40) and Smaller: Hard copper tube, Type K; copper pressure fittings; and soldered joints.
 - 2. NPS 2 (DN 50): Hard copper tube, Type K; copper pressure fittings; and soldered joints.

3.2 VALVE APPLICATIONS

- A. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use bronze ball or gate valves for piping NPS 2 (DN 50) and smaller. Use cast-iron butterfly or gate valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
 - 2. Throttling Duty: Use bronze ball or globe valves for piping NPS 2 (DN 50) and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
 - 3. Hot-Water-Piping, Balancing Duty: Calibrated balancing valves.
 - 4. Drain Duty: Hose-end drain valves.

3.3 PIPING INSTALLATION

- A. Refer to Division 22 for basic piping installation.

3.4 JOINT CONSTRUCTION

- A. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 VALVE INSTALLATION

- A. Install sectional valve close to water main on each branch and riser serving plumbing fixtures or equipment. Use ball or gate valves for piping NPS 2 (DN 50) and smaller. Use butterfly or gate valves for piping NPS 2-1/2 (DN 65) and larger.
- B. Install shutoff valve on each water supply to equipment and on each water supply to plumbing fixtures without supply stops. Use ball or gate valves for piping NPS 2 (DN 50) and smaller. Use butterfly or gate valves for piping NPS 2-1/2 (DN 65) and larger.
- C. Install drain valves for equipment, at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

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1. Install hose-end drain valves at low points in water mains, risers, and branches.
2. Install stop-and-waste drain valves where indicated.

- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 (DN 50) and smaller and butterfly valves for piping NPS 2-1/2 (DN 65) and larger. Refer to Division 15 for balancing valves.
- E. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Refer to Division 15 for calibrated balancing valves.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Refer to Division 22 Sections for pipe hanger and support devices. Install the following:
1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.
 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 22.
- C. Support vertical piping and tubing at base and at each floor.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to service piping with shutoff valve, and extend and connect to the following:
1. Booster Systems: Cold-water suction and discharge piping.
 2. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code.
 4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 (DN 65) and larger.

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3.8 FIELD QUALITY CONTROL

A. Inspect domestic water piping as follows:

1. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

B. Test domestic water piping as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced domestic water piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
4. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.
6. Ensure piping is compliant with WSSC 302.2.5

3.9 CLEANING

A. Clean and disinfect potable and nonpotable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

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- B. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION

SECTION 22 11 19

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following domestic water piping specialties:

1. Vacuum breakers.
2. Drain valves.
3. Water hammer arresters.
4. Air vents.
5. Trap-seal primer valves.
6. Trap-seal primer systems.

B. Related Sections include the following:

1.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig (860 kPa), unless otherwise indicated.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. NSF Compliance:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

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PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ames Co.
 - b. Cash Acme.
 - c. Conbraco Industries, Inc.
 - d. FEBCO; SPX Valves & Controls.
 - e. Rain Bird Corporation.
 - f. Toro Company (The); Irrigation Div.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1001.
3. Size: NPS 1/4 to NPS 3 (DN 8 to DN 80), as required to match connected piping.
4. Body: Bronze.
5. Inlet and Outlet Connections: Threaded.
6. Finish: Chrome plated.

B. Hose-Connection Vacuum Breakers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrowhead Brass Products, Inc.
 - b. Cash Acme.
 - c. Conbraco Industries, Inc.
 - d. Legend Valve.
 - e. MIFAB, Inc.
 - f. Prier Products, Inc.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Woodford Manufacturing Company.
 - i. Zurn Plumbing Products Group; Light Commercial Operation.
 - j. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Chrome or nickel plated.

C. Laboratory-Faucet Vacuum Breakers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Conbraco Industries, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
 - c. Woodford Manufacturing Company.
 - d. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1035.

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3. Size: NPS 1/4 or NPS 3/8 (DN 8 or DN 10) matching faucet size.
4. Body: Bronze.
5. End Connections: Threaded.
6. Finish: Chrome plated.

2.2 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ames Co.
 - b. Conbraco Industries, Inc.
 - c. FEBCO; SPX Valves & Controls.
 - d. Flomatic Corporation.
 - e. Watts Industries, Inc.; Water Products Div.
 - f. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 5 psig (83 kPa) maximum, through middle 1/3 of flow range.
5. Body: Bronze for NPS 2 (DN 50) and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 (DN 65) and larger.
6. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
7. Configuration: Designed for configuration as indicated on Contract Drawings.
8. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

2.3 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armstrong International, Inc.
 - b. Flo Fab Inc.
 - c. ITT Industries; Bell & Gossett Div.
 - d. NIBCO INC.
 - e. TAC Americas.
 - f. Taco, Inc.
 - g. Watts Industries, Inc.; Water Products Div.
2. Type: Ball valve with two readout ports and memory setting indicator.
3. Body: Brass or bronze,
4. Size: Same as connected piping, but not larger than NPS 2 (DN 50).
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

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2.4 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig (860 kPa) minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 (DN 50) and smaller; cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating and for NPS 2-1/2 (DN 65) and larger.
3. End Connections: Threaded for NPS 2 (DN 50) and smaller; flanged for NPS 2-1/2 (DN 65) and larger.
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Perforation Size:
 - a. Strainers NPS 2 (DN 50) and Smaller: 0.033 inch (0.84 mm) <Insert size>.
 - b. Strainers NPS 2-1/2 to NPS 4 (DN 65 to DN 100): 0.045 inch (1.14 mm).
 - c. Strainers NPS 5 (DN 125) and Larger: 0.10 inch (2.54 mm).
6. Drain: Factory-installed, hose-end drain valve.

2.5 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AMTROL, Inc.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. PPP Inc.
 - e. Sioux Chief Manufacturing Company, Inc.
 - f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - g. Tyler Pipe; Wade Div.
 - h. Watts Drainage Products Inc.
 - i. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows or Copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.6 TRAP-SEAL PRIMER VALVES

A. Supply-Type, Trap-Seal Primer Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. MIFAB, Inc.
 - b. PPP Inc.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Watts Industries, Inc.; Water Products Div.
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig (860 kPa) minimum.
4. Body: Bronze.

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5. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.7 TRAP-SEAL PRIMER SYSTEMS

A. Trap-Seal Primer Systems:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. PPP Inc.
2. Standard: ASSE 1044,
3. Piping: NPS 3/4, ASTM B 88, Type L (DN 20, ASTM B 88M, Type B); copper, water tubing.
4. Cabinet: Surface-mounting steel box with stainless-steel cover.
5. Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120-V ac power.
6. Vacuum Breaker: ASSE 1001.
7. Number Outlets: As required.
8. Size Outlets: NPS 1/2 (DN 15).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 1. Locate backflow preventers in same room as connected equipment or system.
 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
 3. Do not install bypass piping around backflow preventers.
- C. Install water regulators with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gages on inlet and outlet.
- D. Install water control valves with inlet and outlet shutoff valves and bypass with globe valve. Install pressure gages on inlet and outlet.
- E. Install balancing valves in locations where they can easily be adjusted.
- F. Install water hammer arresters in water piping according to PDI-WH 201.
- G. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.
- H. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

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- I. Install trap-seal primer systems with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust system for proper flow.

3.2 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 1. Pressure vacuum breakers.
 2. Reduced-pressure-principle backflow preventers.
 3. Double-check backflow-prevention assemblies.
 4. Water pressure-reducing valves.
 5. Calibrated balancing valves.
 6. Primary, thermostatic, water mixing valves.
 7. Manifold, thermostatic, water-mixing-valve assemblies.
 8. Supply-type, trap-seal primer valves.
 9. Trap-seal primer systems.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:
 1. Test each pressure vacuum breaker, reduced-pressure-principle backflow preventer, double-check backflow-prevention assembly, and double-check, detector-assembly backflow preventer according to authorities having jurisdiction and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

3.4 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

END OF SECTION

SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following for soil, waste, and vent piping inside the building and to within 5 feet outside of foundation walls.:
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.

1.2 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. LLDPE: Linear, low-density polyethylene plastic.
- D. NBR: Acrylonitrile-butadiene rubber.
- E. PE: Polyethylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. TPE: Thermoplastic elastomer.

1.3 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure (to be compliant with WSSC 302.3.6), unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 5 psi of air or not less than a 10-foot head of water (30 kPa) and maintaining such pressure for 15 minutes.
 - 2. Sanitary Sewer, Force-Main Piping: 50 psig (345 kPa).

1.4 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Shop Drawings:
 - 1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.
 - 2. Solvent Drainage System: Include plans, elevations, sections, and details.

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- C. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Manufacturer to be ISO 9001 (or equivalent) and ISO 14001 or equivalent certified.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, premolded neoprene compression gasket.

2.3 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Shielded Couplings: ASTM C 1540 and either FM 1680 Class 1 or IAPMO IGC 237 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.

- 1. Heavy duty shielded couplings with type 304 or 316 stainless-steel shield and neoprene or approved equivalent virgin elastomeric gasket, no adhesives. Couplings: Minimum of 4-band type unless FM 1680 approved otherwise. Lateral bracing and thrust restraint is required for non-buried drainage piping sizes 5 inch and larger. Hubless style couplings are not acceptable for pipe size change (reducer) applications, use manufactured pipe fitting.

- a. Available Manufacturers:

- 1) ANACO.
- 2) Fernco, Inc.
- 3) Ideal Div.; Stant Corp.
- 4) Mission Rubber Co.
- 5) Tyler Pipe; Soil Pipe Div.

2.4 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Types L, water tube, drawn temper.
 - 1. Fittings: Wrought copper and bronze drainage pattern fittings, ANSI B16.23 or ANSI B16.29.

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2. Joints: ASTM B828 lead-free soldered joints with ASTM B32 Grade HB, Grade HN, or, approved equal solder that is also listed in Section 1 of ASTM B32, ASTM B813 high temperature water soluble flux. Joints shall be air-cooled only, no quenching.
3. System is to be rinsed thoroughly as soon as possible after soldering to prevent on-going flux activity. Remove external surface flux residue.

2.5 SPECIAL PIPE FITTINGS

- A. Shielded Nonpressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 1. Available Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Mission Rubber Co.
- B. Pressure Pipe Couplings: AWWA C219 metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
 1. Available Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser, Inc.; DMD Div.
 - c. EBAA Iron Sales, Inc.
 - d. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - e. JCM Industries, Inc.
 - f. Romac Industries, Inc.
 - g. Smith-Blair, Inc.
 - h. Viking Johnson.
 2. Center-Sleeve Material: Stainless steel.
 3. Gasket Material: Natural or synthetic rubber.
 4. Metal Component Finish: Corrosion-resistant coating or material.
- C. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 1. Available Manufacturers:
 - a. SIGMA Corp.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

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- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- I. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- J. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- K. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
 - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
 - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- L. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- M. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
- N. Plumbing Specialties:
 - 1. Install backwater valves in sanitary waste gravity-flow piping. Comply with requirements for backwater valves specified in Division 22 Section "Sanitary Waste Piping Specialties."
 - 2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Comply with requirements for cleanouts specified in Division 22 Section "Sanitary Waste Piping Specialties."
 - 3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Division 22 Section "Sanitary Waste Piping Specialties."
- O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."

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- Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- C. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
- D. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.3 VALVE INSTALLATION

- A. General valve installation requirements are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

3.4 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs according to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.
- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.

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3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
5. NPS 8 to NPS 12 (DN 200 to DN 300): 60 inches (1500 mm) with 7/8-inch (22-mm) rod.

F. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).

G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4 (DN 32): 84 inches (2100 mm) with 3/8-inch (10-mm) rod.
2. NPS 1-1/2 (DN 40): 108 inches (2700 mm) with 3/8-inch (10-mm) rod.
3. NPS 2 (DN 50): 10 feet (3 m) with 3/8-inch (10-mm) rod.
4. NPS 2-1/2 (DN 65): 11 feet (3.4 m) with 1/2-inch (13-mm) rod.
5. NPS 3 (DN 80): 12 feet (3.7 m) with 1/2-inch (13-mm) rod.
6. NPS 4 and NPS 5 (DN 100 and DN 125): 12 feet (3.7 m) with 5/8-inch (16-mm) rod.
7. NPS 6 (DN 150): 12 feet (3.7 m) with 3/4-inch (19-mm) rod.
8. NPS 8 to NPS 12 (DN 200 to DN 300): 12 feet (3.7 m) with 7/8-inch (22-mm) rod.

H. Install supports for vertical steel piping every 15 feet (4.5 m).

I. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4 (DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
2. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
3. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
4. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
5. NPS 6 (DN 150): 10 feet (3 m) with 5/8-inch (16-mm) rod.
6. NPS 8 (DN 200): 10 feet (3 m) with 3/4-inch (19-mm) rod.

J. Install supports for vertical copper tubing every 10 feet (3 m).

K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger.

3.6 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 - 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg (250 Pa). Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 - 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 6. Prepare reports for tests and required corrective action.

3.7 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION

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SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following sanitary drainage piping specialties:
 - 1. Cleanouts.
 - 2. Floor drains.
 - 3. Through-penetration firestop assemblies.
 - 4. Miscellaneous sanitary drainage piping specialties.
 - 5. Flashing materials.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

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- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate size and location of roof penetrations.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Metal Cleanouts:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - g. ANCON
 - h. Josam Company; Blucher-Josam Div.
- 2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
- 3. Size: Same as connected drainage piping
- 4. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch or Hubless, cast-iron soil pipe test tee as required to match connected piping.
- 5. Closure: Countersunk, brass plug.
- 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- 7. Closure: Stainless-steel plug with seal.

B. Metal Floor Cleanouts:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. Oatey.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Drainage Products Inc.
 - g. Zurn Plumbing Products Group; Light Commercial Operation.
 - h. Zurn Plumbing Products Group; Specification Drainage Operation.
 - i. ANCON
 - j. Josam Company; Josam Div.

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- k. Kusel Equipment Co.
 - l. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - m. Josam Company; Blucher-Josam Div.
- 2. Standard: ASME A112.36.2M for adjustable housing cast-iron soil pipe with cast-iron ferrule cleanout.
 - 3. Size: Same as connected branch.
 - 4. Type: Adjustable housing Cast-iron soil pipe with cast-iron ferrule.
 - 5. Body or Ferrule: Cast iron.
 - 6. Clamping Device: Required.
 - 7. Outlet Connection: Inside calk Spigot.
 - 8. Closure: Brass plug with straight threads and gasket.
 - 9. Adjustable Housing Material: Cast iron with threads.
 - 10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
 - 11. Frame and Cover Shape: Round.
 - 12. Top Loading Classification: Heavy where traffic bearing and light where pedestrian bearing Duty.
 - 13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.
 - 14. Standard: ASME A112.3.1.
 - 15. Size: Same as connected branch.
 - 16. Housing: Stainless steel.
 - 17. Closure: Stainless steel with seal.
 - 18. Riser: Stainless-steel drainage pipe fitting to cleanout.

C. Cast-Iron Wall Cleanouts:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - g. ANCON
- 2. Standard: ASME A112.36.2M. Include wall access.
- 3. Size: Same as connected drainage piping.
- 4. Body: Hub-and-spigot, cast-iron soil pipe T-branch or Hubless, cast-iron soil pipe test tee as required to match connected piping.
- 5. Closure: Countersunk, drilled-and-threaded brass plug.
- 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- 7. Wall Access: Round, deep, chrome-plated bronze cover plate with screw.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Zurn Plumbing Products Group; Specification Drainage Operation.
- 2. Standard: ASME A112.6.3.
- 3. Pattern: Floor drain.
- 4. Body Material: Gray iron.

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5. Seepage Flange: Required.
6. Anchor Flange: Required.
7. Clamping Device: Required.
8. Outlet: Bottom.
9. Backwater Valve: Refer to schedule on plans.
10. Coating on Interior and Exposed Exterior Surfaces: Refer to plans.
11. Sediment Bucket: Refer to schedule on plans.
12. Top of Body Round and Strainer Finish: Refer to plans.
13. Top Shape: Refer to schedule on plans.
14. Dimensions of Top or Strainer: Refer to schedule on plans.
15. Top Loading Classification: Medium Duty.
16. Funnel: Not required.
17. Inlet Fitting: Gray iron, with spigot outlet, and trap-seal primer valve connection.
18. Trap Material: Cast iron.
19. Trap Pattern: Standard P-trap.
20. Trap Features: Trap-seal primer valve drain connection.

2.3 STAINLESS-STEEL FLOOR DRAINS

A. STAINLESS STEEL Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Stainless steel.
5. Seepage Flange: Required.
6. Anchor Flange: Required.
7. Clamping Device: Required.
8. Outlet: Bottom.
9. Backwater Valve: Refer to schedule on plans.
10. Coating on Interior and Exposed Exterior Surfaces: Refer to plans.
11. Sediment Bucket: Refer to plans.
12. Top of Body and Strainer Finish: Refer to plans.
13. Top Shape: Refer to schedule on plans.
14. Dimensions of Top or Strainer: Refer to schedule on plans.
15. Top Loading Classification: Medium Duty.
16. Funnel: Not required.
17. Inlet Fitting: Gray iron, with spigot outlet, and trap-seal primer valve connection.
18. Trap Material: Refer to schedule on plans.
19. Trap Pattern: Standard P-trap.
20. Trap Features: Trap-seal primer valve drain connection.

2.4 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
2. Size: Same as connected soil, waste, or vent stack.
3. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
4. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
5. Special Coating: Corrosion resistant on interior of fittings.

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2.5 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

- A. Open Drains:
 - 1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
 - 2. Size: Same as connected waste piping with increaser fitting of size indicated.
- B. Floor-Drain, Trap-Seal Primer Fittings:
 - 1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
 - 2. Size: Same as floor drain outlet with NPS 1/2 side inlet.
- C. Air-Gap Fittings:
 - 1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
 - 2. Body: Bronze or cast iron.
 - 3. Inlet: Opening in top of body.
 - 4. Outlet: Larger than inlet.
 - 5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.
- D. Expansion Joints:
 - 1. Standard: ASME A112.21.2M.
 - 2. Body: Cast iron with bronze sleeve, packing, and gland.
 - 3. End Connections: Matching connected piping.
 - 4. Size: Same as connected soil, waste, or vent piping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 - 1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
 - 4. Locate at base of each vertical soil and waste stack.
 - 5. All cleanouts to be either wall or floor type and extend above slab no more than 36" AFF.
 - 6. Pipe cleanouts shall not be used for code required cleanouts.
- C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

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1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
 - b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
 - c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.
3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

- F. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.
- G. Assemble open drain fittings and install with top of hub 1 inch (25 mm) above floor.
- H. Install floor-drain, trap-seal primer fittings on inlet to all floor drains.
 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 2. Size: Same as floor drain inlet.
- I. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- J. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- K. Install wood-blocking reinforcement for wall-mounting-type specialties.
- L. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- M. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled grease removal devices and their installation, including piping and electrical connections, and to assist in testing.
- B. Tests and Inspections:

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1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

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PLUMBING FIXTURES

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Water Closets
2. Toilet Seats
3. Lavatories
4. Urinals
5. Showers
6. Mop Sink
7. Supply fittings
8. Waste fittings

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED Submittals:
 1. Product Data for Credit WE 3.1: Documentation indicating compliance with requirements.
- C. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted plumbing fixtures.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

1.6 PLUMBING FIXTURES AND TRIM

- A. Manufacturers and model numbers shall be as specified herein or on the contract drawings. Not all fixtures are listed herein. See fixture schedule on contract drawings for additional fixture information and

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requirements. Vitreous-china and enameled cast-iron plumbing fixtures shall be white, and except where noted otherwise, shall be the product of the same manufacturer.

- B. Exposed traps and double-cone supply tubes for fixtures and equipment shall be connected to rough-piping at the wall or deck, unless otherwise specified in the contract documents. Floor and wall plates shall be as specified herein or as covered by schedules on project drawings. Exposed-to-view fixture trimmings, fittings, and fasteners shall be chromium-plated or nickel-plated brass with polished, bright surfaces.
- C. Supplies and wastes for lavatories shall be to wall or floor, except as otherwise indicated on the construction drawings. Sleeves are not required at fixture penetrations.
- D. Rubber compression type connections shall not be acceptable. Brass ferrule type fittings shall be required.

1.7 FIXTURE SUPPORTS

- A. Wall-hung fixtures shall be supported by ferrous-metal carriers suited to the particular installation conditions. Carriers may be combination type with adjustable fittings. Water closets and urinals shall have supporting feet not less than 10 inches long. Lavatories shall be supported from the wall by wall-carriers with concealed arms.

1.8 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 2 - EXECUTION

2.1 INSTALLATION

- A. Install plumbing fixtures level and plumb according to roughing-in drawings.
- B. Install floor-mounted water closets on closet flange attachments to drainage piping.
- C. Install counter-mounting fixtures in and attached to casework.
- D. Install pedestal lavatories on pedestals and secured to wood blocking in wall.
- E. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
 - 1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Comply with valve requirements specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- F. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.

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- G. Install toilet seats on water closets.
- H. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- I. Install shower flow-control fittings with specified maximum flow rates in shower arms.
- J. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes unless otherwise indicated.
- K. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- L. Install dishwasher air-gap fitting at each sink indicated to have air-gap fitting. Install in sink deck. Connect inlet hose to dishwasher and outlet hose to disposer.
- M. Set bathtubs and shower receptors in leveling bed of cement grout.
- N. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories and sinks. Comply with requirements in Division 22 Section "Plumbing Piping Insulation."
- O. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Division 22 Section "Escutcheons for Plumbing Piping."
- P. Seal joints between plumbing fixtures, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Division 07 Section "Joint Sealants."

2.2 CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Division 22 Section "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Division 22 Section "Sanitary Waste and Vent Piping."
- D. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories and sinks. Comply with requirements in Division 22 Section "Plumbing Piping Insulation."

2.3 ADJUSTING

- A. Operate and adjust plumbing fixtures and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

2.4 CLEANING AND PROTECTION

- A. After completing installation of plumbing fixtures, inspect and repair damaged finishes.

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- B. Clean plumbing fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed plumbing fixtures and fittings.
- D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Pipe stands.
7. Equipment supports.

B. Related Sections:

1. Section 230548 "Vibration and Seismic Controls for HVAC" for vibration isolation devices.
2. Section 233113 "Metal Ducts" Section 233116 "Nonmetal Ducts" for duct hangers and supports.

1.2 DEFINITIONS

- ###### A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.3 PERFORMANCE REQUIREMENTS

- ###### A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- ###### B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.4 ACTION SUBMITTALS

- ###### A. Product Data: For each type of product indicated.
- ###### B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
1. Trapeze pipe hangers.
 2. Metal framing systems.
 3. Pipe stands.
 4. Equipment supports.

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- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of trapeze hangers.
 - 2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Stainless-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
- C. Copper Pipe Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

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2.3 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. B-line, an Eaton business.
 - b. Flex-Strut Inc.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.
 - d. Unistrut; Part of Atkore International.
 - e. Wesanco, Inc.
2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
3. Standard: MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.4 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Carpenter & Paterson, Inc.
 2. Clement Support Services.
 3. ERICO International Corporation.
 4. National Pipe Hanger Corporation.
 5. PHS Industries, Inc.
 6. Pipe Shields Inc.
 7. Piping Technology & Products, Inc.
 8. Rilco Manufacturing Co., Inc.
 9. Value Engineered Products, Inc.
- B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

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2.6 PIPE STANDS

- A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
- C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
- D. High-Type, Single-Pipe Stand:
 - 1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 - 2. Base: Stainless steel.
 - 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 - 4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
- E. High-Type, Multiple-Pipe Stand:
 - 1. Description: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
 - 2. Bases: One or more; plastic.
 - 3. Vertical Members: Two or more protective-coated-steel channels.
 - 4. Horizontal Member: Protective-coated-steel channel.
 - 5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
- F. Curb-Mounted-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

2.7 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.8 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

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- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Pipe Stand Installation:
 - 1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 - 2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Section 077200 "Roof Accessories" for curbs.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

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- c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

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3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099113 "Exterior Painting"
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports metal trapeze pipe hangers and metal framing systems and attachments for general service applications.
- F. Use stainless-steel pipe hangers and stainless-steel attachments for hostile environment applications.
- G. Use copper-plated pipe hangers and stainless-steel attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal-hanger shield inserts for insulated piping and tubing.
- J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.

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5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.

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2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- O. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

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- P. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- Q. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- R. Use powder-actuated fasteners instead of building attachments where required in concrete construction.

END OF SECTION

SECTION 23 05 48

VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Spring hangers.

1.2 DEFINITIONS

- A. IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning & Development (for the State of California).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 - 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.
 - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
 - b. Annotate to indicate application of each product submitted and compliance with requirements.
 - 3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.
- B. Shop Drawings:
 - 1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
 - 2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Field quality-control reports.

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1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Wind-Restraint Loading:
 - 1. Basic Wind Speed: 125 mph
 - 2. Building Classification Category: IV.
 - 3. Minimum 10 lb/sq. ft. multiplied by maximum area of HVAC component projected on vertical plane normal to wind direction, and 45 degrees either side of normal.

2.2 SPRING HANGERS

- A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression: .
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ace Mountings Co., Inc.
 - b. California Dynamics Corporation.
 - c. Kinetics Noise Control, Inc.
 - d. Mason Industries, Inc.
 - e. Novia; A Division of C&P.
 - f. Vibration Eliminator Co., Inc.
 - g. Vibration Isolation.
 - h. Vibration Mountings & Controls, Inc.
 - 2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 - 3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - 5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - 6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - 7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
 - 8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
 - 9. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic- and wind-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete." and Section 033053 "Miscellaneous Cast-in-Place Concrete."
- B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
- C. Piping Restraints:
 - 1. Comply with requirements in MSS SP-127.
 - 2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
 - 3. Brace a change of direction longer than 12 feet.
- D. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- E. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- G. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

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3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
 2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
 3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
 5. Test to 90 percent of rated proof load of device.
 6. Measure isolator restraint clearance.
 7. Measure isolator deflection.
 8. Verify snubber minimum clearances.
 9. Test and adjust restrained-air-spring isolator controls and safeties.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

3.6 VIBRATION ISOLATION EQUIPMENT BASES INSTALLATION

- A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete." and Section 033053, "Miscellaneous Cast-in-Place Concrete."

END OF SECTION

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.
 2. Warning signs and labels.
 3. Pipe labels.
 4. Duct labels.
 5. Stencils.
 6. Valve tags.
 7. Warning tags.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.
 - c. Carlton Industries, LP.
 - d. Champion America.
 - e. Craftmark Pipe Markers.
 - f. emedco.
 - g. Kolbi Pipe Marker Co.
 - h. LEM Products Inc.
 - i. Marking Services, Inc.
 - j. Seton Identification Products.

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2. Material and Thickness: stainless steel, 0.025-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
3. Letter Color: Black.
4. Background Color: White .
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.
 - c. Carlton Industries, LP.
 - d. Champion America.
 - e. Craftmark Pipe Markers.
 - f. emedco.
 - g. Kolbi Pipe Marker Co.
 - h. LEM Products Inc.
 - i. Marking Services, Inc.
 - j. Seton Identification Products.
2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
3. Letter Color: Blue.
4. Background Color: Yellow.
5. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
6. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
7. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
8. Fasteners: Stainless-steel rivets or self-tapping screws.
9. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brady Corporation.
2. Brimar Industries, Inc.
3. Carlton Industries, LP.
4. Champion America.
5. Craftmark Pipe Markers.

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6. emedco.
 7. LEM Products Inc.
 8. Marking Sevices Inc.
 9. National Marker Company.
 10. Seton Identification Products.
 11. Stranco, Inc.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- C. Letter Color: Red.
- D. Background Color: White.
- E. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- F. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- G. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- H. Fasteners: Stainless-steel rivets or self-tapping screws.
- I. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- J. Label Content: Include caution and warning information plus emergency notification instructions.

2.3 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
 2. Brady Corporation.
 3. Brimar Industries, Inc.
 4. Carlton Industries, LP.
 5. Champion America.
 6. Craftmark Pipe Markers.
 7. emedco.
 8. Kolbi Pipe Marker Co.
 9. LEM Products Inc.
 10. Marking Sevices Inc.
 11. Seton Identification Products.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction according to ASME A13.1.
- C. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.
- D. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- E. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.

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2. Lettering Size: At least 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.

2.4 DUCT LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Brady Corporation.
 2. Brimar Industries, Inc.
 3. Carlton Industries, LP.
 4. Champion America.
 5. Craftmark Pipe Markers.
 6. emedco.
 7. Kolbi Pipe Marker Co.
 8. LEM Products Inc.
 9. Marking Sevices Inc.
 10. Seton Identification Products.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- C. Letter Color: Black.
- D. Background Color: White.
- E. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- F. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- G. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- H. Fasteners: Stainless-steel rivets or self-tapping screws.
- I. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- J. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings; also include duct size and an arrow indicating flow direction.
 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions or as separate unit on each duct label to indicate flow direction.

2.5 STENCILS

- A. Stencils for Piping:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brimar Industries, Inc.
 - b. Carlton Industries, LP.
 - c. Champion America.
 - d. Craftmark Pipe Markers.
 - e. Kolbi Pipe Marker Co.
 - f. Marking Sevices Inc.

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2. Lettering Size: At least 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.
3. Stencil Material: Aluminum.
4. Stencil Paint: Exterior, gloss, in colors complying with recommendations in ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.
5. Identification Paint: Exterior, in colors according to ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.

B. Stencils for Ducts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brimar Industries, Inc.
 - b. Carlton Industries, LP.
 - c. Champion America.
 - d. Craftmark Pipe Markers.
 - e. Kolbi Pipe Marker Co.
 - f. Marking Services Inc.
2. Lettering Size: Minimum letter height of 1-1/4 inches for viewing distances up to 15 feet and proportionately larger lettering for greater viewing distances.
3. Stencil Material: Aluminum.
4. Stencil Paint: Exterior, gloss, alkyd enamel. Paint may be in pressurized spray-can form.
5. Identification Paint: Exterior, alkyd enamel. Paint may be in pressurized spray-can form.

C. Stencils for Access Panels and Door Labels, Equipment Labels, and Similar Operational Instructions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brimar Industries, Inc.
 - b. Carlton Industries, LP.
 - c. Champion America.
 - d. Craftmark Pipe Markers.
 - e. Kolbi Pipe Marker Co.
 - f. Marking Services Inc.
2. Lettering Size: Minimum letter height of 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.
3. Stencil Material: Aluminum.
4. Stencil Paint: Exterior, gloss, alkyd enamel. Paint may be in pressurized spray-can form.
5. Identification Paint: Exterior, . Paint may be in pressurized spray-can form.

2.6 VALVE TAGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
2. Brady Corporation.
3. Brimar Industries, Inc.
4. Carlton Industries, LP.
5. Champion America.
6. Craftmark Pipe Markers.
7. emedco.
8. Kolbi Pipe Marker Co.
9. LEM Products Inc.
10. Marking Services Inc.
11. Seton Identification Products.

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- B. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass wire-link chain or beaded chain or S-hook.
- C. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-tag schedule shall be included in operation and maintenance data.

2.7 WARNING TAGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Brady Corporation.
 - 2. Brimar Industries, Inc.
 - 3. Carlton Industries, LP.
 - 4. Champion America.
 - 5. Craftmark Pipe Markers.
 - 6. emedco.
 - 7. Kolbi Pipe Marker Co.
 - 8. LEM Products Inc.
 - 9. Marking Sevices Inc.
 - 10. Seton Identification Products.
- B. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
 - 1. Size: Approximately 4 by 7 inches.
 - 2. Fasteners: Brass grommet and wire.
 - 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 - 4. Color: Safety-yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

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3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Piping Color Coding: Painting of piping is specified in Section 099123 "Interior Painting."
- B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels, complying with ASME A13.1, with painted, color-coded bands or rectangles on each piping system.
 - 1. Identification Paint: Use for contrasting background.
 - 2. Stencil Paint: Use for pipe marking.
- C. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- D. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- E. Pipe Label Color Schedule:
 - 1. Condensate-Water Piping: White letters on a safety-green background.
 - 2. Refrigerant Piping: Black letters on a safety-orange background.

3.5 DUCT LABEL INSTALLATION

- A. Install self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:
 - 1. Blue: For cold/hot air supply ducts.
 - 2. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
- B. Stenciled Duct Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.
- C. Locate labels near points where ducts enter into and exit from concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

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3.6 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Hot Water: 2 inches, round.
 - 2. Valve-Tag Colors:
 - a. White letters on a safety-black background.

3.7 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Constant-volume air systems.
 - b. Variable-air-volume systems.

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 15 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 15 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. Certified TAB reports.
- E. Sample report forms.
- F. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

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1.4 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC.
 - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC.
 - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC as a TAB technician.

- B. TAB Conference: Meet with Architect, Owner and Commissioning Authority on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.
 - 1. Agenda Items:
 - a. The Contract Documents examination report.
 - b. The TAB plan.
 - c. Coordination and cooperation of trades and subcontractors.
 - d. Coordination of documentation and communication flow.

- C. Certify TAB field data reports and perform the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

- D. TAB Report Forms: Use standard TAB contractor's forms approved by Architect, Owner and Commissioning Authority.

- E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

- F. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

- G. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.5 PROJECT CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.6 COORDINATION

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

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PART 2 - PRODUCTS - Not Applicable

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

- A. Subject to compliance with requirements, engage one of the following.

3.2 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Section 23 31 13 "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.
- L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

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- M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- N. Examine operating safety interlocks and controls on HVAC equipment.
- O. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.3 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Hydronic systems are filled, clean, and free of air.
 - 3. Automatic temperature-control systems are operational.
 - 4. Equipment and duct access doors are securely closed.
 - 5. Balance, smoke, and fire dampers are open.
 - 6. Isolating and balancing valves are open and control valves are operational.
 - 7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.
 - 1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 3300 "Air Duct Accessories."
 - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 0713 "Duct Insulation," Section 23 0716 "HVAC Equipment Insulation," and Section 23 0719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

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- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 23 3113 "Metal Ducts."

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
 - 2. Measure fan static pressures as follows to determine actual static pressure:
 - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Report the cleanliness status of filters and the time static pressures are measured.
 - 4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
 - 5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 - 6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 - 7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
 - 1. Measure airflow of submain and branch ducts.
 - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 - 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.

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3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
3. Measure total system airflow. Adjust to within indicated airflow.
4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
 - a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.
7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record final fan-performance data.

3.8 PROCEDURES FOR HEAT EXCHANGERS

A. Measure water flow through all circuits.

B. Adjust water flow to within specified tolerances.

C. Measure inlet and outlet water temperatures.

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- D. Check settings and operation of safety and relief valves. Record settings.

3.9 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 - 1. Manufacturer's name, model number, and serial number.
 - 2. Motor horsepower rating.
 - 3. Motor rpm.
 - 4. Efficiency rating.
 - 5. Nameplate and measured voltage, each phase.
 - 6. Nameplate and measured amperage, each phase.
 - 7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.10 TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 5 percent.
 - 2. Air Outlets and Inlets: Plus or minus 5 percent.
 - 3. Heating-Water Flow Rate: Plus or minus 5 percent.

3.11 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.12 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Pump curves.
 - 2. Fan curves.
 - 3. Manufacturers' test data.
 - 4. Field test reports prepared by system and equipment installers.
 - 5. Other information relative to equipment performance; do not include Shop Drawings and product data.

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- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB contractor.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 3. Test Data - Indicated and Actual Values:

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- a. Total air flow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Preheat-coil static-pressure differential in inches wg.
 - g. Cooling-coil static-pressure differential in inches wg.
 - h. Heating-coil static-pressure differential in inches wg.
 - i. Outdoor airflow in cfm.
 - j. Return airflow in cfm.
 - k. Outdoor-air damper position.
 - l. Return-air damper position.
 - m. Vortex damper position.
- F. Apparatus-Coil Test Reports:
1. Coil Data:
 - a. System identification.
 - b. Location.
 - c. Coil type.
 - d. Number of rows.
 - e. Fin spacing in fins per inch o.c.
 - f. Make and model number.
 - g. Face area in sq. ft.
 - h. Tube size in NPS.
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
 2. Test Data - Indicated and Actual Values:
 - a. Air flow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
 - h. Water flow rate in gpm.
 - i. Water pressure differential in feet of head or psig.
 - j. Entering-water temperature in deg F.
 - k. Leaving-water temperature in deg F.
- G. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.
 3. Test Data - Indicated and Actual Values:
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.

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- c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.
- H. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
- 1. Report Data:
 - a. System and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft.
 - g. Indicated air flow rate in cfm.
 - h. Indicated velocity in fpm.
 - i. Actual air flow rate in cfm.
 - j. Actual average velocity in fpm.
 - k. Barometric pressure in psig.
- I. Air-Terminal-Device Reports:
- 1. Unit Data:
 - a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Apparatus used for test.
 - d. Area served.
 - e. Make.
 - f. Number from system diagram.
 - g. Type and model number.
 - h. Size.
 - i. Effective area in sq. ft.
 - 2. Test Data - Indicated and Actual Values:
 - a. Air flow rate in cfm.
 - b. Air velocity in fpm.
 - c. Preliminary air flow rate as needed in cfm.
 - d. Preliminary velocity as needed in fpm.
 - e. Final air flow rate in cfm.
 - f. Final velocity in fpm.
 - g. Space temperature in deg F.
- J. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:
- 1. Unit Data:
 - a. System and air-handling-unit identification.
 - b. Location and zone.
 - c. Room or riser served.
 - d. Coil make and size.
 - e. Flowmeter type.
 - 2. Test Data - Indicated and Actual Values:
 - a. Air flow rate in cfm.
 - b. Entering-water temperature in deg F.
 - c. Leaving-water temperature in deg F.
 - d. Water pressure drop in feet of head or psig.
 - e. Entering-air temperature in deg F.
 - f. Leaving-air temperature in deg F.
- K. Instrument Calibration Reports:
- 1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.

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- d. Dates of use.
- e. Dates of calibration.

3.13 INSPECTIONS

- A. Initial Inspection:
 - 1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
 - 2. Check the following for each system:
 - a. Measure airflow of at least 10 percent of air outlets.
 - b. Measure water flow of at least 5 percent of terminals.
 - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
 - d. Verify that balancing devices are marked with final balance position.
 - e. Note deviations from the Contract Documents in the final report.
- B. Final Inspection:
 - 1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Commissioning Authority.
 - 2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Commissioning Authority.
 - 3. Commissioning Authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
 - 4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
 - 5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
 - 1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 - 2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.
- D. Prepare test and inspection reports.

3.14 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION

SECTION 23 07 13

DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply and outdoor air.
 - 2. Indoor, exposed supply and outdoor air.
 - 3. Indoor, concealed return located in unconditioned space.
 - 4. Indoor, exposed return located in unconditioned space.
 - 5. Indoor, exposed exhaust between isolation damper and penetration of building exterior.

- B. Related Sections:
 - 1. Section 230719 "HVAC Piping Insulation."
 - 2. Section 233113 "Metal Ducts" for duct liners.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
 - 3. Detail application of field-applied jackets.
 - 4. Detail application at linkages of control devices.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.

- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

- C. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

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- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

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- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Armaflex.
- G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Manson Insulation Inc.
 - e. Owens Corning.
- H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - b. CertainTeed Corporation.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Manson Insulation Inc.
 - f. Owens Corning.
- I. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied FSK jacket complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - b. CertainTeed Corporation.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Manson Insulation Inc.
 - f. Owens Corning.

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2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - 2. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. P.I.C. Plastics, Inc.
 - d. Speedline Corporation.
 - 2. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

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1. VOC Content: 300 g/L or less.
2. Low-Emitting Materials: Mastic coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Foster Brand; H. B. Fuller Construction Products.
 - b. Knauf Insulation.
 - c. Vimasco Corporation.
2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
2. Service Temperature Range: 0 to 180 deg F.
3. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
4. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
2. Service Temperature Range: Minus 50 to plus 220 deg F.
3. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
4. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
2. Service Temperature Range: Minus 20 to plus 180 deg F.
3. Solids Content: 60 percent by volume and 66 percent by weight.
4. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Vimasco Corporation.
2. Adhesives shall have a VOC content of 50 g/L or less.
3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
4. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
5. Service Temperature Range: 0 to plus 180 deg F.
6. Color: White.

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2.5 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. Sealant shall have a VOC content of 420 g/L or less.

B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. Sealant shall have a VOC content of 420 g/L or less.

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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- a. Johns Manville; a Berkshire Hathaway company.
 - b. P.I.C. Plastics, Inc.
 - c. Proto Corporation.
 - d. Speedline Corporation.
2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.
- D. Metal Jacket:
1. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.
 - a. Sheet and roll stock ready for shop or field sizing.
 - b. Material, finish, and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 2.5-mil-thick polysurlyn.
 - d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
- E. Self-Adhesive Outdoor Jacket: 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white aluminum-foil facing.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Polyguard Products, Inc.

2.8 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.

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2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Compac Corporation.
 - b. Ideal Tape Co., Inc., an American Biltrite Company.
 - c. Venture Tape.
2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.9 SECUREMENTS

A. Bands:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 3/4 inch wide with wing seal or closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated.

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- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) Nelson Stud Welding.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) CL WARD & Family Inc.
 - 3) Gemco.
 - 4) Hardcast, Inc.
 - 5) Midwest Fasteners, Inc.
 - 6) Nelson Stud Welding.
3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Midwest Fasteners, Inc.
 - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gemco.
 - 2) Midwest Fasteners, Inc.
 - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
 - c. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

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5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.
 6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) Nelson Stud Welding.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
 7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gemco.
 - 2) Midwest Fasteners, Inc.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- D. Wire: 0.062-inch soft-annealed, stainless steel.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. C & F Wire.
- 2.10 CORNER ANGLES
- A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.

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- B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.
- C. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.

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3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
 - K. Install insulation with factory-applied jackets as follows:
 1. Draw jacket tight and smooth.
 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
 - L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
 - M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
 - N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- 3.4 PENETRATIONS
- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
 - B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
 - C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
 - D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

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1. Comply with requirements in Section 078413 "Penetration Firestopping."

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.

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7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.

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4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.8 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Section 078413 "Penetration Firestopping."

3.9 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:

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1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

3.12 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, rectangular, supply-air duct insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

B. Concealed, rectangular, return-air duct insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

C. Concealed, rectangular, outdoor-air duct insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

D. Concealed, rectangular, exhaust-air duct insulation between isolation damper and penetration of building exterior shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

E. Concealed, supply-air plenum insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

F. Concealed, return-air plenum insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

G. Concealed, outdoor-air plenum insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

H. Concealed, exhaust-air plenum insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

I. Exposed, rectangular, supply-air duct insulation shall be one of the following:

1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

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- J. Exposed, rectangular, return-air duct insulation shall be one of the following:
 - 1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- K. Exposed, rectangular, outdoor-air duct insulation shall be one of the following:
 - 1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- L. Exposed, supply-air plenum insulation shall be one of the following:
 - 1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- M. Exposed, return-air plenum insulation shall be one of the following:
 - 1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- N. Exposed, outdoor-air plenum insulation shall be one of the following:
 - 1. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Ducts and Plenums, Concealed:
 - 1. PVC, Color-Coded by System: 30 mils thick.
- D. Ducts and Plenums, Exposed:
 - 1. PVC, Color-Coded by System: 30 mils thick.

3.14 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Ducts and Plenums, Concealed:
 - 1. Aluminum, Smooth: thick.
- D. Ducts and Plenums, Exposed, up to 48 Inches in Diameter or with Flat Surfaces up to 72 Inches:
 - 1. Aluminum, Smooth: 0.040 inch thick.
- E. Ducts and Plenums, Exposed, Larger Than 48 Inches in Diameter or with Flat Surfaces Larger Than 72 Inches:
 - 1. Aluminum, Smooth with: 0.040 inch thick.

END OF SECTION

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METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Sheet metal materials.
3. Sealant and gaskets.
4. Hangers and supports.

B. Related Sections:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.
3. Seismic-restraint devices.
4. ."

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.

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9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.
- 13.

C. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.

B. Welding certificates.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

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PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 - 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 - 2. Tape Width: 4 inches.

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3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.4 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

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- F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round and flat-oval ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

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- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Outdoor, Supply-Air Ducts: Seal Class A.
 - 3. Outdoor, Exhaust Ducts: Seal Class C.
 - 4. Outdoor, Return-Air Ducts: Seal Class C.
 - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 - 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
 - 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
 - 8. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 - 10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
 - 11. Conditioned Space, Exhaust Ducts: Seal Class B.
 - 12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

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3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
 - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test. Test 25% of the of total installed duct for all classes.
 - 2. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
 - 3. Test for leaks before applying external insulation.
 - 4. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
 - 5. Give seven days' advance notice for testing.
- C. Duct System Cleanliness Tests:
 - 1. Visually inspect duct system to ensure that no visible contaminants are present.
 - 2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
 - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.
- D. Duct system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.7 DUCT CLEANING

- A. Clean old and new duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
 - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
 - 1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.

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2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.8 START UP

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

- B. Supply Ducts:

1. Ducts Connected to Fan Coil Units, and Terminal Units
 - a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
2. Ducts Connected to Variable-Air-Volume Air-Handling Units:
 - a. Pressure Class: Positive 4-inch wg.

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- b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 3.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
 - 3. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive 2-inch wg .
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 3.
- C. Return Ducts:
 - 1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - 2. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - 3. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 3.
- D. Exhaust Ducts:
 - 1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
 - 2. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - 3. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A
 - c. SMACNA Leakage Class for Rectangular: 6.
- E. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
 - 1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.

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- c. SMACNA Leakage Class for Rectangular: 6.
 2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
- F. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
 - c. Velocity 1500 fpm or Higher:
 - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
 2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
 3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.

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- b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
- c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

G. Branch Configuration:

- 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
- 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Backdraft and pressure relief dampers.
2. Manual volume dampers.
3. Flange connectors.
4. Turning vanes.
5. Flexible connectors.

B. Related Requirements:

1. Section 233346 "Flexible Ducts" for insulated and non-insulated flexible ducts.

1.2 ACTION SUBMITTALS

A. Sustainable Design Submittals:

1. Product data showing compliance with ASHRAE 62.1.

B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
 - a. Special fittings.
 - b. Manual volume damper installations.
 - c. Control-damper installations.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.

B. Source quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

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1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- A. Description: Gravity balanced.
- B. Maximum Air Velocity: 2000 fpm.
- C. Maximum System Pressure: 2-inch wg.
- D. Frame: Hat-shaped, 0.03-inch-thick stainless steel, with welded corners or mechanically attached and mounting flange.
- E. Blades: Multiple single-piece blades, center pivoted, maximum 6-inch width, noncombustible, tear-resistant, neoprene-coated fiberglass with sealed edges.
- F. Blade Action: Parallel.
- G. Blade Seals: Neoprene, mechanically locked.
- H. Blade Axles:
 - 1. Material: Stainless steel.
 - 2. Diameter: 0.20 inch.

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- I. Tie Bars and Brackets: Aluminum.
- J. Return Spring: Adjustable tension.
- K. Bearings: Steel ball or synthetic pivot bushings.
- L. Accessories:
 - 1. Adjustment device to permit setting for varying differential static pressure.
 - 2. Counterweights and spring-assist kits for vertical airflow installations.
 - 3. Electric actuators.
 - 4. Screen Mounting: Front mounted in sleeve.
 - a. Sleeve Thickness: 20 gage minimum.
 - b. Sleeve Length: 6 inches minimum.
 - 5. Screen Mounting: Rear mounted.
 - 6. Screen Material: Aluminum.
 - 7. Screen Type: Insect.
 - 8. 90-degree stops.

2.4 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aire Technologies.
 - b. American Warming and Ventilating; a Mestek Architectural Group company.
 - c. Flexmaster U.S.A., Inc.
 - d. Flex-Tek Group.
 - e. McGill AirFlow LLC.
 - f. Nailor Industries Inc.
 - g. Pottorff.
 - h. Ruskin Company.
 - i. Trox USA Inc.
 - j. Vent Products Co., Inc.
 - 2. Standard leakage rating.
 - 3. Suitable for horizontal or vertical applications.
 - 4. Frames:
 - a. Frame: Hat-shaped, 0.094-inch-thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 - 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized-steel, 0.064 inch thick.
 - 6. Blade Axles: Galvanized steel.
 - 7. Bearings:
 - a. Oil-impregnated bronze.

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- b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 8. Tie Bars and Brackets: Galvanized steel.
- B. Standard, Aluminum, Manual Volume Dampers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Warming and Ventilating; a Mestek Architectural Group company.
 - b. McGill AirFlow LLC.
 - c. Nailor Industries Inc.
 - d. Pottorff.
 - e. Ruskin Company.
 - f. Trox USA Inc.
 - g. Vent Products Co., Inc.
 2. Standard leakage rating.
 3. Suitable for horizontal or vertical applications.
 4. Frames: Hat-shaped, 0.10-inch-thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Roll-Formed Aluminum Blades: 0.10-inch-thick aluminum sheet.
 - e. Extruded-Aluminum Blades: 0.050-inch-thick extruded aluminum.
 6. Blade Axles: Nonferrous metal.
 7. Bearings:
 - a. Oil-impregnated bronze.
 - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 8. Tie Bars and Brackets: Aluminum.
- C. Jackshaft:
1. Size: 1-inch diameter.
 2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
 3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.
- D. Damper Hardware:
1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
 2. Include center hole to suit damper operating-rod size.
 3. Include elevated platform for insulated duct mounting.

2.5 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Hardcast, Inc.
4. Nexus PDQ.
5. Ward Industries; a brand of Hart & Cooley, Inc.

- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.6 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Aero-Dyne Sound Control Co.
 2. CL WARD & Family Inc.
 3. Ductmate Industries, Inc.
 4. Duro Dyne Inc.
 5. Elgen Manufacturing.
 6. Hardcast, Inc.
 7. METALAIRE, Inc.
 8. SEMCO LLC.
 9. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- E. Vane Construction: Double wall.
- F. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.7 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Aire Technologies.
 2. American Warming and Ventilating; a Mestek Architectural Group company.
 3. Cesco Products; a division of MESTEK, Inc.
 4. CL WARD & Family Inc.
 5. Ductmate Industries, Inc.
 6. Elgen Manufacturing.
 7. Flexmaster U.S.A., Inc.
 8. Greenheck Fan Corporation.

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9. McGill AirFlow LLC.
10. Nailor Industries Inc.
11. Pottorff.
12. Ventfabrics, Inc.
13. Ward Industries; a brand of Hart & Cooley, Inc.

B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."

1. Door:
 - a. Double wall, rectangular.
 - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
 - c. Vision panel.
 - d. Hinges and Latches: 1-by-1-inchbutt or piano hinge and cam latches.
 - e. Fabricate doors airtight and suitable for duct pressure class.
2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:
 - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.

2.8 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Duro Dyne Inc.
4. Elgen Manufacturing.
5. Hardcast, Inc.
6. JP Lamborn Co.
7. Ventfabrics, Inc.
8. Ward Industries; a brand of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd..
2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

F. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.

1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.

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2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

2.9 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Compliance with ASHRAE/IESNA 90.1-2004 includes Section 6.4.3.3.3 - "Shutoff Damper Controls," restricts the use of backdraft dampers, and requires control dampers for certain applications. Install control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 1. Install steel volume dampers in steel ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 1. On both sides of duct coils.
 2. Upstream from duct filters.
 3. At outdoor-air intakes and mixed-air plenums.
 4. At drain pans and seals.
 5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
 6. At each change in direction and at maximum 50-foot spacing.
 7. Upstream from turning vanes.

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8. Upstream or downstream from duct silencers.
9. Control devices requiring inspection.
10. Elsewhere as indicated.

- H. Install flexible connectors to connect ducts to equipment.
- I. Connect terminal units to supply ducts directly with hard ducts . Do not use flexible ducts to change directions.
- J. Connect diffusers or light troffer boots to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- K. Connect flexible ducts to metal ducts with liquid adhesive plus tape.
- L. Install duct test holes where required for testing and balancing purposes.
- M. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 1. Operate dampers to verify full range of movement.
 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
 4. Inspect turning vanes for proper and secure installation.
 5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION

SECTION 23 33 46

FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Insulated flexible ducts.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
1. Product data showing compliance with ASHRAE 62.1.
 2. Product Data: For adhesives and sealants, indicating VOC content.
 3. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
 4. Laboratory Test Reports: For Insulation, indicating compliance with requirements for low-emitting materials.
 5. Product Data : For insulation, indicating that R-values comply with tables in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air Conditioning."
- C. Shop Drawings: For flexible ducts.
1. Include plans showing locations and mounting and attachment details.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from installers of the items involved.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- C. Comply with the Air Diffusion Council's "ADC Flexible Air Duct Test Code FD 72-R1."
- D. Comply with ASTM E 96/E 96M, "Test Methods for Water Vapor Transmission of Materials."

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2.2 INSULATED FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Flexmaster U.S.A., Inc.
 2. JP Lamborn Co.
 3. McGill AirFlow LLC.
 4. Thermaflex; a Flex-Tek Group company.
 5. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Insulated, Flexible Duct: UL 181, Class 1, two-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.
1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 10 to plus 160 deg F.
 4. Insulation R-Value: Comply with ASHRAE/IES 90.1.
 - 5.

2.3 FLEXIBLE DUCT CONNECTORS

- A. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
- B. Non-Clamp Connectors: Liquid adhesive plus tape.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install flexible ducts according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install in indoor applications only. Flexible ductwork should not be exposed to UV lighting.
- C. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- D. Connect diffusers or light troffer boots to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- E. Connect flexible ducts to metal ducts with liquid adhesive plus tape.
- F. Install duct test holes where required for testing and balancing purposes.
- G. Installation:
1. Install ducts fully extended.
 2. Do not bend ducts across sharp corners.
 3. Bends of flexible ducting shall not exceed a minimum of one duct diameter.
 4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
 5. Install flexible ducts in a direct line, without sags, twists, or turns.

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H. Supporting Flexible Ducts:

1. Suspend flexible ducts with bands 1-1/2 inches wide or wider and spaced a maximum of 48 inches apart. Maximum centerline sag between supports shall not exceed 1/2 inch per 12 inches.
2. Install extra supports at bends placed approximately one duct diameter from center line of the bend.
3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.
4. Vertically installed ducts shall be stabilized by support straps at a maximum of 72 inches o.c.

END OF SECTION

SECTION 23 34 16

CENTRIFUGAL HVAC FANS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: For each product.
1. Forward-curved centrifugal fans.

1.2 ACTION SUBMITTALS

- A. Product Data:
1. Include rated capacities, furnished specialties, and accessories for each fan.
 2. Certified fan performance curves with system operating conditions indicated.
 3. Certified fan sound-power ratings.
 4. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 5. Material thickness and finishes, including color charts.
 6. Dampers, including housings, linkages, and operators.
- B. Shop Drawings:
1. Include plans, elevations, sections, and attachment details.
 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For centrifugal fans to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AMCA Compliance:
1. Comply with AMCA performance requirements and bear the AMCA-Certified Ratings Seal.
 2. Operating Limits: Classify according to AMCA 99.

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- B. Unusual Service Conditions:
 - 1. Ambient Temperature: 75 deg F.
 - 2. Altitude: 100 feet above sea level.
 - 3. High humidity.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 FORWARD-CURVED CENTRIFUGAL FANS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. PennBarry
 - 2. Greenheck
 - 3. Penn Ventilator Co.
 - 4. Carnes.
 - 5. Loren Cook.
- B. Description:
 - 1. Factory-fabricated, square in-line centrifugal fans -assembled, -tested, and -finished, direct- driven centrifugal fans consisting of housing, wheel, motor, drive assembly, and support structure.
 - 2. Deliver fans as factory-assembled units, to the extent allowable by shipping limitations.
 - 3. Factory-installed and -wired disconnect switch.
- C. Housings:
 - 1. Durable galvanized steel formed panels to make curved-scroll housings with shaped cutoff and acoustically insulated and shall be provided with a backdraft damper, motor vibration isolation and electrical connections.
 - 2. Panel Bracing: Steel angle- or channel-iron member supports for mounting and supporting fan scroll, wheel, motor, and accessories.
 - 3. Horizontally split, bolted-flange housing.
 - 4. Spun inlet cone with flange.
 - 5. Motor Enclosure: Green Plus EC Motor. Motor isolated from airstream.
- D. Fan Wheels:
 - 1. Aluminum backward-inclined blades robotically welded to aluminum.
 - 2. Mechanically secured to flange and backplate; cast-steel hub swaged to backplate and fastened to shaft with set screws.
- E. Shafts:
 - 1. Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with adjustable alignment and belt tensioning.
 - 2. Turned, ground, and polished hot-rolled steel with keyway. Ship with protective coating of lubricating oil.
 - 3. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.
- F. Prelubricated and Sealed Shaft Bearings:
 - 1. Self-aligning, pillow-block-type ball bearings.
 - 2. Ball-Bearing Rating Life: ABMA 9, L10 at 120,000 hours.
 - 3. Roller-Bearing Rating Life: ABMA 11, L10 at 120,000 hours.
- G. Grease-Lubricated Shaft Bearings:
 - 1. Self-aligning, pillow-block-type, tapered roller bearings with double-locking collars and two-piece, cast-iron housing.
 - 2. Ball-Bearing Rating Life: ABMA 9, L10 at 120,000 hours.
 - 3. Roller-Bearing Rating Life: ABMA 11, L10 at 120,000 hours.
 - 4. .

CENTRIFUGAL HVAC FANS
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- H. Accessories:
1. Access for Inspection, Cleaning, and Maintenance: Comply with requirements in ASHRAE 62.1.
 2. Companion Flanges: Rolled flanges for duct connections of same material as housing.
 3. Speed controller.
 4. Backdraft Damper with felt sound absorbers and nylon bearings.
 5. Companion Flanges: For inlet and outlet duct connections.
 6. Vibration Isolators

2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.4 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210/ASHRAE 51, "Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install centrifugal fans level and plumb.
- B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.
- D. Equipment Mounting: Install centrifugal fans on vibration isolation equipment base. Comply with requirements specified in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."
- E. Install units with clearances for service and maintenance.
- F. Label fans according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 CONNECTIONS

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."
- B. Install ducts adjacent to fans to allow service and maintenance.

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3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 - 5. Verify lubrication for bearings and other moving parts.
 - 6. See Section 230593 "Testing, Adjusting, and Balancing For HVAC" for testing, adjusting, and balancing procedures.
 - 7. Remove and replace malfunctioning units and retest as specified above.
- D. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

END OF SECTION

SECTION 23 37 13.13

AIR DIFFUSERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rectangular and square ceiling diffusers.
 - 2. Linear bar diffusers.
 - 3. Linear slot diffusers.
- B. Related Requirements:
 - 1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers.
 - 2. Section 233713.23 "Air Registers and Grilles" for adjustable-bar register and grilles, fixed-face registers and grilles, and linear bar grilles.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Diffuser Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension assembly members.
 - 2. Method of attaching hangers to building structure.
 - 3. Size and location of initial access modules for acoustical tile.
 - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 5. Duct access panels.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 RECTANGULAR AND SQUARE CEILING DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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1. A-J Manufacturing Co., Inc.
2. Anemostat Products; a Mestek company.
3. Carnes Company.
4. Hart & Cooley Inc.
5. Krueger.
6. METALAIRE, Inc.
7. Nailor Industries Inc.
8. Price Industries.
9. Shoemaker Mfg. Co.
10. Titus.
11. Tuttle & Bailey.

B. Devices shall be specifically designed for variable-air-volume flows.

C. Material: Steel.

D. Finish: Baked enamel, color selected by Architect.

E. Face Size: 24 by 24 inches.

F. Face Style: Four cone.

G. Mounting: T-bar.

H. Pattern: Adjustable.

I. Dampers: Radial opposed blade.

J. Accessories:

1. Equalizing grid.
2. Plaster ring.
3. Safety chain.
4. Wire guard.
5. Sectorizing baffles.
6. Operating rod extension.

2.2 LINEAR BAR DIFFUSERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Anemostat Products; a Mestek company.
2. Carnes Company.
3. Dayus Register & Grille Inc.
4. Hart & Cooley Inc.
5. Krueger.
6. METALAIRE, Inc.
7. Nailor Industries Inc.
8. Price Industries.
9. Raymon-Donco.
10. Titus.
11. Tuttle & Bailey.

B. Devices shall be specifically designed for variable-air-volume flows.

C. Material: Steel.

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- D. Finish: Baked enamel, color selected by Architect.
- E. Narrow Core Spacing Arrangement: 1/8-inch-thick blades spaced 1/4 inch apart; 15-degree deflection.
- F. Two-Way Deflection Vanes: Extruded construction adjustable louvers with removable core.
- G. Frame: 1-1/4 inches wide.
- H. Mounting: Spring clip.
- I. Damper Type: Adjustable opposed-blade assembly.
- J. Accessories: Blank-off strips.

2.3 LINEAR SLOT DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Anemostat Products; a Mestek company.
 - 2. Carnes Company.
 - 3. Hart & Cooley Inc.
 - 4. Kees, Inc.
 - 5. Krueger.
 - 6. METALAIRE, Inc.
 - 7. Nailor Industries Inc.
 - 8. Price Industries.
 - 9. Titus.
 - 10. Tuttle & Bailey.
- B. Devices shall be specifically designed for variable-air-volume flows.
- C. Material - Shell: Steel , insulated.
- D. Finish - Tees: Baked enamel, color selected by Architect.
- E. Slot Width: 1 inch.
- F. Accessories: T-bar on inlet side.

2.4 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INSTALLATION

- A. Install diffusers level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION

SECTION 23 37 13.23

AIR REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adjustable blade face registers and grilles.
2. Fixed face registers and grilles.

B. Related Requirements:

1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to registers and grilles.
2. Section 233713.13 "Air Diffusers" for various types of air diffusers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Register and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Duct access panels.

B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 REGISTERS

A. Fixed Face Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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- a. A-J Manufacturing Co., Inc.
 - b. Anemostat Products; a Mestek company.
 - c. Carnes Company.
 - d. Dayus Register & Grille Inc.
 - e. Hart & Cooley Inc.
 - f. Kees, Inc.
 - g. Krueger.
 - h. Nailor Industries Inc.
 - i. Price Industries.
 - j. Shoemaker Mfg. Co.
 - k. Titus.
 - l. Tuttle & Bailey.
2. Material: Steel.
 3. Finish: Baked enamel, color selected by Architect.
 4. Face Blade Arrangement: Horizontal spaced 3/4 inch apart.
 5. Face Arrangement: Perforated core.
 6. Core Construction: Integral.
 7. Frame: 1-1/4 inches wide.
 8. Mounting Frame: Filter.
 9. Mounting: Countersunk screw.
 10. Damper Type: Adjustable opposed blade.

2.2 GRILLES

A. Adjustable Blade Face Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A-J Manufacturing Co., Inc.
 - b. Anemostat Products; a Mestek company.
 - c. Carnes Company.
 - d. Dayus Register & Grille Inc.
 - e. Hart & Cooley Inc.
 - f. Kees, Inc.
 - g. Krueger.
 - h. METALAIRE, Inc.
 - i. Nailor Industries Inc.
 - j. Price Industries.
 - k. Raymon-Donco.
 - l. Shoemaker Mfg. Co.
 - m. Titus.
 - n. Tuttle & Bailey.
2. Material: Steel.
3. Finish: Baked enamel, color selected by Architect.
4. Face Blade Arrangement: Horizontal spaced 3 inches apart.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Horizontal spaced apart.
7. Frame: 1-1/4 inches wide.
8. Mounting Frame: Filter.
9. Mounting: Countersunk screw.
10. Accessories:
 - a. Front-blade gang operator.

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2.3 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate registers and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where registers and grilles are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install registers and grilles level and plumb.
- B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust registers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Common electrical installation requirements.

1.2 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, and cables, will be clear of obstructions and of the working and access space of other equipment.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Metal-clad cable, Type MC, rated 600 V or less. Limited applications only.
3. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer's authorized service representative.
- B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Alpha Wire Company.
 2. American Bare Conductor.
 3. Belden Inc.
 4. Encore Wire Corporation.
 5. General Cable Technologies Corporation.
 6. Okonite Company (The).
 7. Southwire Company.
- C. Standards:
 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

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2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

E. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type UF: Comply with UL 83 and UL 493.
3. Type XHHW-2: Comply with UL 44.

2.2 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems; a part of Atkore International.
2. Alpha Wire Company.
3. American Bare Conductor.
4. Belden Inc.
5. Encore Wire Corporation.
6. Southwire Company.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. RoHS compliant.

4. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Circuits:

1. Single circuit and or multi-circuit with color-coded conductors as indicated on the drawings.

E. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

F. Ground Conductor: Insulated green.

G. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

H. Armor: Steel, interlocked.

I. Jacket: PVC applied over armor.

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2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. 3M Electrical Products.
 2. AFC Cable Systems; a part of Atkore International.
 3. Gardner Bender.
 4. Hubbell Power Systems, Inc.
 5. Ideal Industries, Inc.
 6. ILSCO.
 7. NSi Industries LLC.
 8. O-Z/Gedney; a brand of Emerson Industrial Automation.
 9. Service Wire Co.
 10. TE Connectivity Ltd.
 11. Thomas & Betts Corporation; A Member of the ABB Group.
- C. Jacketed Cable Connectors: For steel jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
 2. Type: Two hole with long barrels.
 3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Feeders: Copper for feeders smaller than No. 4 AWG; copper for feeders No. 4 AWG and larger. Conductors shall be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- C. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- D. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.

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- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
- G. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- H. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes; cabinets; or equipment enclosures where circuit connections are made.
- I. Color-Coding: Color-code fire-alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.

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- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 FIRESTOPPING

- A. Apply fires topping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections with the assistance of a factory-authorized service representative.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors feeding the following critical equipment and services for compliance with requirements:
 - 3. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.
 - 4. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

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- a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
5. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- C. Cables will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports to record the following:
1. Procedures used.
 2. Results that comply with requirements.
 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.
 - 1. Grounding and bonding requirements.
 - 2. Foundation steel electrodes.
 - 3. Conductors for grounding and bonding.
 - 4. Connectors for grounding and bonding.
 - 5. Ground bars.
 - 6. Ground rod electrodes.
 - 7. Ground system test.

1.2 REFERENCE STANDARDS

- A. IEEE 81 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; National Electrical Manufacturers Association.
- D. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2009.
- E. NFPA 70 - National Electrical Code; National Fire Protection Association, 2010.
- F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.
- G. ANSI J-STD-607-B - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
- H. TIA/EIA-606-A - Administration Standard for Commercial Telecommunications Infrastructure.

1.3 SUMMARY

- A. The equipment grounding system shall be designed so all building steel, metallic structures, raceways, enclosures, cabinets, machine frames, junction boxes, outlet boxes, portable equipment, and all other conductive items in close proximity with electrical circuits operate continuously at ground potential providing a low impedance path for possible ground fault currents.

1.4 DEFINITIONS

- A. Area served by a separately-derived system: The area within the building that contains any part of a circuit of the system.
- B. BIM: Building Information Modeling.
- C. ERB: Electric Room grounding busbar.
- D. IBGB: Intersystem bonding termination grounding busbar.
- E. TMGB: Telecommunications Main grounding busbar.
- F. TGB: Telecommunications grounding busbar.

1.5 SUBMITTALS

- A. Comply with Division 01 Section "Submittals Procedures" and Division 26 section "General Electrical Requirements".
- B. Product Data: For each type of product indicated. Provide manufacturer's standard catalogue pages and data sheets for grounding and bonding system components.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Shop Drawings: As-built BIM showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

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1. Test wells.
 2. Ground rods.
 3. Grounding arrangements and connections for separately derived systems.
 4. Grounding for sensitive electronic equipment.
- E. Field quality-control test reports. Submit written test reports to include the following:
1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- F. Field quality-control reports.
- G. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
1. Refer to Division 01 Section "Operation and Maintenance Data".
 2. Instructions for periodic testing and inspection of grounding features at test wells and grounding connections for separately derived systems based on NFPA 70B.
 - a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
 - b. Include recommended testing intervals.
 - c. Plans showing as-built BIM dimensioned locations of grounding features including the following:
 - 1) Test wells.
 - 2) Ground rods.
 - 3) Grounding arrangements and connections for separately derived systems.
 - 4) Grounding for sensitive electronic equipment.
- H. Coordination
1. Verify exact locations of underground metal water service pipe entrances to building.
 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
 3. Notify Architect/Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- I. Sequencing:
1. Do not install ground rod electrodes until final backfill and compaction is complete.
- J. Certifications:
1. System test.
- K. Project Record Documents
1. Record actual locations of all ground rods and grounding electrode system components and connections.
 2. Instructions for periodic testing and inspection of grounding features at grounding connections for separately derived systems based on NETA MTS.
 - a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - b. Include recommended testing intervals.
- 1.6 QUALITY ASSURANCE
- A. All equipment and materials shall be listed by Underwriter's Laboratories, Inc. (UL) for their intended use and shall bear the UL label.
 - B. Testing Agency Qualifications: Member company of NRTL.

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1. Testing Agency's Field Supervisor: An independent agency, with experience and capability to conduct the testing indicated, currently certified by InterNational Electrical Testing Association that is acceptable to the authority having jurisdiction (AHJ) to supervise on-site testing.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- D. Comply with UL 467 for grounding and bonding materials and equipment.
- E. Equipment shall be constructed in accordance with National Electrical Manufacturer's Association (NEMA) standards.
- F. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

1.8 WARRANTIES

- A. Refer to Division 01 Section "Warranties".
- B. Warranty periods shall begin from Date of Substantial Completion.

PART 2 - PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Burndy; part of Hubbell Electrical Systems.
 2. ERICO International Corporation.
 3. O-Z/Gedney; a division of Emerson Industrial Automation.
 4. Panduit Corp.
 5. Thomas & Betts Corporation; a member of the ABB Group.

2.2 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding System Resistance:
 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect/Engineer. Precipitation within the previous 48 hours does not constitute normally dry conditions.
 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
- E. Grounding Electrode System:
 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 2. Metal Underground Water Pipe(s):
 - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than five (5) feet from the point of entrance to the building.

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- b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
 - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
3. Metal Building or Structure Frame:
 - a. Provide connection to metal building or structure frame effectively grounded in accordance with NFPA 70 at nearest accessible location.
 4. Concrete-Encased Electrode:
 - a. Provide connection to concrete-encased electrode consisting of not less than 20 feet of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
 5. Ground Rod Electrode(s):
 - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
 - b. Space electrodes not less than 10 feet from each other and any other ground electrode.
 - c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
 6. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance at additional cost to the Owner.
 7. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
 - a. Ground Bar Size: 1/4 by 4 by 12 inches unless otherwise indicated or required.
 - b. Ground Bar Mounting Height: 12 inches above finished floor unless otherwise indicated.
 8. Ground Riser: Provide common grounding electrode conductor not less than 3/0 AWG for tap connections to multiple separately derived systems as permitted in NFPA 70.
- F. Separately Derived System Grounding:
1. Separately derived systems include, but are not limited to:
 - a. Transformers (except autotransformers such as buck-boost transformers).
 - b. Generators, when neutral is switched in the transfer switch.
 2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
 3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
 4. Outdoor Source: Where the source of the separately derived system is located outside the building or structure supplied, provide connection to grounding electrode at source in accordance with NFPA 70.
 5. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
 6. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- G. Bonding and Equipment Grounding:

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1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) ground bus.
 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
 7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
 - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
 - b. Metal gas piping.
 8. Provide bonding for interior metal air ducts.
- H. Communications Systems Grounding and Bonding:
1. Provide bonding jumper in raceway from building grounding electrode system to each communications room or backboard and provide ground bar for termination.
 - a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
 - b. Raceway Size: 3/4-inch unless otherwise indicated or required.
 - c. Ground Bar Size: 1/4 by 4 by 12 inches unless otherwise indicated or required.
 - d. Ground Bar Mounting Height: 12-inches above finished floor unless otherwise indicated.

2.3 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.4 CONDUCTORS

- A. Equipment Grounding Conductors: Insulated with green-colored insulation. Sized in accordance with the 2011 NEC Table 250.122.
- B. Comply with UL 486A-486B.
- C. Grounding Electrode Conductors: For the main service and transformers within the building shall be bare stranded copper and shall be sized no smaller than that indicated on the drawings or, where not indicated, in accordance with 2011 NEC Table 250.66.
- D. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- E. Bare Copper Conductors:
 1. Solid Conductors: ASTM B 3.
 2. Stranded Conductors: ASTM B 8.
 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4-inch in diameter.
 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 5. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16-inch thick.
- F. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1/18 inches apart, unless otherwise indicated. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V Lexan or PVC, impulse tested at 5000 V.
- G. Bare Grounding Conductor and Conductor Protector for Wood Poles:
 1. No. 4 AWG minimum, soft-drawn copper.

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2. Conductor Protector: Half-round PVC or wood molding; if wood, use pressure treated fir, cypress, or cedar.

2.5 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions shall be equal to "Cadweld", manufactured by ERICO International Corporation.
- D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- E. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- H. Water Pipe Clamps:
 1. Mechanical type, two pieces with stainless-steel bolts.
 - a. Material: Tin-plated aluminum.
 - b. Listed for direct burial.
- I. U-bolt type with malleable-iron clamp and copper ground connector.

2.6 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel, 3/4 inch diameter by 10 feet.
 1. Backfill Material: Electrode manufacturer's recommended material.
- B. Chemical-Enhanced Grounding Electrodes: Copper tube, straight or L-shaped, charged with nonhazardous electrolytic chemical salts.
 1. Termination: Factory-attached No. #3/0 4/0 AWG bare conductor at least 48 inches long.
 2. Backfill Material: Electrode manufacturers recommended material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as shown on the drawings.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify existing conditions prior to beginning work.

3.2 APPLICATIONS

- A. Conductors in Raceways: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
 1. Bury at least 24-inches below grade.
 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

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1. Install bus on insulated spacers 2 inches minimum from wall, 6 inches above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Ground Rods not at Test Wells: Welded Connectors.
5. Connections to Structural Steel: Welded connectors.

3.3 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.4 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.

3.5 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.
- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.
- D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation. If concrete pad is for equipment supplied by the local Utility Company, comply with utility company's grounding standards.

3.6 EQUIPMENT GROUNDING

- A. Furnish and install a separate green insulated equipment grounding conductor for each single or three-phase feeder and each branch circuit with a two-pole or three-pole protective device. The required grounding conductor shall be installed in the same raceway with the related phase and/or neutral conductors. Where there are parallel feeders installed in more than one raceway, each raceway shall have a green insulated equipment ground conductor. Single-phase branch circuits required for 120 and 277 volt lighting, receptacles, and motors shall consist of phase and neutral conductors installed in a common metallic raceway, which shall serve as the grounding conductor. Flexible metallic conduit equipment connections utilized in conjunction with the above single-phase branch circuits shall be provided with suitable green insulated grounding conductors connected to grounding terminals at each end of the flexible conduit.

- B. The equipment grounding conductors and straps shall be sized in compliance with the NEC. All equipment grounding conductors shall be provided with green insulation equivalent to the insulation on the associated phase conductors. The related feeder and branch circuit grounding conductors shall be connected to the ground bus with pressure connectors. A feeder serving several panelboards shall have a continuous grounding conductor which shall be connected to each related cabinet ground bus.
- C. Provide insulated equipment grounding conductors with all feeders and branch circuits.
- D. Where ground conductors are shown on Drawings and for all feeders, the use of the metallic raceway in place of the ground conductor will not be permitted. Where PVC conduit is used, the contractor is responsible for installing a code sized ground conductor, whether shown or not.
- E. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- F. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
 - 1. Provide a No. 4 AWG minimum conductor in a 3/4-inch conduit from the ERB to a TMGB, located in the telecommunications entrance facility.
 - 2. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in 3/4-inch conduit from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location. When located in a room other than where the TMGB, or TGB is, provide a grounding busbar in the same room as the equipment. Bond the grounding busbar to the TMGB, or TGB with a No. 4 AWG minimum conductor.
 - 3. Service and Central Equipment Locations and Wiring Closets: Provide a TGB at each location. Where a telephone and data terminal is not in a wiring closet, provide a TGB next to it. Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus. Install 2-inches from wall and a minimum of 6-inches above finished floor unless otherwise noted.
 - 4. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
 - 5. Where a TMGB or TGB is in a room, the TMGB or TGB shall be kept completely electrically separate from the BGES. The only connection between the telecommunications grounding systems shall be at the main service entrance bonding location.
 - 6. For other communication equipment, such as fire alarm, intercom, CATV/IPTV, and security panels, when located in a room other than where the TMGB, or TGB is, provide a grounding busbar in the same room as the equipment. Bond the grounding busbar to the TMGB, or TGB with a No. 4 AWG minimum conductor in a 3/4-inch conduit.
- G. Electrical Power Panelboards: Where an electrical panelboard for telecommunications equipment is located in the same room or space, bond each TGB to the ground bar of the panelboard.
- H. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate ground conductor with green insulation in addition to grounding conductor installed with branch-circuit conductors to the lighting standard (pole). Ground conductor in conduit to ground stud. Connect to a corrosion-resistant ground stud or ground clamp furnished as part of the standard. Use exothermic welds. Make connections without exposing steel or damaging copper coating. The ground conductor shall originate and be run with the branch circuit wiring.
- I. Power Transformers: Provide system ground to building steel and bonding conductor to nearest water line serving the area per NEC or as scheduled, whichever is the larger conductor.
- J. All electrical outlets shall be connected from the device grounding terminal to the outlet box with No. 12 AWG green insulated conductor. This Contractor shall furnish and install a green screw terminal in the outlet box and a continuous green ground conductor from the green terminal screw to the grounding systems as indicated on the Drawings.
- K. Install a ground conductor in all sectional raceways with removable covers for access (e.g. plug-in strips, surface raceway systems, and wireways) unless specified otherwise. Size conductor in accordance with the NEC for the largest phase conductor size installed in raceway, or as indicated. Bond all sections of the raceway to the ground conductors. Connect all receptacle ground terminals in the raceway to the ground conductor, and make other ground connections shown on Drawings.

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- L. Telecommunications Enclosures and Equipment Racks: Bond metallic components of enclosures to the telecommunications bonding and grounding system. Install vertically mounted rack grounding busbar unless the enclosure and rack are manufactured with the busbar. Bond the equipment grounding busbar to the TGB No. 2 AWG bonding conductors.
- M. Rack- and Cabinet-Mounted Equipment: Bond powered equipment chassis to the cabinet or rack grounding bar. Power connection shall comply with NFPA 70; the equipment grounding conductor in the power cord of cord- and plug-connected equipment shall be considered as a supplement to bonding requirements in this Section.
- N. Coaxial cable
 - 1. Bond coaxial cable surge arrester to the ground or roof ring using bonding conductor size recommended by surge-arrester manufacturer.

3.7 INSTALLATION

- A. Comply with NECA 1.
- B. Comply with TIA-607-B.
- C. Provide the complete grounding of conduit systems, electrical equipment, conductor and equipment enclosures, motors, transformers, and neutral conductors in accordance with applicable codes. Grounded phase and neutral conductors shall be continuously identified. Continuity of metal raceways shall be insured by double locknuts.
- D. Main distribution system: Furnish and install a minimum No. 4 AWG bare copper ground conductor from the main distribution switchboard ground bus to the foundations and/or footings concrete-encased electrode rebar meeting the requirements of NEC 250.52(A)(3). The conductor shall be thermal welded to the concrete-encased electrode (rebar), using the proper style mold. Refer to the detail on the Drawings. Furnish and install an insulated ground conductor to the ground bus within the switchgear, to the neutral of the switchgear, and to all non-current carrying parts.
- E. Provide a secondary building ground bar to serve as part of the building grounding electrode system in each electric room and other utilitarian areas of the building where dry-type transformers will be located, and in each communication room and/or where telecommunications main distribution frames (MDF) and sub-distribution frames (SDF) will be located. A ground bar(s) shall also be located at the telephone and CATV service entrance demarcation point(s). The ground bar(s) shall be electro-tin plated copper, minimum size of 1/4" x 4" x 12" or larger sizes as shown on the Drawings or as required, with 3/8-inch plastic standoff insulators bolted to the wall. These ground bars shall be connected with a continuous No. #3/0 AWG bare copper ground conductor using high compression two (2) hole lugs. The No. #3/0 AWG green insulated copper conductor in an under slab raceway shall originate at the main switchboard ground bus (MSGB) to each building secondary ground bus (BSGB) unspliced to each of the ground bars. Each BSGB shall be bonded with at #3/0 AWG green insulated copper conductor to the nearest structural steel and copper water line in the area.
 - 1. In renovations only, with permission of the owner, this conductor can be run overhead as open cable. It shall be identified. Provide green tags on the ground conductors every fifty (50) feet or less. The tags shall identify the ground conductor as the building secondary grounding electrode system. Laminate tags and secure with tie wraps.
- F. Exterior electrical equipment enclosures with new concrete foundations and/or footings shall be provided with a bare copper ground conductor from the ground rods (if provided) and/or from the ground bus of the main panel within the enclosure to the concrete-encased electrode, meeting the requirements of NEC 250.52(A)(3), as shown on the Drawings. The conductor shall be thermal welded to the concrete-encased electrode (rebar), using the proper style mold. The enclosure, if metal, shall be bonded to the grounded electrode.
- G. Furnish and install main grounds for secondary electrical service to cold water main in accordance with NEC requirement. In addition to the cold water ground, provide ground rods as indicated or as required by NEC and applicable codes.

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- H. Secondary services shall be grounded on the "line" side in accordance with the NEC. The neutral disconnecting link, or links, shall be located so that the main distribution switchboard neutral bus with all interior secondary neutrals can be isolated from the common ground bus and the service entrance conductors.
- I. Install products in accordance with manufacturer's instructions.
- J. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- K. From the equipment ground bus in panelboards through raceways and flexible metallic conduit to ground terminal in a connection box mounted on three-phase motors, furnish and install a ground conductor sized as herein specified. Where the motor has a separate starter and disconnecting device, the ground conductor shall originate at the ground bus in the panelboard. Motors shall be bonded to each starter and disconnecting device enclosure.
- L. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- M. Ground Rods: Drive rods until tops are six (6)-inches below finished floor or final grade, unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
 - 2. For grounding electrode system, install six (6) ground rods, spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
 - 3. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
 - 4. Where encountered rock prohibits vertical installation, install at 45-degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70.
- N. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems" and shall be at least 12-inches deep, with cover.
 - 1. Install at least one (1) test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- O. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- P. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install 3/0 green insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use 3/0 braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each above ground portion of gas piping system downstream from equipment shutoff valve.

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- Q. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity. Provide a green insulated equipment ground conductor sized in accordance with the NEC based on the rating of the overcurrent device supplying the unit. This conductor shall be bonded to the ground bus in the associated panelboard.
- R. Bond all conductive metallic piping system in each mechanical equipment room as required by NEC 250-80/B. Minimum size of conductors as required by NEC. Locate all connections where access is unrestricted for inspection. Looping of conductor from one system to another is acceptable provided the conductor is without splice.
- S. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
 - 1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
 - 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.8 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" for instruction signs. The label shall be green with white text.
- B. Labels shall be preprinted or computer-printed type.
 - 1. Label TMGB(s) with "fs-TMGB," where "fs" is the telecommunications space identifier for the space containing the TMGB.
 - 2. Label TGB(s) with "fs-TGB," where "fs" is the telecommunications space identifier for the space containing the TGB.
- C. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.
 - 1. Label Text: "WARNING! TELECOMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT. IF THIS CONNECTOR OR CABLE IS LOOSE OR IF IT MUST BE REMOVED FOR ANY REASON, NOTIFY THE FACILITY MANAGER."

3.9 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: Ensure continuity of metallic raceway systems, boxes, and equipment.

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1. Circuits Greater than 250V to Ground: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, or where raceways connect to equipment or boxes with eccentric or concentric knockouts, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted and clamped-type connections between conductors and ground rods.
- F. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- H. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.10

FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturers Field Services: Engage a factory-authorized service representative to inspect, test and adjust components, assemblies, and equipment installations, including connections.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13.
- D. Perform the following tests and inspections and prepare test reports:
 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions
 3. Test completed grounding system at service disconnect enclosure grounding terminal, at ground test wells, and at service grounding rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 4. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- E. Grounding system will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.
- G. Report measured ground resistances that exceed the following values:
 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 4. Panelboards Serving Electronic Equipment: 1 ohm.
 5. Pad-Mounted Equipment: 5 ohms.
 6. Manhole Grounds: 10 ohms.
- H. Excessive Ground Resistance: If resistance to ground exceeds specified 5 ohms, notify Architect/Engineer promptly and include recommendations to reduce ground resistance.
- I. Submit detailed reports indicating inspection and testing results and corrective actions taken.

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END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
5. Fabricated metal equipment support assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
2. Include rated capacities and furnished specialties and accessories.

B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.
3. Equipment supports.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) if any, and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Suspended ceiling components.
2. Structural members to which hangers and supports will be attached.
3. Size and location of initial access modules for acoustical tile.

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- B. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Quality procedures and personnel according to AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame Rating: Class 1.
 - 2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch- (10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. ERICO International Corporation.
 - d. Flex-Strut Inc.
 - e. GS Metals Corp.
 - f. G-Strut.
 - g. Thomas & Betts Corporation; A Member of the ABB Group.
 - h. Unistrut; Part of Atkore International.
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 - 4. Channel Width: Selected for applicable load criteria 1-5/8 inches (41.25 mm).
 - 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

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- 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- 1) B-line, an Eaton business.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F 3125/F 3125M, Grade A325 (Grade A325M).
6. Toggle Bolts: Stainless-steel springhead type.
7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
1. NECA 1.
 2. NECA 101
 3. NECA 102.
 4. NECA 105.
 5. NECA 111.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

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- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 - 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

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- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete." And or Section 033053 "Miscellaneous Cast-in-Place Concrete."
- C. Anchor equipment to concrete base as follows:
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touchup: Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Metal wireways and auxiliary gutters.
4. Boxes, enclosures, and cabinets.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.

1.2 DEFINITIONS

A. GRC: Galvanized rigid steel conduit.

B. IMC: Intermediate metal conduit.

1.3 ACTION SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Coordinate installation of conduits indoors with other building existing systems such as lighting, duct-work, piping and etc.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Subject to compliance with requirements, provide products by one of the following:

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- a. AFC Cables Systems
 - b. Allied Tube & Conduit
 - c. Anamet Electric, Inc.
 - d. O-Z/Gedney; a brand of Emerson Industrial Automation
 - e. Republic Conduit
 - f. Southwire Company
 - g. Thomas & Betts Corporation
 - h. Western Tube and Conduit Corporation
 - i. Wheatland Tube Company
 - j. FSR, Inc
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 3. GRC: Comply with ANSI C80.1 and UL 6.
 4. IMC: Comply with ANSI C80.6 and UL 1242.
 5. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - a. Comply with NEMA RN 1.
 - b. Coating Thickness: 0.040 inch (1 mm), minimum.
 6. EMT: Comply with ANSI C80.3 and UL 797.
 7. FMC: Comply with UL 1; zinc-coated steel.
 8. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Metal Fittings:
1. Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cables Systems
 - b. Allied Tube & Conduit
 - c. Anamet Electric, Inc.
 - d. O-Z/Gedney; a brand of Emerson Industrial Automation
 - e. Republic Conduit
 - f. Southwire Company
 - g. Thomas & Betts Corporation
 - h. Western Tube and Conduit Corporation
 - i. Wheatland Tube Company
 - j. FSR, Inc
 2. Comply with NEMA FB 1 and UL 514B.
 3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 4. Fittings, General: Listed and labeled for type of conduit, location, and use.
 5. Fittings for EMT:
 - a. Material: Steel or die cast.
 - b. Type: compression.
 6. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 7. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- C. Joint Compound for IMC, or GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

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1. Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cables Systems
 - b. Allied Tube & Conduit
 - c. Anamet Electric, Inc.
 - d. O-Z/Gedney; a brand of Emerson Industrial Automation
 - e. Republic Conduit
 - f. Southwire Company
 - g. Thomas & Betts Corporation
 - h. Western Tube and Conduit Corporation
 - i. Wheatland Tube Company
 - j. FSR, Inc
 - k. RACO, Hubble
 - l. United Fiberglass
2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
4. LFNC: Comply with UL 1660.
5. Continuous HDPE: Comply with UL 651A.
6. RTRC: Comply with UL 2515A and NEMA TC 14.

B. Nonmetallic Fittings:

1. Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cables Systems
 - b. Allied Tube & Conduit
 - c. Anamet Electric, Inc.
 - d. O-Z/Gedney; a brand of Emerson Industrial Automation
 - e. Republic Conduit
 - f. Southwire Company
 - g. Thomas & Betts Corporation
 - h. Western Tube and Conduit Corporation
 - i. Wheatland Tube Company
 - j. FSR, Inc
 - k. RACO, Hubble
 - l. United Fiberglass
 - m. CANTEX, Inc
 - n. Electric-Flex Company
2. Fittings, General: Listed and labeled for type of conduit, location, and use.
3. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:
 1. B-line an Eaton Business
 2. Hoffman; a brand of Pentair Equipment Protection
 3. Mono Systems, Inc.
 4. Square-D
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 or Type 3R as indicated on the drawings, unless otherwise indicated, and sized according to NFPA 70.

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1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Subject to compliance with requirements, provide products by one of the following:
 1. Crouse-Hind, an Eaton Business
 2. EGS/Appleton Electric
 3. Erickson Electric Equipment Company
 4. FSR Inc.
 5. Hoffman; a brand of Pentair Equipment Protection
 6. Hubbell Incorporated
 7. Milbank Manufacturing Co
 8. Mono Systems, Inc.
 9. O-Z/Gedney
 10. RACO, Hubbell
 11. Spring City Electrical Manufacturing Company
 12. Thomas & Betts Corporation
 13. Topaz Electric
 14. Wiremold/LeGrand
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
- J. Gangable boxes are prohibited.
- K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 and/or Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- L. Cabinets:

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1. NEMA 250, Type 1 and/or Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: GRC.

B. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use compression fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

D. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

E. Do not install aluminum conduits.

F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C).

3.2 INSTALLATION

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.

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- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- H. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- I. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- J. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- K. Raceways Embedded in Slabs:
 - 1. Run all conduits, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- L. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- M. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- N. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- O. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- P. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- Q. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- R. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- S. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

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- T. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- U. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- V. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service raceway enters a building or structure.
 3. Conduit extending from interior to exterior of building.
 4. Conduit extending into pressurized duct and equipment.
 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 6. Where otherwise required by NFPA 70.
- W. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- X. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C) and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.00078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 3. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 4. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- Y. Flexible Conduit Connections: Comply with NEMA RV 3. Use where indicated on the plans.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- Z. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.
- AA. Locate boxes so that cover or plate will not span different building finishes.
- BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- DD. Set metal floor boxes level and flush with finished floor surface.

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EE. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Bands and tubes.
4. Tapes and stencils.
5. Tags.
6. Signs.
7. Cable ties.
8. Paint for identification.
9. Fasteners for labels and signs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

B. Samples: If requested, provide for each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

D. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ASME A13.1 and IEEE C2.

B. Comply with NFPA 70.

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- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70E and Section 260573.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Color for Neutral: White.
 - 4. Color for Equipment Grounds: Green.
- C. Raceways and Cables Carrying Circuits at More Than 600 V:
 - 1. Black letters on an orange field.
 - 2. Legend: "DANGER - CONCEALED HIGH VOLTAGE WIRING."
- D. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- E. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."
 - 3. Insert names and wording of warning signs or labels (for example, arc flash, multiple services and voltages, and others).
- F. Equipment Identification Labels:

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1. Black letters on a white field.
2. Insert specific requirements for equipment to be labeled, such as transformers, switchboards, panelboards, etc.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Brady Corporation.
- b. Champion America.
- c. emedco.
- d. Marking Services, Inc.
- e. Panduit Corp.
- f. Seton Identification Products.

B. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Brady Corporation.
- b. Marking Services, Inc.
- c. Panduit Corp.
- d. Seton Identification Products.

C. Self-Adhesive Wraparound Labels: Preprinted, 3-mil- (0.08-mm-) thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Brady Corporation.
- b. emedco.
- c. Ideal Industries, Inc.
- d. LEM Products Inc.
- e. Marking Services, Inc.
- f. Panduit Corp.
- g. Seton Identification Products.

2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.

3. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.

D. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil- (0.08-mm-) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Brady Corporation.
- b. emedco.

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- c. Grafoplast Wire Markers.
- d. Ideal Industries, Inc.
- e. LEM Products Inc.
- f. Marking Services, Inc.
- g. Panduit Corp.
- h. Seton Identification Products.

2. Minimum Nominal Size:

- a. 1-1/2 by 6 inches (37 by 150 mm) for raceway and conductors.
- b. 3-1/2 by 5 inches (76 by 127 mm) for equipment.
- c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches (50 mm) long, with diameters sized to suit diameters and that stay in place by gripping action.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Brady Corporation.
- b. HellermannTyton.
- c. Marking Services, Inc.
- d. Panduit Corp.

2.5 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Carlton Industries, LP.
- b. Champion America.
- c. HellermannTyton.
- d. Ideal Industries, Inc.
- e. Marking Services, Inc.
- f. Panduit Corp.

- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide; compounded for outdoor use.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Brady Corporation.
- b. Carlton Industries, LP.
- c. emedco.
- d. Marking Services, Inc.

- C. Tape and Stencil: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers placed diagonally over orange background and are 12 inches (300 mm) wide. Stop stripes at legends.

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1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. HellermannTyton.
 - b. LEM Products Inc.
 - c. Marking Services, Inc.
 - d. Seton Identification Products.

D. Underground-Line Warning Tape:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Ideal Industries, Inc.
 - c. LEM Products Inc.
 - d. Marking Services, Inc.
 - e. Reef Industries, Inc.
 - f. Seton Identification Products.
2. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
3. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
 - 1) Indicate the voltage either 15kV or 208V on the tape.

- E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

2.6 SIGNS

A. Baked-Enamel Signs:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Carlton Industries, LP.
 - b. Champion America.
 - c. emedco.
 - d. Marking Services, Inc.
2. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
3. 1/4-inch (6.4-mm) grommets in corners for mounting.
4. Nominal Size: 7 by 10 inches (180 by 250 mm).

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B. Metal-Backed Butyrate Signs:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Champion America.
 - c. emedco.
 - d. Marking Services, Inc.
2. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch (1-mm) galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
3. 1/4-inch (6.4-mm) grommets in corners for mounting.
4. Nominal Size: 10 by 14 inches (250 by 360 mm).

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

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- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment.
- K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- L. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
- M. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- N. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
- O. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- P. Self-Adhesive Labels:
 - 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
- Q. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.
- R. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- S. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
- T. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- U. Underground Line Warning Tape:

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1. During backfilling of trenches, install continuous underground-line warning tape directly above duct-banks at 12 inches (300 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.
2. Install underground-line warning tape for all, cables in raceways and duct-banks.

V. Baked-Enamel Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on minimum 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use signs minimum 2 inches (50 mm) high.

W. Metal-Backed Butyrate Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use labels 2 inches (50 mm) high.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels vinyl tape applied in bands.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels and or self-adhesive wraparound labels to identify the phase.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- E. Power-Circuit Conductor Identification, More Than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic preprinted tags colored and marked to indicate phase, and a separate tag with the circuit designation.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- G. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- H. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.

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1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- I. Locations of Underground Lines: Underground-line warning tape for power, and control wiring and optical-fiber cable.
- J. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- K. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels.
 1. Apply to exterior of door, cover, or other access.
 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- L. Arc Flash Warning Labeling: Self-adhesive labels.
- M. Operating Instruction Signs: Self-adhesive labels and or Baked-enamel warning signs.
- N. Emergency Operating Instruction Signs: Self-adhesive labels or Baked-enamel warning signs. with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer, etc.
- O. Equipment Identification Labels:
 1. Indoor Equipment: Self-adhesive label and or Baked-enamel signs.
 2. Outdoor Equipment: Laminated acrylic or melamine sign and or Stenciled legend 4 inches (100 mm) high.
 3. Equipment to Be Labeled: all indoor and outdoor equipment installed under this contract.

END OF SECTION

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LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Photoelectric switches.
 - 2. Indoor occupancy and vacancy sensors.
 - 3. Switchbox-mounted occupancy sensors.
 - 4. High-bay occupancy sensors.
 - 5. Emergency shunt relays.

- B. Related Requirements:
 - 1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For manufacturer's warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of lighting control software.
 - b. Faulty operation of lighting control devices.
 - 2. Warranty Period: Two year(s) from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 OUTDOOR PHOTOELECTRIC SWITCHES

- A. Description: Solid state, with SPST dry contacts rated for 1800 VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A, and compatible with ballasts and LED lamps.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lux), with an adjustment for turn-on and turn-off levels within that range.
 3. Time Delay: Fifteen-second minimum, to prevent false operation.
 4. Surge Protection: Metal-oxide varistor.
 5. Mounting: Twist lock complies with NEMA C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.
 6. Failure Mode: Luminaire stays ON.

2.2 INDOOR OCCUPANCY AND VACANCY SENSORS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
1. Cooper Controls, Inc.
 2. Watt Stopper.
 3. Sensor Switch, Inc.
 4. Philips Controls.
- B. General Requirements for Sensors:
1. Wall or Ceiling-mounted, solid-state indoor occupancy and vacancy sensors.
 2. Dual technology.
 3. Integrated or Separate power pack.
 4. Hardwired connection to switch.
 5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 6. Operation:
 - a. Occupancy Sensor: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - b. Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - c. Combination Sensor: Unless otherwise indicated, sensor shall be programmed to turn lights on when coverage area is occupied and turn them off when unoccupied, or to turn off lights that have been manually turned on; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - d. Plug load control: Unless otherwise indicated, turn designated receptacles on when coverage area is occupied, and turn them off when unoccupied with a time delay for turning receptacles off, adjustable over a minimum range of 1 to 15 minutes.
 7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
 8. Power: Line voltage.

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9. Power Pack: Dry contacts rated for 20-A LED load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 10. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 12. Bypass Switch: Override the "on" function in case of sensor failure.
 13. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lux); turn lights off when selected lighting level is present.
- C. Dual-Technology Type: Wall or Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
 4. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of 1000 square feet (110 square meters) when mounted 48 inches (1200 mm) above finished floor.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

- A. Products: Subject to compliance with requirements, provide one of the following:
1. Cooper Controls, Inc.
 2. Watt Stopper.
 3. Sensor Switch, Inc.
 4. Philips Controls.
- A. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and .
 2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).
 3. Switch Rating: Not less than 800-VA fluorescent at 120 V, 1200-VA fluorescent at 277 V, and 800-W incandescent.
- B. Wall-Switch Sensor Tag WS1:
1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft. (84 sq. m).
 2. Sensing Technology: Dual technology - PIR and ultrasonic.
 3. Switch Type: SP, field selectable automatic "on," or manual "on" automatic "off."
 4. Voltage: Match the circuit voltage dual technology type.

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5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

C. Wall-Switch Sensor Tag WS2:

1. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft. (84 sq. m).
2. Sensing Technology: PIR.
3. Switch Type: SP, field selectable automatic "on," or manual "on" automatic "off."
4. Voltage: Match the circuit voltage, dual-technology type.
5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

2.4 HIGH-BAY OCCUPANCY SENSORS

A. Products: Subject to compliance with requirements, provide one of the following:

1. Cooper Controls, Inc.
2. Watt Stopper.
3. Sensor Switch, Inc.
4. Philips Controls.

B. Description: Solid-state unit. The unit is designed to operate with the lamp and ballasts indicated.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operation: Turn lights on when coverage area is occupied, and to half-power when unoccupied; with a time delay for turning lights to half-power that is adjustable over a minimum range of 1 to 16 minutes.
3. Continuous Lamp Monitoring: When lamps are dimmed continuously for 24 hours, automatically turn lamps on to full power for 15 minutes for every 24 hours of continuous dimming.
4. Power: Line voltage.
5. Operating Ambient Conditions: 32 to 149 deg F (0 to 65 deg C).
6. Mounting: Threaded pipe.
7. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
8. Detector Technology: PIR.
9. Power and dimming control from the luminaire ballast that has been modified to include the dimming capacitor.

C. Detector Coverage: User selectable by interchangeable PIR lenses, suitable for mounting heights from 12 to 50 feet (3.7 to 15.2 m).

D. Accessories: Obtain manufacturer's installation and maintenance kit with laser alignment tool for sensor positioning and power port connectors.

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2.5 EMERGENCY SHUNT RELAY

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
1. Coope Controls, Inc.
 2. Lighting Control and Design.
 3. Watt Stopper.
 4. Philips Bodine.
- B. Description: Normally closed, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.
1. Coil Rating: 120 V.

2.6 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- C. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

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3.3 CONTACTOR INSTALLATION

- A. Comply with NECA 1.
- B. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.4 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.5 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Lighting control devices will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.7 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

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1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Lighting and appliance branch-circuit panelboards.

1.2 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. MCCB: Molded-case circuit breaker.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
 - 1. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details.
 - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
 - 3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
 - 4. Detail bus configuration, current, and voltage ratings.
 - 5. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 6. Include evidence of NRTL listing for SPD as installed in panelboard.
 - 7. Settings of individual overcurrent components.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

1.6 MAINTENANCE MATERIAL SUBMITTALS

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 or 9002 certified.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handle and prepare panelboards for installation according to NEMA PB 1.

1.9 FIELD CONDITIONS

- A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding minus 22 deg F (minus 30 deg C) to plus 104 deg F (plus 40 deg C).
 - b. Altitude: Not exceeding 6600 feet (2000 m).

- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

- C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Owner's written permission.
3. Comply with NFPA 70E.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: Five (5) years from date of Substantial Completion.

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.
- D. Enclosures: Surface-mounted, dead-front cabinets.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor and Wet Locations: NEMA 250, Type 3R.
 - 2. Height: 84 inches (2.13 m) maximum.
 - 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
 - 4. Finishes:
 - a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Galvanized steel
- E. Incoming Mains:
 - 1. Location: Convertible between top and bottom.
- F. Phase, Neutral, and Ground Buses:
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - a. Plating shall run entire length of bus.
 - b. Bus shall be fully rated the entire length.
 - 2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
 - 3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
- G. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Terminations shall allow use of 75 deg C rated conductors without derating.
 - 3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
 - 4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
 - 5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
- H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

1. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton.
 2. Square D; by Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: Circuit breaker.
- D. Branch Overcurrent Protective Devices: All circuit breakers shall be Bolt-on type.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton.
 2. Square D; by Schneider Electric.
- B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
 1. Thermal-Magnetic Circuit Breakers:
 - a. Instantaneous magnetic trip element for short circuits.
 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Breaker handle indicates tripped status.
 - c. UL listed for reverse connection without restrictive line or load ratings.
 - d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - e. Ground-Fault Protection: Relay and trip time-delay settings, push-to-test feature.

2.4 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Panelboard Name: Provide panelboard name and source panel as indicated on contract documents.
- C. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- D. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
 1. Provide typed directory referencing the actual loads and room numbers for the circuits; mark spare breakers as "spare" and bussed spaces as "space" in the directory. The directory shall list the panelboard name, and the name of the source panel. The contractor is liable for the accuracy of the directory regardless of the room numbers used on the contract documents.

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Comply with NECA 1.
- C. Install panelboards and accessories according to NEMA PB 1.1.
- D. Equipment Mounting:
 - 1. U.O.N Attach panelboard to the vertical finished or structural surface behind the panelboard.
- E. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.
- F. Mount panelboard cabinet plumb and rigid without distortion of box.
- G. Install filler plates in unused spaces.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
- C. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- D. Tests and Inspections:
- E. Panelboards will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as indicated. .
- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes. Prior to making circuit changes to achieve load balancing, inform Architect of effect on phase color coding.
 - 1. Measure loads during period of normal facility operations.
 - 2. Perform circuit changes to achieve load balancing outside normal facility operation schedule or at times directed by the Architect. Avoid disrupting services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
 - 3. After changing circuits to achieve load balancing, recheck loads during normal facility operations. Record load readings before and after changing circuits to achieve load balancing.
 - 4. Tolerance: Maximum difference between phase loads, within a panelboard, shall not exceed 20 percent.

3.6 PROTECTION

- A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard-grade receptacles, 125 V, 20 A.
2. GFCI receptacles, 125 V, 20 A.
3. Twist-locking receptacles.
4. Cord and plug sets.
5. Toggle switches, 120/277 V, 20 A.
6. Wall plates.
7. Floor service fittings.
8. Poke-through assemblies.

1.2 DEFINITIONS

- A. AFCI: Arc-fault circuit interrupter.
- B. BAS: Building automation system.
- C. EMI: Electromagnetic interference.
- D. GFCI: Ground-fault circuit interrupter.
- E. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- F. RFI: Radio-frequency interference.
- G. SPD: Surge protective device.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

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PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - 2. Devices shall comply with requirements in this Section.
- F. Devices for Owner-Furnished Equipment:
 - 1. Receptacles: Match plug configurations.
 - 2. Cord and Plug Sets: Match equipment requirements.
- G. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: Duplex convenience receptacles shall be white in color. Duplex computer receptacles shall be gray in color
- H. Wall Plate Color: For plastic covers, match device color.
- I. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

- A. Duplex Receptacles, 125 V, 20 A :
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Wiring Devices, Inc.
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
 - 2. Description: Two pole, three wire, and self-grounding.
 - 3. Configuration: NEMA WD 6, Configuration 5-20R.
 - 4. Standards: Comply with UL 498 and FS W-C-596.
- B. Weather-Resistant Duplex Receptacle, 125 V, 20 A :
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Wiring Devices, Inc.
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).

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2. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498.
5. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Duplex GFCI Receptacles, 125 V, 20 A :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Wiring Devices, Inc.
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Type: Feed through.
5. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

2.4 TWIST-LOCKING RECEPTACLES

A. Twist-Lock, Single Receptacles, 120 V, 20 A :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Wiring Devices, Inc.
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Configuration: NEMA WD 6, Configuration L5-20R.
3. Standards: Comply with UL 498.

B. Twist-Lock, Single Receptacles, 250 V, 20 A :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Wiring Devices, Inc.
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Configuration: NEMA WD 6, Configuration L6-20R.
3. Standards: Comply with UL 498.

2.5 CORD AND PLUG SETS

- A. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
- B. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
- C. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

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2.6 TOGGLE SWITCHES, 120/277 V, 20 A

A. Single-Pole Switches, 120/277 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Wiring Devices, Inc.
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Standards: Comply with UL 20 and FS W-S-896.

B. Three-Way Switches, 120/277 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Wiring Devices, Inc.
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Comply with UL 20 and FS W-S-896.

2.7 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished, Type 302 stainless steel.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

2.8 POKE-THROUGH ASSEMBLIES

A. Description: Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Wiring Devices, Inc.
2. Hubbell Incorporated; Wiring Device-Kellems .
3. Leviton Manufacturing Co., Inc.
4. Pass & Seymour/Legrand (Pass & Seymour)

C. Standards: Comply with scrub water exclusion requirements in UL 514.

D. Service-Outlet Assembly: Flush type with two simplex receptacles and space for two RJ-45 jacks, complying with requirements in Section 271513 "Communications Copper Horizontal Cabling."

E. Size: Selected to fit nominal 3-inch (75-mm) cored holes in floor and matched to floor thickness.

F. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.

G. Closure Plug: Arranged to close unused 3-inch (75-mm) cored openings and reestablish fire rating of floor.

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- H. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors and a minimum of two, four-pair cables that comply with requirements in Section 271513 "Communications Copper Horizontal Cabling."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
 - 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
 - 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
 - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 - 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
 - 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - 8. Tighten unused terminal screws on the device.
 - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
 - 1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the left.
 - 2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.

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- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:
 - 1. Install dimmers within terms of their listing.
 - 2. Verify that dimmers used for fan-speed control are listed for that application.
 - 3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.
- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, Ptouch, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments that comply with UL 1436.
- B. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- C. Perform the following tests and inspections:
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- D. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 3. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 4. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- E. Wiring device will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION

SECTION 26 51 19
LED INTERIOR LIGHTING

PART 1 - PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior solid-state luminaires that use LED technology.
2. Lighting fixture supports.

B. Related Requirements:

1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.2 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaires.
4. Include emergency lighting units, including batteries and chargers.
5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project.

B. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

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1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.6 QUALITY ASSURANCE

- A. Provide luminaires from a single manufacturer for each luminaire type.
- B. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- D. Recessed Fixtures: Comply with NEMA LE 4.
- E. Bulb shape complying with ANSI C79.1.
- F. Lamp base complying with ANSI C81.6 or IEC 60061-1.
- G. CRI of minimum 80 < . CCT of 3500 K .

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- H. Rated lamp life of 50,000 hours.
- I. Lamps dimmable from 100 percent to 10 percent of maximum light output.
- J. Internal driver.
 - 1. Listed with UL, certified by Electronic Testing Laboratories
 - 2. Efficiency: Higher than 90%.
 - 3. Power Factor: 0.90 or above.
 - 4. Sound rating: Class A per UI 935-84.
 - 5. RFI/EMI: Comply with FCC Title 47 CFR Part 18.
 - 6. THD: less than 10%.
 - 7. Transient Voltage Protection: Comply with IEEE C62.41.1 and IEEE C62.41.2.
- K. Nominal Operating Voltage: 277 V ac.
 - 1. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
- L. Housings:
 - 1. Extruded-aluminum housing and heat sink.
 - 2. Clear anodized finish.

2.2 DOWNLIGHT

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:
 - 1. As indicated on drawings.
- B. Minimum 1,000lumens. Minimum allowable efficacy of 80 lumens per watt.
- C. Universal mounting bracket.
- D. Integral junction box with conduit fittings.

2.3 HIGHBAY, LINEAR

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:
 - 1. As indicated on drawings.
- B. Minimum 10,000 lumens. Minimum allowable efficacy of 80 lumens per watt.

2.4 LINEAR INDUSTRIAL

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:
 - 1. As indicated on drawings.
- B. Minimum 5,000 lumens. Minimum allowable efficacy of 80 lumens per watt.

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C. Housing and heat sink rated to the following:

1. Class 1, Division 2 Group(s) ABCandD.
2. NEMA 4X.
3. IP 54.
4. IP 66.
5. Marine and wet locations.
6. CSA C22.2 No 137.

2.5 LOWBAY

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

1. As indicated on drawings.

B. Minimum 5,000 lumens. Minimum allowable efficacy of 80 lumens per watt.

C. Universal mounting bracket.

2.6 RECESSED LINEAR

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

1. As indicated on drawings.

B. Minimum 13,000 lumens. Minimum allowable efficacy of 85 lumens per watt.

C. Integral junction box with conduit fittings.

2.7 STRIP LIGHT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

1. As indicated on drawings.

B. Minimum 750 lumens. Minimum allowable efficacy of 75 lumens per watt.

C. Integral junction box with conduit fittings.

2.8 SURFACE MOUNT, LINEAR

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

1. As indicated on drawings.

B. Minimum 750 lumens. Minimum allowable efficacy of 75 lumens per watt.

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- C. Integral junction box with conduit fittings.

2.9 SURFACE MOUNT, NONLINEAR

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

- 1. As indicated on drawings.

- B. Minimum 750 lumens. Minimum allowable efficacy of 75 lumens per watt.

- C. Integral junction box with conduit fittings.

2.10 SUSPENDED, LINEAR

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

- 1. As indicated on drawings.

- B. Minimum 3,000 lumens. Minimum allowable efficacy of 85 lumens per watt.

2.11 SUSPENDED, NONLINEAR

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but not limited to the following:

- 1. As indicated on drawings.

- B. Minimum 3,000 lumens. Minimum allowable efficacy of 85 lumens per watt.

- C. Integral junction box with conduit fittings.

2.12 MATERIALS

- A. Metal Parts:

- 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.

- B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

- C. Diffusers and Globes:

- 1. Tempered Fresnel glass
 - 2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 3. Glass: Annealed crystal glass unless otherwise indicated.

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4. Lens Thickness: At least **0.125 inch (3.175 mm)** minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Clearanodized finish.

E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:

- a. "USE ONLY" and include specific lamp type.
- b. Lamp diameter, shape, size, wattage, and coating.
- c. CCT and CRI for all luminaires.

2.13 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.14 LUMINAIRE FIXTURE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: **1/2-inch (13-mm)** steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, **12 gage (2.68 mm)** .

D. Rod Hangers: **3/16-inch (5-mm)** minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting.

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3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaire Support:
 - 1. Secured to outlet box.
 - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 - 3. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaire Support:
 - 1. Attached to structural members in walls .
 - 2. Do not attach luminaires directly to gypsum board.
- G. Ceiling-Mounted Luminaire Support:
 - 1. Ceiling mount with two **5/32-inch- (4-mm-)** diameter aircraft cable supports adjustable to **120 inches (6 m)** in length .
 - 2. Ceiling mount with pendant mount with **5/32-inch- (4-mm)** diameter aircraft cable supports adjustable to **120 inches (6 m)** in length .
 - 3. Ceiling mount with hook mount.
- H. Suspended Luminaire Support:
 - 1. Pendants and Rods: Where longer than **48 inches (1200 mm)**, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 - 3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
 - 4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- I. Ceiling-Grid-Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

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3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

- B. Luminaire will be considered defective if it does not pass operation tests and inspections.

- C. The minimum illumination levels shall be met based on the latest Illuminating Engineers Society (IES) guidelines, refer below for space type and area ambient illumination levels (foot-candles)

- | | | |
|----|---------------------------|-------|
| 1. | Office – Open and Private | 40 fc |
| 2. | Workrooms | 30 fc |
| 3. | Conference Room | 50 fc |
| 4. | Pantry | 65 fc |
| 5. | Private toilet | 30 fc |
| 6. | Group toilet | 40 fc |
| 7. | Corridors | 20 fc |
| 8. | Mechanical/Electrical rm | 50 fc |
| 9. | Meeting Room | 30 fc |

END OF SECTION

SECTION 26 52 13

EMERGENCY AND EXIT LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Emergency lighting.
 2. Exit signs.
 3. Materials.
 4. Luminaire support components.

1.2 DEFINITIONS

- A. Correlated Color Temperature (CCT): The absolute temperature, measured in kelvins, of a blackbody whose chromaticity most nearly resembles that of the light source.
- B. Color Rendering Index (CRI): Measure of the degree of color shift that objects undergo when illuminated by the light source as compared with the color of those same objects when illuminated by a reference source.
- C. Emergency Lighting Unit: A lighting unit with internal or external emergency battery powered supply and the means for controlling and charging the battery and unit operation.
- D. Lumen (lm): The SI derived unit of luminous flux equal to the luminous flux emitted within a unit solid angle by a unit point source (1 lm = 1 cd-sr).

1.3 ACTION SUBMITTALS

- A. Product Data:
1. For each type of emergency lighting unit, exit sign, and emergency lighting support.
 - a. Include data on features, accessories, and finishes.
 - b. Include physical description of unit and dimensions.
 - c. Battery and charger for light units.
 - d. Include life, output of luminaire (lumens, CCT, and CRI), and energy-efficiency data.
 - e. Include photometric data and adjustment factors based on laboratory tests by, or under supervision of, qualified luminaire photometric testing laboratory, for each luminaire type.
- B. Shop Drawings:
1. For nonstandard or custom luminaires.
 - a. Include plans, elevations, sections, and mounting and attachment details.

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- b. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- c. Include diagrams for power, signal, and control wiring.

C. Product Schedule:

- 1. For emergency lighting units.
- 2. For exit signs.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of luminaire.
- B. Product Test Reports: For each luminaire for tests performed by, or under supervision of, qualified luminaire photometric testing laboratory.
- C. Sample Warranty: For manufacturer's warranty.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.

1.6 QUALITY ASSURANCE

- A. Mockups: For interior luminaires in room or module mockups, complete with power and control connections.
 - 1. Obtain Architect's approval of luminaires and signs in mockups before starting installations.
 - 2. Maintain mockups during construction in an undisturbed condition as a standard for judging completed Work.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 WARRANTY

- A. Special Installer Extended Warranty for Emergency and Exit Lighting: Installer warrants that fabricated and installed emergency luminaires and exit signs, including batteries, perform in accordance with specified requirements and agrees to repair or replace components and assemblies that fail to perform as specified within extended warranty period.

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1. Extended Warranty Period: Two year(s) from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- A. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70 and UL 924, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- B. Comply with NFPA 101.
- C. Comply with NEMA LE 4 for recessed luminaires.
- D. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body.
 1. Emergency Connection: Operate one lamp(s) continuously at an output of 1100 lumens each upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.
 2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 3. Nightlight Connection: Operate lamp continuously at 40 percent of rated light output.
 4. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.
 - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 5. Battery: Sealed, maintenance-free, nickel-cadmium type.
 6. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
 7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.2 EMERGENCY LIGHTING

- A. General Characteristics: Self-contained units.
- B. Emergency Luminaire :
 1. Options:
 - a. Operating at nominal voltage of 120 V(ac).
 - b. Internal emergency power unit.
 - c. Rated for installation in damp locations, and for sealed and gasketed luminaires in wet locations.
 - d. UL 94 5VA flame rating.

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2.3 EXIT SIGNS

- A. General Characteristics: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

- B. Internally Lighted Sign:
 - 1. Options:
 - a. Operating at nominal voltage of 120 V(ac).
 - b. Lamps for AC Operation:
 - 1) LEDs; 50,000 hours minimum rated lamp life.

2.4 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components must be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.

- B. Doors, Frames, and Other Internal Access:
 - 1. Smooth operating, free of light leakage under operating conditions.
 - 2. Designed to permit relamping without use of tools.
 - 3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

- C. Housings:
 - 1. Extruded aluminum housing.
 - 2. Clear anodized finish.

- D. Conduit: EMT, minimum metric designator 21 (trade size 3/4).

2.5 METAL FINISHES

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.6 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

- B. Support Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 0.106 inch (2.69 mm) .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of luminaires.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Examine walls, floors, roofs, and ceilings for suitable conditions where emergency lighting luminaires will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- B. Install lamps in each luminaire.
- C. Supports:
 - 1. Sized and rated for luminaire and emergency power unit weight.
 - 2. Able to maintain luminaire position when testing emergency power unit.
 - 3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices must be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.
- D. Wall-Mounted Luminaire Support:
 - 1. Attached to structural members in walls.
 - 2. Do not attach luminaires directly to gypsum board.
- E. Suspended Luminaire Support:
 - 1. Pendants and Rods: Where longer than **48 inch (1200 mm)**, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 - 3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
 - 4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- F. Ceiling Grid Mounted Luminaires:
 - 1. Secure to outlet box, if provided.
 - 2. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

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3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Field tests and inspections must be witnessed by authorities having jurisdiction.
- B. Tests and Inspections:
 - 1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- C. Nonconforming Work:
 - 1. Luminaire will be considered defective if it does not pass operation tests and inspections.
 - 2. Remove and replace defective units and retest.
- D. Prepare test and inspection reports.
- E. Manufacturer Services:
 - 1. Engage factory-authorized service representative to support field tests and inspections.

3.5 SYSTEM STARTUP

- A. Perform startup service:
 - 1. Charge emergency power units minimum of one hour and depress switch to conduct short-duration test.
 - 2. Charge emergency power units minimum of 24 hours and conduct one-hour discharge test.

3.6 ADJUSTING

- A. Adjustments: Within 12 months of date of Substantial Completion, provide on-site visit to do the following:
 - 1. Inspect luminaires. Replace lamps, emergency power units, batteries, exit signs, and luminaires that are defective.
 - a. Parts and supplies must be manufacturer's authorized replacement parts and supplies.
 - 2. Conduct short-duration tests on all emergency lighting.

3.7 PROTECTION

- A. Remove and replace luminaires and exit signs that are damaged or caused to be unfit for use by construction activities.

END OF SECTION

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SECTION 28 31 11
DIGITAL ADDRESSABLE FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manual fire-alarm boxes.
2. System smoke detectors.
3. Air-sampling smoke detectors.
4. Audio/visual alarm notification appliances.
5. Auxiliary NAC power supplies.
6. Device guards.
7. Plenum Cabling (in red colored EMT conduit).
8. System programming.
9. System testing.

B. Related Requirements:

1. Refer to Division 08 Section "Door Hardware".
2. Refer to Division 26 Section "Hangers and Supports for Electrical Systems".
3. Refer to Division 26 Section "Raceways and Boxes for Electrical Systems for conduits and boxes used for Digital Addressable Fire Alarm System.
4. Refer to Division 28 Section, "Conductors and Cables for Electronic Safety and Security" for cables and conductors for Digital Addressable Fire Alarm System.

1.2 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
B. FACP: Fire Alarm Control Panel.
C. HLI: High Level Interface.
D. LED: Light-emitting diode.
E. NICET: National Institute for Certification in Engineering Technologies.
F. PC: Personal computer.
G. POTS: Plain Old Telephone Service.

1.3 APPLICABLE STANDARDS

A. The following standards and guides (of the issue indicated) are hereby made a part of this work by reference thereto.

1. International Building Code, 2015 edition
2. NFPA 70 - National Electrical Code, 2014edition.
3. NFPA 72 - National Fire Alarm Code, 2013 edition.
4. NFPA 90A, Air Conditioning and Ventilation Systems,
5. NFPA 101 – Life Safety Code, 2015edition.
6. UL Standard 38, Manually Activated Signaling Devices, 2008 edition.
7. UL Standard 228, Door Closers-Holders, With or Without Integral Smoke Detectors, 2006 edition.
8. UL Standard 268, Smoke Detectors for Fire Protective Signaling Systems, 2009 edition.
9. UL Standard 268A, Smoke Detectors for Duct Application, 2008 edition.
10. UL Standard 346, Waterflow Indicators for Fire Protective Signaling Systems, 2005 edition.
11. UL Standard 464, Audible Signal Appliances, 2009 edition.
12. UL Standard 521, Heat Detectors for Fire Protective Signaling Systems, 1999 edition.
13. UL Standard 864, Control Units for Fire Protective Signaling Systems, 2014 edition.
14. UL Standard 1424, Cables for Power-Limited Fire Protective Signaling Systems, 2005 edition.
15. UL Standard 1481, Power Supplies for Fire Protective Signaling Systems, 2006 edition.
16. UL Standard 1638, Visual Signaling Appliances, 2001 edition.
17. Americans with Disabilities Act Accessibility Guidelines (ADAAG), 2010 edition.

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18. American Society of Mechanical Engineers (ASME)/American National Standards
19. Institute (ANSI) A17.1, Elevator Code, 2007 edition.
20. American National Standards (ANSI) A117.1, Accessibility Code, 2009 edition.

1.4 GENERAL CONDITIONS

- A. Division 01 General Requirements of the specifications shall apply to the work in this Section.
- B. The Contractor shall furnish all equipment, materials, tools, labor, engineering, drawings, necessary for a complete point addressable fire alarm system with the system made ready for operation in accordance with the requirements of these specifications and associated drawings. The purpose of these specifications and drawings is to convey to the Contractor the scope of work required, all of which the Contractor is responsible to furnish, install, adjust, and make operable.

1.5 SUMMARY

- A. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
- B. Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.
- C. The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:
 1. Fire alarm system detection and notification operations.
 2. Control and monitoring of elevators, door hold-open devices, and other equipment as indicated in the drawings and specifications.

1.6 SCOPE OF WORK

- A. Provide labor, materials, and equipment for a complete and functional fire alarm and supervisory signaling system as outlined in these specifications and shown on the drawings.
- B. The guidelines are not intended to be all-inclusive and do not limit or define the Contractor's Scope of Work. The work includes the following:
 1. Furnishing and installing point addressable fire alarm control equipment, power supplies, alarm initiating devices and indicating peripheral, notification appliances, remote graphic annunciators, backboxes, outlet boxes, red conduit, red j-boxes with red colored covers, line and low voltage wiring, switches, relays, software and all required accessories, to provide a complete fire alarm system throughout the building.
All devices shall be new.
 2. Installing conduit and wiring necessary for a complete system. All conduit and wiring shall be hidden from view, except in areas of open structure.
 3. Core drilling and firestopping as required.
 4. Cutting and patching as required.
 5. Submission of detailed shop drawings and submittal information.
 6. Coordination of the work with other trades.
 7. Providing on-site project supervision.
 8. All permits, fees, and other charges required for the work.
 9. Providing Record Documents upon completion of the project.
 10. Providing operating and maintenance manuals including instructions for the use of all devices and equipment utilized on the project.
 11. Providing training of designated Owner's personnel.
 12. Conducting final system testing as required by the applicable Standards and the AHJ.
 13. Providing a warranty for all equipment and labor.

1.7 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm raceways shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

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1.8 ACCEPTABLE EQUIPMENT AND SERVICE PROVIDERS

- A. Manufacturers: The equipment and service described in this specification are those supplied and supported by NOTIFIER ONYX Series NFS2-3030 and represent the base bid for the equipment. No substitutions accepted.
- B. The equipment and service provider shall be a nationally recognized, factory authorized dealer and installer (Notifier) company specializing in fire alarm and detection systems. This provider shall employ factory trained and NICET Level III, and IV certified technicians, and shall maintain a service organization within 50 miles of this project location. The equipment and service provider shall have a minimum of 10 years' experience in the fire protective signaling systems industry.

1.9 SYSTEM DESCRIPTION

- A. The digital addressable fire alarm system shall comply with requirements of NFPA 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall contain a microprocessor based Central Processing Unit (CPU) and power supply. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, annunciators, and other system controlled devices and electrically supervised and monitor the integrity of all conductors, non-coded addressable system, with automatic sensitivity control of certain smoke detectors and multiplexed signal transmission, dedicated to fire-alarm service only.
- B. All circuits requiring system-operating power shall be 24 VDC nominal voltage and shall be individually fused at the control unit.
- C. The incoming power to the system shall be supervised so that any power failure will be indicated at the control unit. A green "power on" LED shall be displayed continuously at the user interface while incoming power is present.
- D. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (emergency generator) power conditions.
- E. Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate
- F. Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
- G. Supervise all initiating signaling and notification circuits throughout the facility by way of connection to addressable monitor and control modules.
- H. The audible alarm notification appliances shall provide a sound pressure level of 15 dbA above the ambient sound level or 5 dbA above the maximum sound level having a duration of at least 60 seconds, whichever is greater.
- I. Provide a smoke detector protecting each fire alarm control unit, notification appliance circuit power extenders, and supervising station transmitting equipment per NFC 72 907.41
- J. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for Fire Alarm applications and the installation shall be in compliance with the UL listing.
- K. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final checkout and to ensure the systems integrity.

1.10 SUBMITTALS

- A. Comply with Division 01 Section "Submittals Procedures".
- B. Prior to formal submittal process, there shall be a mandatory pre-submittal meeting, to review and discuss proposed submittal data. Attendees are to be the General Contractor, Architect, Electrical Engineer, Owner's representative, Owner's Department of Safety and Security, Owner's maintenance representative, Fire Alarm and detection contractor, electrical contractor, mechanical contractor, temperature control contractor, and EMS contractor.
- C. Submittals not containing all information listed in this section shall be rejected.
- D. This Contractor shall submit detailed drawings indicating the Digital Addressable Fire Alarm System locations for this Project to the Authority Having Jurisdiction for review and approval no later than 60 days after notice to proceed has been issued to the General Contractor. Any additional devices required by the Authority Having Jurisdiction (AHJ) during the plan review and approval process and any additional work and associated costs (labor and materials, etc.) required to add additional devices shall be the responsibility of the Contractor.
- E. General Submittal Requirements:
 - 1. Submit the following according to Conditions of the Contract and Section 01 "Submittal Procedures".

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2. Initial submittal of complete Shop Drawings must be submitted to Architect within sixty (60) days from date of Award of Contract or Notice to Proceed; otherwise the Digital Addressable Fire Alarm System contractor is considered to be in default and is subject to termination of subcontract or order.
 3. Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification.
 4. Wiring diagrams from manufacturer. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
 5. Shop Drawings showing system details including location of FACP, all devices, device location identification, circuiting, and details of the graphic annunciator.
 6. System power and battery charts with performance graphs and voltage drop calculation for each notification appliance circuit to assure that the system will operate per the prescribed back-up time periods and under all voltage conditions per UL and NFPA standards.
 7. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of input and output points in the system shall be provided.
 8. Submission to Authority Having Jurisdiction: In addition to submission of the above material to the Authority Having Jurisdiction per 1.4.B above, make an identical submission to the Architect/Engineer. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the AHJ, make resubmissions (if required) to make clarifications or revisions to obtain AHJ final approval. Submittals shall be prepared in accordance with contract specifications, NFPA 72-2013.
- F. Product Data: For each type of product indicated, including furnished options and accessories.
1. A complete list by model number of each component of the system with a statement of quantity of each model are to be furnished and a listing of the specific data sheet.
 2. A description of the system as it functions by component in the system using model numbers where applicable.
 3. Include construction details, material descriptions, dimensions, profiles, and finishes.
 4. Include rated capacities, operating characteristics, and electrical characteristics.
 - a. Audio/visual alarm notification appliances.
 - b. Auxiliary NAC power supplies.
 - c. Digital communicator.
 - d. Automatic detection devices.
 - e. Manual alarm initiating devices.
 - f. Addressable relays, control and monitoring devices.
 - g. System cabling.
 - h. List of all system program points with device ID.
 5. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
- G. Descriptive Data for Each Product:
1. To verify specifications have been met/exceeded.
 2. Clearly indicate or state all options, etc.:
 - a. Manufacturer and catalogue number.
 - b. Manufacturer's options.
 - c. Accessories.
 - d. Indicate point of connections with other equipment or systems.
 - e. Bill of materials showing quantities and model numbers.
 - f. Manufacturer's data on all proposed equipment.
 - g. Highlight or clearly indicate all items to be provided.
 - h. Catalogued by the control system manufacturer.
 - i. UL listing of each component individually.
 - j. UL listed for use in proposed system.
 - k. Approved by local Fire Marshal, or other local authority, where required.
 - l. Combined components of several manufacturers are not permitted unless proof of UL approval with the proposed control panel is provided.

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- H. System Information:
1. Device schedule matrix indicating all devices and conditions down left side, and all functions across top. Fill in matrix to indicate functions, responses, etc. associated with each device or condition.
 2. Device address list.
 3. Written sequence of operation for all modes:
 - a. Alarm conditions.
 - b. Trouble conditions.
 - c. Supervisory signal conditions.
 - d. Manual switch functions (i.e. HVAC shutdown).
 - e. Other functions (Drill, Reset, etc.).
 - f. Digital Communicator functions.
- I. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, calculations, and attachments to other work.
1. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified fire-alarm technician, Level III minimum.
 - c. Licensed or certified by authorities having jurisdiction (AHJ).
 - d. Signed and sealed by qualified professional engineer licensed in the state of Maryland.
 2. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
 3. Include plans, elevations, sections, details, calculations, and attachments to other work. Include details of equipment assemblies.
 4. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
 5. Detail assembly and support requirements, including temporary supports.
 6. Include voltage drop calculations for notification appliance circuits (NAC). Load visual NAC's to a maximum of 60% capacity to allow for additional devices or resetting candela output of devices provided.
 7. Include battery-size calculations for each control panel and power supply. Load batteries to a maximum of 60% capacity to allow for additional devices or resetting candela output of devices provided.
 8. A complete battery calculation listed by module for the system.
 9. The rated wattage of the speakers.
 10. The ambient sound-pressure level used as the basis of design.
 11. Include input/output matrix.
 12. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
 13. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 14. Include the location of each smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the detector. Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72.
 15. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 16. Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.
 17. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring required for HVAC unit shut down on alarm.

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- c. Show field wiring and equipment required for HVAC unit shut down on alarm and override by firefighters' control system.
 - d. Locate detectors according to manufacturer's written recommendations.
 - e. Show air-sampling detector pipe routing.
18. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
19. Include alarm signaling service equipment rack or console layout, grounding schematic, amplifier power calculation, and single line connection diagram.
20. Scaled floor plans of each building level to indicate locations and type of all proposed devices showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.
21. Include 1/8" = 1'-0" scale floor plans to indicate final locations of all equipment and devices showing address of each addressable device and their required interconnections. The interconnections shall indicate the system's manufacturer recommended size and types of wires and route of cable and conduits. The plans shall show the locations of all required control and monitor modules and their addresses. The layout of all fire detection and alarm system equipment, devices, conduit routing shall closely follow that shown on the drawings.
22. Include riser diagram. Include device addresses, conduit sizes, cable and wire type and sizes.
23. A detailed drawing shall be furnished of each type of device in the system stating its program function in the system.
24. A detailed list shall be furnished of the relays in the system and their program function.
- J. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer registered in the state of Maryland responsible for their preparation.
- 1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
 - 2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
 - 3. Indicate audible appliances required to produce square wave signal per NFPA 72.
- K. Classification of the supervising station.
- L. Details of ceiling height and construction.
- M. Classification of the supervising station.
- N. All plans and shop drawings shall use the symbols identified in NFPA 170, Standard for Fire Safety and Emergency Symbols.

1.11

INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer, a factory authorized installer is to perform the work of this section.
- B. Field quality-control reports.
- C. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Sample Warranty: Provide example of warranty.

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1.12 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01, Section "Operation and Maintenance Data," include the following:
1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 2. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
 3. Owners' Instructions and Operation Manuals, specific for this project, shall be supplied to the Building Operations Staff by the Factory Trained and Authorized Fire Alarm Vendor. A "Generic" or "Typical" Owners' Instruction and Operation Manual shall not be acceptable to fulfill this requirement.
 4. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
 5. Riser diagram.
 6. Device address list including plain text descriptions/locations.
 7. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
 8. Record copy of site-specific software.
 9. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a. Equipment tested.
 - b. Frequency of testing of installed components.
 - c. Frequency of inspection of installed components.
 - d. Requirements and recommendations related to results of maintenance.
 - e. Manufacturer's user training manuals.
 10. Manufacturer's required maintenance related to system warranty requirements.
 11. Abbreviated operating instructions for mounting at Fire Alarm control unit.
 12. Name, address, email, phone number of the factory authorized representative.

1.13 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Fire Alarm and Detection System Installer: The General Contractor will submit to the Owner for review, selection, and approval the names of several firms with at least five (5) years of successful installation experience with projects similar to the requirements for this project. Submit qualification documentation prior to pre-submittal meeting. Any firm, which has been determined to have provided unsatisfactory past installations, will not be acceptable.
 2. Supplier shall be a fully authorized local distributor of this equipment, responsible for proper installation, supervision and inspection as installation progresses.
 3. The installation shall be in accordance with all requirements of NFPA, the NEC, ADAAG, and all state and local requirements. A factory-authorized installer is to perform the work of this section.
 4. All installers must have minimum NICET Level II certification and perform installation, adjustments and tests, and final connections of the system.
 5. Personnel specifically trained and certified under the manufacturer's installation training program, including assign installation project resources in a manner which utilizes certified personnel for each and every project manager and foreman/supervisor position associated with providing services to meet these installation requirements. Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
 - a. Installation and all connections shall be made by authorized distributor.
 - b. Fire Alarm Trade shall submit "Letter of Certification" and proof of continuing education.

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- c. The contractor for this section of the work shall be certified in all aspects of the installation.
 - d. Provide a list of certified personnel and a copy of the appropriate certification documentation for each person involved in the work.
6. Installation shall be supervised by personnel certified by NICET as Fire-Alarm Level III technician.
- B. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Installation trade shall be employed by manufacturer's authorized distributor. Components shall be compatible with, and operate as, an extension of existing system.
 - C. Non-coded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation.
 - D. Automatic sensitivity control of certain smoke detectors.
 - E. All components provided shall be listed for use with the selected system.
 - F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - G. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "UL" label. All control equipment is to be listed under UL Category UOJZ as a single control unit. Partial listing shall NOT be acceptable.
 - H. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL. Certification shall be submitted verifying the Fire Alarm Trade is the manufacturer's authorized dealer and the installer has NICET certified personnel (indicate NICET levels) and whose local project office is listed in the UL "Fire Protection Equipment Directory".
 - I. Refer to Division 01 "Product Requirements". Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's, installers, suppliers, or producer's etc. nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

1.14 CONTRACTOR COORDINATION

- A. Nomenclature for final room names and numbers may vary from the construction documents. Final names and numbers used in the shop drawings shall be coordinated with final room names and numbers assigned by the Owner and Architect.
- B. Fire Alarm contractor shall coordinate their work with all other trades prior to fabrication of systems and commencement of installation. It shall be the responsibility of the electrical contractor to review the work of other trades (including, but not limited to structural, architectural, food service, special equipment, fire suppression, plumbing, HVAC, and electrical) as it affects their work, and as their work affects other trades, to insure that the construction documents are closely followed and conflicts are avoided. Where discrepancies arise, they shall be referred to the Architect/Engineer for resolution before proceeding with the Work.

1.15 DELIVERY, HANDLING AND STORAGE

- A. Deliver Fire Alarm and detection equipment and components in factory-fabricated containers or wrappings, which properly protect the equipment from damage.
- B. Store Fire Alarm and detection equipment and components in original packaging. Store inside a well-ventilated space protected from weather, moisture, soiling, humidity, and extreme temperatures.
- C. Handle Fire Alarm and detection equipment and components carefully to prevent damage, breaking, and scoring of finishes. Do not install damaged units or components, replace with new.

1.16 SOFTWARE AND FIRMWARE OPERATION DOCUMENTATION WITH SERVICE AGREEMENT

- A. The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary.
- B. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.

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- C. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.
- D. Panels shall be capable of full system operation during new site specific configuration download, master exec downloads, and slave exec downloads.
- E. Remote panel site-specific software and executive firmware downloads shall be capable of being performed over proprietary fire alarm network communications and via TCP/IP Ethernet network communications. Ethernet access to any fire alarm panel shall be capable of providing access only to authenticated users through a cryptographically authenticated and secure SSL tunnel.
- F. Panels shall automatically store all program changes to the panel's non-volatile memory each time a new program is downloaded. Panels shall be capable of storing the active site-specific configuration program and no less than nine (9) previous revisions in reserve. A compare utility program shall also be available to authorized users to compare any two of the saved programs. The compare utility shall provide a deviation report highlighting the changes between the two compared programs.
- G. Panels shall provide electronic file storage with a means to retrieve a record copy of the site-specific software and up to nine (9) previous revisions. Sufficient file storage shall be provided for other related system documentation such as record drawings, record of completion, owner's manuals, testing and maintenance records, etc.
- H. Comply with UL 864.
- I. Technical Support: Beginning with Substantial Completion, provide software support for two (2) years.
- J. Device address list including plain text descriptions/locations.
- K. The media used to store the record copy of site-specific software and other related system documentation shall be electrically supervised. If the media is removed a trouble shall be reported on the fire alarm control panel.
 - 1. Program Software Backup: Digital media, complete with data files.
- L. Printout of software application and graphic screens.
- M. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within year from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 - 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.17 SEQUENCING AND SCHEDULING

- A. Indicate all points of connection between Fire Alarm system and other devices: sprinkler switches, door holders, extinguishing system controls, etc. Coordinate with mechanical and temperature control systems work and other electrical work including wires/cables, electrical boxes and fittings, motor starters, and conduit, to properly interface installation of this system with others. Provide information to others as necessary on wiring configuration and termination points of Fire Alarm output modules. Coordinate with temperature control contactor on location of control points to minimize wiring.
- B. Sequence installation of this system with other trades to minimize possibility of damage and soiling during the remainder of construction.

1.18 PROJECT CONDITIONS

- A. Use of Devices during Construction: Per 2010 NFPA 17.7.1.11 protect devices during construction unless devices are placed in service to protect the facility during construction.

1.19 WARRANTY

- A. Refer to Division 01 Section "Warranties".

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- B. The Contractor shall provide a written warranty for the complete Fire Alarm system installation, as described in these specifications and drawings, free from all mechanical and electrical defects for the period of two (2) years, beginning from the date of substantial completion or final acceptance of the work, whichever is the later. The Contractor shall, during this two (2) year warranty period, be responsible to repair or replace equipment and apparatus installed by him and do all work necessary to ensure efficient and proper function of the system. No charges shall be made by the contractor for any labor, equipment, or transportation during period to maintain this system.
- C. Contractor shall stock necessary parts to and have a fully equipped service organization to facilitate any emergency service required to maintain the Fire Alarm and detection system. This service shall be done within eight (8) hours from time of notification, 24 hours a day, 7 days a week to service completed systems.
- D. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.

1.20 EXTRA MATERIALS

- A. Refer to Division 01 Section "Extra Materials."

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

2.2 EQUIPMENT AND MATERIAL GENERAL REQUIREMENTS

- A. All equipment furnished for this project shall be new and unused. All components and systems shall be designed for uninterrupted duty. All equipment, materials, accessories, devices, and other facilities covered by this specification or noted on contract drawings and installation specifications shall be the best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this Specification is provided by different manufacturers, then that equipment shall be recognized as compatible by both manufacturers, and "Listed" as such by Underwriters' Laboratories.
- B. System installation and operations shall be verified by the manufacturer's representative and a verification certificate presented upon completion. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system and initial staff training as required by the Engineer.
- C. The system shall be capable of detecting the electrical location of each Signature intelligent device including new devices. It shall be possible to display the intelligent device map on the laptop PC.
- D. If a device map cannot be generated by the Control Panel, the contractor must include a minimum of three (3) days to verify location of all wire runs while in the presence of the Architect/Engineer or Building Owners Representative to verify all conduit and wire runs.
- E. .
- F. In addition, "As-Built" riser and wiring diagrams, each programmed device characteristic including detector type, zone number, base type, serial number, sensitivity setting and wire configurations will be provided to the Architect/Engineer, based on the information gathered during the verification process described above.
- G. It shall be possible for authorized service personnel using a Program/Service Tool or laptop PC to change the personality/function of a Signature Series Device to meet changes in building layout or environment. System changes shall be verified by the manufacturer's representative and a verification certificate presented upon completion.

2.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

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1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.4 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
 1. Manual stations.
 2. Heat detectors.
 3. Smoke detectors.
 4. Duct smoke detectors.
 5. Carbon monoxide detectors.
 6. Heat detectors in elevator shaft and elevator pit.
- B. Fire-alarm signal shall initiate the following actions:
 1. Continuously operate alarm notification appliances.
 2. Identify alarm at fire-alarm control unit and remote graphic annunciators.
 3. Transmit an alarm signal to the remote alarm receiving station.
 4. Unlock electric door locks and open security gates in designated egress paths.
 5. Release fire and smoke doors held open by single point electronic hold-open) push or pull door closer.
 - a. Single point electronic hold-open furnished by Division 8, connected to Digital Addressable Fire Alarm System by Division 28.
 6. Activate alarm communication system.
 7. Close overhead coiling doors at fire rated partitions.
 8. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 9. Shut down all air handling equipment with smoke detection control.
 10. Close smoke dampers in air ducts of designated air-conditioning duct system.
 11. Record events in the system memory.
 12. Indicate device in alarm on the graphic annunciator.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
 1. Valve supervisory switch.
 2. User disabling of zones or individual devices.
 3. Loss of communication with any panel on the network.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
 1. Open circuits, shorts, and grounds in designated circuits.
 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of communication with any addressable sensor, input module, relay, control module or remote annunciator.
 4. Loss of primary power at Fire Alarm control unit.
 5. Ground or a single break in fire-alarm control unit internal circuits.
 6. Abnormal ac voltage at Fire Alarm control unit.
 7. Break in standby battery circuitry.
 8. Failure of battery charging.
 9. Abnormal position of any switch at fire-alarm control unit or annunciator.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliances and annunciate at fire-alarm control unit and remote annunciators.
- F. System Supervisory Signal Actions:
 1. Initiate notification appliances.
 2. Identify specific device initiating the event at fire-alarm control unit and remote annunciator.
 3. After a time delay of 90 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
 4. Transmit system status to central station monitoring.

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5. Display system status on remote annunciator.
- G. Use identification label to identify Fire Alarm system devices. Refer to Division 26 section "Identification for Electrical Systems".
 1. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.
 2. Format for Fire Alarm Device Identification:
 - a. Minimum Size: 3/8 inch by 1-1/2 inches.
 - b. Legend: Designation indicated and device zone or address.
 - c. Text: All capitalized unless otherwise indicated.
 - d. Minimum Text Height: 3/16 inch.
 - e. Color: Red text on white background.
 - f.

2.5 SYSTEM MONITORING:

- A. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.
- B. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory.
- C. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
 1. "Generator Running" supervisory shall automatic reset to normal when not running, with no signal transmitted to off-site monitoring service.
 2. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.
- D. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.
 1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- E. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
 1. Batteries: Sealed lead calcium or Vented, wet-cell pocket, plate nickel cadmium.

2.6 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 2. Station Reset: Key-operated switch.
 3. Indoor Protective Shield: Factory-fabricated clear polycarbonate enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation. Cover shall provide clearance for access to unit reset without cover removal. STI Stopper II Model STI-1100.
 4. Weatherproof Protective Shield: Factory fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Include all accessories for a complete operating system. STI Stopper II Model STI-1155.

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2.7 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
1. Comply with UL 268; operating at 24-Vdc, nominal.
 2. Detectors shall be two-wire type.
 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
 7. Remote Control: Unless otherwise indicated, detectors shall be digital addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F.
 - c. Provide multiple levels of detection sensitivity for each sensor.
- B. Photoelectric Smoke Detectors:
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
- C. Duct Smoke Detectors with Sampling Tubes: Photoelectric type complying with UL 268A. Furnished by Division 28. Installed by Division 23. Connected by Division 28.
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 2. An operator/service technician at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector in order to inspect, calibrate, and repair:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
 3. Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACP.
 4. The Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single 'Form C' contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable (controlled by the FACP, not by the detector itself). Relay shall be mounted within 3 feet of HVAC control circuit.
 5. Duct Housing shall provide a relay control trouble indicator Yellow LED.
 6. Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.

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7. Duct Housing shall provide two (2) Test Ports for measuring airflow and for testing. These ports will allow aerosol injection in order to test the activation of the duct smoke sensor.
 8. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover.
 9. Each duct smoke sensor shall have a Remote Test Station with an alarm LED and keyed test switch to remotely test duct smoke sensor. Install test switch near the location of the detector, flush mounted on wall 72-inches AFF. Do not install test stations in ceilings. Refer to Mechanical Ductwork Drawings (M-Series) for quantity and exact location.
 10. Where located outdoors, provide NEMA 4X weatherproof duct housing enclosure that shall provide for the circulation of conditioned air around the internally mounted addressable duct sensor housing to maintain the sensor housing at its rated temperature range. The housing shall be UL Listed to Standard 268A.
 11. Each detector shall be installed upon the composite supply/return air ducts(s), with properly sized air sampling tubes.
 12. Each sensor shall have multiple levels of detection sensitivity.
- D. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
1. Pipe Material: CPVC and complying with UL 1887, "Safety Fire Test of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics."
 2. Joints in the sampling pipe shall be airtight. Use solvent cement approved by the pipe manufacturer on all joints except at entry to the detector.
 3. Identify piping with labels reading: "Aspirating Smoke Detector Pipe - Do Not Paint or Disturb" along its entire length at regular intervals according to NFPA 72.
 4. Support pipes at not more than 60-inch centers.
 5. Fit end of each trunk or branch pipe with an end cap and drilled with a hole appropriately sized to achieve the performance as specified and as calculated by the system design
- E. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.8

HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type Automatic heat detectors shall have a combination rate of rise and fixed temperature rated at 135 deg F for areas where ambient temperatures do not exceed 100 deg F, and 200 deg F for areas where the temperature does not exceed 150 degrees.
- C. The rate of rise element shall consist of an air chamber, a flexible metal diaphragm, and a factory calibrated, moisture-proof, trouble free vent, and shall operate when the rate of temperature rise exceeds 15 degrees F per minute.
- D. The fixed temperature element shall consist of a fusible alloy retainer and actuator shaft.
- E. Automatic heat detectors shall have a smooth ceiling rating of 2500 square feet
- F. Heat detectors shall be a low profile, ceiling mount type with positive indication of activation.
 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.9

CARBON MONOXIDE DETECTORS

- A. General: Carbon monoxide detector listed for connection to fire-alarm system.
 1. Mounting: Adapter plate for outlet box mounting.
 2. Testable by introducing test carbon monoxide into the sensing cell.
 3. Detector shall provide alarm contacts and trouble contacts.
 4. Detector shall send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
 5. Comply with UL 2075.
 6. Locate, mount, and wire according to manufacturer's written instructions.
 7. Provide means for addressable connection to fire-alarm system.
 8. Test button simulates an alarm condition.

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2.10 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, equipped for mounting as indicated and with screw terminals for system connections.
 - 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
- B. Horns: Electric-vibrating-polarized type, 24-Vdc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.
- C. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum one-inch- high letters on the lens.
 - 1. Rated Light Output:
 - a. 15/20/75/110/177 cd: as noted on the Drawings.
 - b. 15/30/75/110 cd, selectable in the field.
 - 2. Mounting: Wall mounted unless otherwise indicated.
 - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 - 4. Flashing shall be in a temporal pattern, synchronized with other units.
 - 5. Strobe Leads: Factory connected to screw terminals.
 - 6. Mounting Faceplate:
 - a. Wall mount: Factory finished, red.
 - b. Ceiling mount: Factory finished, white.
- D. Exit Marking Audible Notification Appliance:
 - 1. Exit marking audible notification appliances shall meet the audibility requirements in NFPA 72.
 - 2. Provide exit marking audible notification appliances at the entrance to all building exits.
 - 3. Provide exit marking audible notification appliances at the entrance to areas of refuge with audible signals distinct from those used for building exit marking.

2.11 ADDRESSABLE INTERFACE DEVICES

- A. General:
 - 1. Include address-setting means on the module.
 - 2. Store an internal identifying code for control panel use to identify the module type.
 - 3. Listed for controlling HVAC fan motor controllers.
- B. Monitor Module: Microelectronic monitor module listed for use in providing a multiplex system address for listed fire and sprinkler alarm-initiating devices with normally open contacts.
- C. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall and to circuit breaker shunt trip for power shutdown.
 - 1. Allow the control panel to switch the relay contacts on command.
 - 2. Have a minimum of two normally open and two normally closed contacts available for field wiring
- D. Control Module: Microelectronic control module listed for use in providing a multiplex system address with normally open and normally closed contacts. Used to interface operation with non-system devices and equipment such as dampers, starters, and relays.

2.12 ADDRESSABLE CONTROL RELAYS

- A. UL 864 for Control Units and Accessories for Fire Alarm systems.
- B. Addressable for control of elevator recall, AHU shutdown, etc.:
 - 1. Provide interface between Fire Alarm control panel and all other systems and equipment controlled by the Fire Alarm system:

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- a. AHU shutdown.
 - b. Damper closure.
 - c. Fire/smoke door holder release.
 - d. Provide (3) for Elevator recall (primary, alternate and fireman's hat).
 - e. Elevator breaker shunt trip activation.
 - f. Shunt trip circuit activation (grease hood extinguishing system).
 - g. Gas solenoid shutoff (grease hood extinguishing system).
 - h. Priority Override for sound and PA system muting.
2. Single device addressable control module.
 3. Field selectable address through DIP or rotary switches.
 4. Form 'C' contacts for misc. control functions.
 5. Locate relay within 36-inches of controlled equipment.
 6. Form 'C' relay contacts, rated for voltage and amperage of controlled load.
 7. UL Listed for Fire Alarm use and application.
 8. Metal NEMA 1 enclosure with status LED.
 9. Provide for future connections for kitchen equipment shutdown, HVAC Manual Shutdown, etc. where indicated.

2.13 POWER SUPPLY/BATTERY ENCLOSURE

- A. Altronix 400R Enclosure. Description: 19-gauge red finish enclosure with key lock, 15.5-inches H x 12-inches Wide x 4.5 inches Deep. Provide twelve (12) sets of keys for the enclosure.
 1. Provide one relay for Alarm Trouble, and Supervisory. Install in one (1) enclosure.

2.14 OFF-LINE SWITCHING POWER SUPPLY/CHARGER

- A. Altronix eFlow6NB. Description: Power supply/charger converts a 120C/60 HZ input to a 12Vdc or 24Vdc at 6 amp output. Provide one (1) power supply.
 1. Input:
 - a. 120V, 3.5A
 2. Output:
 - a. 12Vdc or 24Vdc selectable output.
 - b. 6A continuous supply current.
 - c. Auxiliary power-limited output rated at 1A (unswitched).
 - d. Over Voltage Protection.
 - e. Filtered and electronically regulated outputs.
 3. Battery Backup:
 - a. Built-in charger for sealed lead acid or gel type battery.
 - b. Maximum charge current 1.54A.
 - c. Automatic switch over to stand-by battery when power fails.
 - d. Transfer to stand-by battery is instantaneous with no interruption.
 4. Fire Alarm Disconnect:
 - a. Supervised Fire Alarm disconnect (latching or non-latching) 10K EOL resistor. Operates on Normally Open (NO) or Normally Closed (NC) trigger.
 5. Supervision:
 - a. AC fail supervision (form 'C' contacts).
 - b. Battery fail and presence supervision (form 'C' contacts).
 - c. Low power shutdown. Shuts down DC output terminals if battery voltage drops 80% of nominal.
 6. Electrical:
 - a. Operating temperature: 0 deg C to 49 deg C.
 - b. 36.9-73.7 BTU/Hr.
 - c. System AC input VA requirement: 420VA.

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- 7. Visual LED Indicators:
 - a. AC input.
 - b. DC output.
 - c. Battery.
- 8. Additional Features:
 - a. Short circuit and overload protection.
- 9. Mechanical:
 - a. Board dimensions: 7.5-inches L x 4.6-inches W x 1.75-inches H.

2.15 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the device requiring protection. Provide where noted on the contract drawings.
 - 1. Factory fabricated and furnished by manufacturer of device.
 - 2. Finish: Chrome or paint of color to match the protected device.

2.16 WIRE AND CABLE

- A. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation. Listed for use with Fire Alarm Systems per NFPA 72 and NFPA 70 (NEC) Articles 760 and 800. All Fire Alarm cabling shall be plenum rated.
 - 1. Low-Voltage Circuits: No. 16 AWG, minimum.
 - 2. Line-Voltage Circuits: No. 12 AWG, minimum.
- B. Power-Limited Circuits: Listed for use with Fire Alarm Systems per NFPA 72 and NFPA 70 (NEC) Articles 760 and 800, Types FPL, FPLR, or FPLP, as recommended by manufacturer. All Fire Alarm cabling shall be plenum rated.
- C. All Fire Alarm cabling shall be plenum rated and completely installed in red colored conduit.

2.17 FIELD WIRING TERMINAL BLOCKS

- A. For ease of service all panel I/O wiring terminal blocks shall be removable, plug-in types and have sufficient capacity for #18 to #12 AWG wire. Terminal blocks that are permanently fixed are not acceptable.

2.18 KEYS

- A. Keys and locks to be identical for all equipment:
 - 1. Annunciator panel(s).
 - 2. Control panel.
 - 3. Duct detector test stations.
 - 4. Enclosure(s).
 - 5. Keyed switch functions.
 - 6. Manual station reset.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
 - 1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INSTALLATION

- A. Provide and install the system in accordance with the plans and specification, all applicable codes and the manufacturer's recommendations. All wiring shall be without any T-Taps and all wiring shall be install in strict compliance with all the provisions of the NEC – Article 760 A and C, Power-Limited Fire Protective Signaling Circuits or if required may be reclassified as non-power limited and wired in accordance with NEC – Article 760 A and B. Upon completion, the contractor shall so certify in writing to the Owner and General Contractor. All junction boxes shall be painted red and labeled "Fire Alarm". Refer to Section 26 "Identification for Electrical Systems".
- B. Installation personnel who qualified and experienced in the installation, inspection, and testing of the Fire Alarm systems. Examples of qualified personnel shall include at a minimum:
 - 1. Factory trained and certified personnel.
 - 2. National Institute of Certification in Engineering Technologies (NICET) Fire Alarm Level II certified personnel.

3.3 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101, and requirements of authority having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760. "Fire Alarm Systems."
 - 1. Devices placed in service before all other trades have completed clean-up shall be replaced.
 - 2. Device installed but not placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.
 - 3. Install seismic bracing.
- B. Visual indicating appliances: Install where shown on the drawings. If field conditions require variation from drawings, do not violate ADA requirements, including, but not limited to, the following:
 - 1. Any room or space required to have a visual appliance, including corridors or hallways: No place shall be more than 50-feet from the indicating appliance in the horizontal plane.
 - 2. Rooms and spaces exceeding 100-feet in one dimension, without obstructions 6 feet above the finished floor: Indicating appliances may be placed around the perimeter, spaced approximately 100-feet apart.
 - 3. Visual strobe device shall be located between 80-inches and 96-inches above finished floor (AFF) in all cases per NFPA.
- C. Manual Fire-Alarm Boxes
 - 1. Install manual fire-alarm box in the normal path of egress within 60 horizontal inches of the exit doorway.
 - 2. Mount manual fire-alarm box on a background of a contrasting color.
 - 3. The operable part of manual Fire Alarm box shall be 48-inches AFF. All devices shall be mounted at the same height unless otherwise indicated.
- D. Smoke or Heat-Detector Spacing:
 - 1. Smoke detectors (not heat detectors) shall be installed at each elevator lobby or floor level served by the elevator, and in each elevator machine room and control room in accordance with NFPA 72. Upon activation, these detectors shall initiate Phase I recall and activate a Fire Alarm.
 - 2. Provide a smoke detector within five (5) feet horizontally of each piece of fire alarm control system equipment, including main control, auxiliary control, transponders, sub-panels, and booster power supplies.
 - 3. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 - 4. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 - 5. The detectors shall report to the Fire Alarm panel as a separate zone (or initiating device identifier for addressable Fire Alarm systems) for each machine room, control room and secondary sheave area provided with a detector
 - 6. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to NFPA 72.

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7. HVAC: Locate detectors not closer than 3-feet from air-supply diffuser or return-air opening.
 8. Lighting Fixtures: Locate detectors not closer than 12-inches from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
- E. Per 2013 NFPA 72 17.7.1.11 Construction debris, dust (especially gypsum dust and the fines resulting from the sanding of dry wall joint compounds), and aerosols can affect the sensitivity of smoke detectors and, in some instances, cause deleterious effects to the detector, thereby significantly reducing the expected life of the detector.
- F. Per 2013NFPA 72 17.7.11.2 – Where detectors are installed but not operational during construction, they shall be protected from construction debris, dust, dirt, and damage in accordance with the manufacturer’s recommendations and verified to be operating in accordance with the listed sensitivity, or they shall be replaced prior to the final testing of the system. Shipping “covers” supplied are merely for shipping and are not intended to be used in lieu of proper protection from construction debris. If allowed by the Authority Having Jurisdiction (AHJ), the installation of protective covers may be used. However, these covers cannot be relied on to keep the detector entirely free of contaminants. Therefore, sensitivity measurement and cleaning of the detectors after all construction trades have finished their work shall be required. If covers are used, the contractor must also have a means of verifying that they all have been removed when the construction trades have completed their work. If the Authority Having Jurisdiction requires the covers to be removed at the end of each day, a good practice is to number the covers to ensure that all have been removed and then to replace them the next morning. Again, if the covers are removed during the construction process, it will be necessary to inspect the detectors closely, cleaning the detectors, and testing the detectors to ensure that their sensitivity is within the listed and marked sensitivity range.
- G. Per 2013 NFPA 72 17.7.1.11.3 – Where detection is not required during construction, detectors shall not be installed until after all other construction trades have completed cleanup.
- H. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36-inches long shall be supported at both ends. Comply with manufacturer’s written instructions.
1. Division 28 to furnish duct smoke detectors and instructions for installation to the contractor performing work under Division 23.
 2. Verify that each unit is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 3. Duct smoke detectors shall be installed to ensure accessibility to provide access for the service technician to inspect, calibrate, and repair after installation.
 4. After installation by Division 23, verify devices are installed in accordance with the manufacturer’s instructions.
 5. Division 28 to provide circuitry and connections.
 6. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- I. Audible Alarm-Indicating Devices: Install not less than 6-inches below the ceiling. Install all devices at heights as indicated in Division 01. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
1. [Redacted]
 2. Audio alarm signals shown on the Drawings to be installed in new construction shall be furnished and installed by this contractor over concealed device boxes or appropriate size with appropriate trim rings.
 3. Wire guards shown on the Drawings to be installed over alarm signals shall be furnished and installed by this Contractor. Wire guards shall not be anchored into acoustical wall panels. The wire guards shall be anchored through wall panels and into wood blocking (where applicable).
 4. Audio alarm signals shown on the Drawings to be installed flush and/or semi-flush mounted in ceilings shall be installed by this Contractor over concealed flush mounted device boxes of the appropriate size with appropriate trim rings. The box shall be supported by ceiling support bridges and steel wire directly to the building structure.
- J. Visible Alarm-Indicating Devices: Install at least 6-inches below the ceiling. Install all devices at heights as indicated in Division 01

Commented [DBC1]: Delete for new construction.

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1. Visual alarm signals shown on the Drawings to be installed in new construction shall be furnished and installed by this contractor over concealed device boxes or appropriate size with appropriate trim rings.
2. Wire guards shown on the Drawings to be installed over alarm signals shall be furnished and installed by this Contractor. Wire guards shall not be anchored into acoustical wall panels. The wire guards shall be anchored through wall panels and into wood blocking (where applicable).
3. Visual alarm signals shown on the Drawings to be installed flush and/or semi-flush mounted in ceilings shall be installed by this Contractor over concealed flush mounted device boxes of the appropriate size with appropriate trim rings. The box shall be supported by ceiling support bridges and steel wire directly to the building structure.

- K. Device Location-Indicating Lights: Locate in public space near the device they monitor.
L.

3.4 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than three (3)-feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
1. Smoke dampers in air ducts of designated air-conditioning duct systems
 2. Single point electronic hold-open door holder closer furnished by Division 8.
 3. Electronically locked doors and access gates.
 4. Alarm-initiating connection to elevator recall system and components.
 5. Alarm-initiating connection to activate emergency lighting control.
 6. Supervisory connections at valve supervisory switches.
 7. Data communication circuits for connection to building management system.

3.5 WIRING INSTALLATION

- A. Wiring Method: All wiring for this system shall be 12 AWG copper solid installed completely in red colored conduit, above ceiling, 3/4-inch minimum. All Fire Alarm conduits and junction boxes shall be painted red for distinct identification. Factory colored raceway and/or boxes are acceptable in lieu of field painting. Install according to Division 26, Section "Raceways and Boxes." Conceal raceway except in unfinished spaces and as indicated. All conduit, device mounting boxes, junction boxes, and panels shall be securely fastened with appropriate fittings to ensure positive ground throughout the entire system. Do not mix Fire Alarm wiring with wiring of any other system.
- B. Use distinctive color coding for insulation.
1. Distinct from all power wiring colors.
 2. Different colors for IDC, NAC, and SLC wiring.
 3. The wiring for the SLC loop is not to exceed 80% of loop capacity (in order to leave space for future devices and shall be in one conduit and the wiring for the NAC conduits shall be in a separate conduit. The loop shall have Class B operation.
- C. All connections to panel, devices, and detectors shall be made as required by Fire Alarm equipment manufacturer.
- D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the Fire Alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

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- E. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- F. Color-Coding: Color-code Fire Alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices.
- G. All wiring shall be checked and tested by the electrical contractor to ensure the system is free from grounds, opens, and shorts.

3.6 SINGLE POINT ELECTRONIC HOLD-OPEN (PUSH OR PULL) DOOR HOLDER CLOSER
(FURNISHED BY DIVISION 8, CONNECTED BY DIVISION 28):

- A. Provide smoke detectors at all single point electronic hold-open door holder closer locations, per NFPA. At a minimum, one (1) smoke detector shall be installed within five (5) feet of each side of the door, regardless of whether indicated on the drawings.
- B. Single point electronic hold-open door holder closer are provided by Division 08.
- C. Smoke Detectors with Relay Base: Provide detectors with relay base on each side of the door for release of electronic hold-open door holder(s) upon local smoke condition.
- D. Addressable Relays: Provide addressable control relays for release of magnetic door holder(s) upon local smoke condition.
- E. Coordinate voltage

3.7 DOOR ACCESS CONTROL SYSTEM:

- A. Addressable Relays: Provide addressable control relays for connection to door access control panel.

3.8 INTERIOR CIRCUIT ISOLATION:

- A. Provide line isolation modules for all interior initiating device circuits and/or signal line circuits between buildings, between floors of buildings, and to group devices in groups not to exceed 50 on each isolation module.

3.9 UNDERGROUND CIRCUIT PROTECTION:

- A. Provide lightning protection for all underground or exterior circuits, as per NEC.

3.10 ELECTRICAL POWER:

- A. Connect control panel emergency power to 120 VAC power system, as indicated.
- B. Provide dedicated circuit.
- C. Clearly label "FIRE ALARM" on panelboard directory.
- D. Locking clip for breaker handle to lock in "ON" position, but not prevent tripping of breaker.
- E. Fire Alarm Power Supply Disconnect: Where system is served from an enclosed breaker or fusible switch, paint red and label "FIRE ALARM".
- F. Connect Altronix eFlow6NB directly to emergency power 120 VAC power system as indicated.
- G. Provide dedicated circuit.
- H. Clearly label "FIRE ALARM" on panelboard directory.

3.11 TELCO LINES FOR CENTRAL STATION MONITORING:

- A. Arrange for and provide two (2) dedicated (POTS) telephone lines from the local communications company, installed to the Fire Alarm digital communicator location.
- B. Provide and terminate two (2) Cat 6A UTP cables.
- C. Install telephone cables in 1-inch EMT conduit from the digital communicator to the point of connection with telephone system (MDF or main telephone room).
- D. Provide telephone jacks (RJ31X), wiring and connections to phone system and communicator.
- E. Label phone cables at telephone connection to indicate "FIRE ALARM COMMUNICATOR".

3.12 MISCELLANEOUS ADDITIONAL HARDWARE OF FEATURE SET

- A. Requirements: The public address systems shall be muted by a relay during an emergency transmission from the Division 27 Section "Intercommunication and Program Systems" to allow the paging speakers to transmit to the audience. Furnish and install the appropriate hardware/relays/sensing devices such that any incoming "Emergency Intercom Page" from the "Intercommunications and Program Systems" shall feed/mute the sound system.

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- B. Emergency transmission must be heard in **commons, corridors, , gymnasium .**

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3.13 PENETRATIONS

- A. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials and utilize a UL-listed firestop assembly for each penetration.
- B. Smoke Penetration Sealing: Fill the void opening around the item penetrating the wall with a noncombustible material such as mineral wool or another listed fill-void material. The fill void material shall have a coating of sealant applied and smoothed to close any gaps. The sealant shall be non-combustible or have a Class A flame spread combustibility rating.

3.14 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification as required in NFPA and as specified in Division 26, Section "Identification for Electrical Systems."
- B. Identification of individual detectors is required. These device numbers, which must also be shown on the shop drawings, shall be permanently affixed to the detector base. Device labels may not be affixed to the device. Identification labels must be printed labels with black lettering on a clear background. Handwritten labels or labels made from embossed tape are not acceptable.
- C. Install framed instructions in a location visible from fire-alarm control unit.
1. Location to be provided by Architect/Engineer.

3.15 GROUNDING

- A. Refer to Division 26, Section "Grounding & Bonding for Electrical Systems" for general requirements, in addition to those specified herein.
- B. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- C. Ground cable shields and equipment according to system manufacturer's instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.
- D. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
- E. Ground equipment and conductor and cable shields.
- F. For audio circuits, minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

3.16 FIELD QUALITY CONTROL

- A. The Fire Alarm System Trade shall enlist the service of a Third Party inspector to perform all electrical and mechanical tests of the system. The Fire Alarm System Trade shall notify the Owner and Engineer in writing one (1) week prior to Third Party testing. Testing agency shall verify functionality, location, and levels of system control panel, components, audible, and visual indicating appliances.
1. Provide Third Party testing information within 90 days of Notice to Proceed.
- B. Field tests shall be witnessed by the Architect and/or Owner representative and authorities having jurisdiction.
- C. Final Test Notice: Provide a 10-day minimum notice in writing to Architect and Owner when the system is ready for final acceptance testing.
- D. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing and shall be present to make adjustments related to the testing.
- E. Provide all testing to certify the system is complete and fully operable.
1. All tests required by Authority Having Jurisdiction.
 2. Provide written statement of successful test results.

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3. Submit letter to Owner and Architect.
 4. Perform tests in presence of Owner or Authorized Representative.
 5. Manufacturer's technician
- F. Tests and Inspections:
1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
 2. Verify activation of all waterflow switches.
 3. Open initiating device circuits and verify that the trouble signal actuates.
 4. Open and short signaling line circuits and verify that the trouble signal actuates.
 5. Open and short notification appliance circuits and verify that trouble signal actuates.
 6. Ground all circuits and verify response of trouble signals.
 7. Check presence and audibility of tone at all alarm notification devices.
 8. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.
 9. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
 10. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 11. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 12. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
 13. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 14. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- G. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72 National Fire Alarm Code. Minimum required tests are as follows:
1. Absences of grounded, shorted or open circuits.
 2. Each initiating device functions as specified.
 3. Abnormal conditions on any supervised circuit or device provided specified trouble signals.
 4. Batteries can operate the system for minimum 30-minute test, including 5 minutes of alarm.
 5. Alarm signals are audible in all building areas.
 6. The system shall be operable under the specified trouble conditions.
 7. Automatic emergency generator operation upon loss of AC power.
 8. All auxiliary functions are executed correctly, completely and as required.
 9. Communicator successfully transmits to UL Central Station.
 10. Verify the absence of unwanted voltages between circuit conductors and ground.
 11. Test all conductors for short circuits using an insulation-testing device.
 12. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
 13. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.

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14. Test signal line, initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of the initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
 15. Test each initiating and indicating device for alarm operation and proper response at the control unit.
 16. Test smoke detectors with actual products of combustion.
 17. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications.
 18. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.
 19. Single point electronic hold-open (push or pull) door holder closer are released by appropriate smoke detectors located on each side of the door.
 20. Motor operated smoke dampers operate and reset properly in response to duct smoke detector activation.
 21. HVAC manual shutdown switch(es) function properly on appropriate units.
 22. Extinguishing system control panel alarms and trouble conditions are correctly monitored by building FACP.
 23. Test multiple detectors in extinguishing system areas for proper cross zoning and programming.
 24. Test extinguishing system manual release and abort station functions.
 25. Extinguishing system release signals are correctly controlled by building FACP.
- H. Fire-alarm system will be considered defective if it does not pass tests and inspections. Take corrective action and retest until accepted by the AHJ.
- I. Prepare test and inspection reports: The Fire Alarm Technician shall perform all electrical and mechanical tests required by the fire alarm manufacturer. All test and report costs shall be included in the Contract price. A checkout report shall be prepared by the installation technicians and submitted in triplicate with one (1) copy of which will be registered with the equipment manufacturer. The report shall include, but not limited to:
1. A complete list of equipment installed and wired.
 2. Indication that all equipment is properly installed and functions and conforms to these specifications.
 3. Tests of individual zones and addressable devices as applicable.
 4. Serial numbers, locations by zone, and model number of each installed device.
 5. Voltage (sensitivity) settings for each photoelectric detector as measured in place with the HVAC operating system.
 6. IBC 907.7 Acceptance Tests and Completion.
 7. Technician's name, certificate number, and date.
- J. The completed smoke detection system shall be tested to ensure that is operating properly. This test will consist of exposing the installed units to a standard fire test. Failure of the devices to sense smoke shall be considered a failure of the system and all detectors in that system shall be readjusted or replaced. Acceptance of the system shall also require a demonstration of the stability of the system. This shall be adequately demonstrated if the system operates for a ninety (90) day test period without any unwarranted alarms. Should an unwarranted alarm(s) occur, the Fire Alarm Trade shall readjust or replace the detector(s) and begin another ninety (90) day test period. As required by the Design Engineers, the Fire Alarm Trade shall recheck the detectors using the fire test after each readjustment or replacement of detectors. This test shall not start until Owner has obtained beneficial use of the building under tests.
- K. Final tests and inspections shall be held in the presence of the Contractor's Project Manager and the Owner's representative. The Fire Alarm Trade shall supply personnel and any required auxiliary equipment for the tests without any additional costs.

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- L. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections. Provide a written record of inspections, tests, and detailed test results in the form of a test log. Use NFPA 72 Forms for documentation.
- M. Final Test, Record of Completion, and Occupancy Certificate
 - 1. Test the system as required by the Authority Having Jurisdiction (AHJ) in order to obtain occupancy certificate. Provide completed NFPA 72 Record of Completion forms to Owner and AHJ.

3.17 CLEANING

- A. General
 - 1. Remove paint splatters and other spots, dirt, and debris.
 - 2. Touch up scratches and marred finishes to match original finish.
 - 3. Clean front panels of all control panels, annunciators, graphic panels, etc. using methods and materials recommended by manufacturer.
 - 4. Remove dust covers from all smoke detectors. Sensitivity measurement and cleaning of the detectors after all construction trades have finished their work shall be performed. If covers are used, the contractor must also have a means of verifying that they all have been removed when the construction trades have completed their work. If the covers are installed during the construction process, it will be necessary to inspect the detectors closely, cleaning the detectors when necessary, and testing the detectors to ensure that their sensitivity is within the listed and marked sensitivity range.
 - a. Provide written documentation of testing all detectors installed during construction. Provide a list by smoke detector number and room location of sensitivity testing.

3.18 ADJUSTING

- A. Sensitivity Adjustments:
 - 1. Initial Settings: Provide initial setting of detector sensitivity prior to final testing, based on assumed room use.
 - 2. Final adjustments: Provide adjustments to detector sensitivity after Owner occupancy, where required, due to actual room use, environmental conditions, false alarms, etc.

3.19 FIELD PROGRAMMING

- A. The manufacturer's technical representative shall field program the fire detection and alarm system after all related programming has been installed and prior to any final testing. The technical representative shall be factory certified for programming. The initial program shall be developed in conjunction with the Owner and Fire Marshal.
- B. In addition to the initial field programming described above, the manufacturer shall furnish an additional two (2) sessions of field programming to be performed at any time during the warranty period at no additional expense to the Owner.

3.20 DEMONSTRATION AND TRAINING

- A. Engage a factory-authorized service representative to provide familiarization training in two (2) six hour sessions for Owner's Safety and Security personnel, Owner's Facilities Services personnel, to adjust, operate, and maintain fire-alarm system. Schedule training sessions at the Owner's convenience.
 - 1. Discuss proper operation, maintenance, use of system, preventive maintenance service techniques and schedules, including historical data trending of alarm and trouble records.
 - 2. Demonstrate the following specific tasks, as applicable:
 - a. Alarm acknowledge/silence.
 - b. System reset.
 - c. Individual device reset.
 - 3. Overall system concepts, capabilities, and functions. Training shall be in depth, so that the owner shall be able to take any device out of service and return any device to service without need of Manufacture's approval or assistance.

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4. Explanation of all access levels and control functions, including training to program and operate the system software.
 5. Methods and means of troubleshooting and replacement of all field wiring devices.
 6. Methods and procedures for troubleshooting the main fire alarm control panel, including field peripheral devices as to programming, bussing systems, internal panel and unit wiring, circuitry and interconnections.
 7. Instructor shall be fully knowledgeable of the installed system and all components.
 8. Training shall be completed at the project site following Owner occupancy, at Owner's discretion.
 9. Schedule after all final tests, adjustments and Owner's acceptance.
 10. Training shall include use of delivered O&M manuals.
 11. Manuals, drawings, and technical documentation. Actual system software used for training shall be provided on digital media and shall be left with the Owner at the completion of training for the Owner's use in the future.
- B. The Fire Alarm Trade shall provide three (3) complete Operation & Maintenance (O&M) bound manuals, manufacturer's detailed maintenance requirements, factory service manuals, system programming data including system programming CDs, complete with component schematics and all as-built wiring diagrams showing all loop numbers and device addresses, plus terminal numbers connected to control equipment.
1. The contractor shall provide one (1) set of the fire alarm system supplier's laminated as-built drawings for permanent use on-site. The contractor shall:
 - a. Laminate each page of these drawings
 - b. Provide a rigid means for mounting such as 1/4-inch thick x two-inch wide x width of drawings through-bolted wood along the left edge of the drawings.
 - c. Furnish and install hooks on the back of the Communications Room door; and hang the bound set of drawings.
- C. Owners' Instructions and Operation Manuals, specific for this project, shall be supplied to the Building Operations Staff by the Factory Trained and Authorized Fire Alarm Vendor. A "Generic" or "Typical" Owners' Instruction and Operation Manual shall not be acceptable to fulfill this requirement.
- D. Refer to Division 01 Section "Demonstration and Training".

3.21

PROTECTION

- A. Protect installed fire alarm system during construction.

END OF SECTION

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COMPLETE AND RETURN WITH BID
INVITATION FOR BIDS #18-24
LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS
SECTION V: BID PRICING FORM/BID PACKET

THIS FORM MUST BE COMPLETED AND INCLUDED WITH THE BID SUBMITTAL. FAILURE TO SUBMIT THIS FORM SHALL DEEM THE BIDDER NON-RESPONSIVE.

IN ACCORDANCE WITH ALL TERMS, SPECIFICATIONS AND REQUIREMENTS, WE PROPOSE TO FURNISH ALL LABOR, EQUIPMENT, MATERIALS AND SERVICES AND THE PERFORMANCE OF ALL WORK NECESSARY FOR THE PROJECT. PROVIDE PRICING BELOW TO INCLUDE OVERHEAD, PROFIT, TAXES, INSURANCE AND OTHER APPLICABLE FEES AND COSTS. ALTERATIONS TO THIS FORM OR BID ALTERNATES (UNLESS OTHERWISE SPECIFIED) ARE NOT ACCEPTABLE. LINE ITEMS LEFT BLANK OR MARKED "\$0" SHALL DEEM THIS BID NON-RESPONSIVE.

| Bid Item No. | Description | Unit | Estimated Quantity | Unit Price | Total |
|--------------------------|---|-------------|---------------------------|-------------------|--------------|
| 1. | GENERAL CONDITIONS | LS | 1 | | |
| 2. | SELECTIVE DEMOLITION | LS | 1 | | |
| 3. | CONCRETE | LS | 1 | | |
| 4. | MASONRY | LS | 1 | | |
| 5. | METALS | LS | 1 | | |
| 6. | OPENINGS / DOORS & WINDOWS | LS | 1 | | |
| 7. | FINISHES | LS | 1 | | |
| 8. | SPECIALTIES | LS | 1 | | |
| 9. | CASEWORK & EQUIPMENT | LS | 1 | | |
| 10. | PLUMBING | LS | 1 | | |
| 11. | HVAC / MECHANICAL | LS | 1 | | |
| 12. | ELECTRICAL | LS | 1 | | |
| 13.0 | ALLOWANCES | | | | |
| 13.1 | HAZMAT ABATEMENT | LS | 1 | \$15,000 | \$15,000 |
| 13.2 | FIRE ALARM: FULL SYSTEM UPGRADE | LS | 1 | \$25,000 | \$25,000 |
| 13.3 | SUPPLEMENTAL HVAC SYSTEM (FITNESS ROOM) | LS | 1 | \$15,000 | \$15,000 |
| A. BASE BID TOTAL | | | | | |

GRAND TOTAL (BASE BID) IN WORDS _____

_____ (\$ _____)

EXCEPTIONS

All exceptions taken to the specifications contained in this document must be clearly indicated in the space provided below. Unless noted as an exception, the bidder will be held responsible for providing each component or standard called for.

The City Manager for the City of Rockville, Maryland retains the exclusive right to approve or reject any exception taken to the specifications contained in this bid. It is hereby agreed that if this bid is rejected due to an exception taken to a specification by the bidder, the rejection taken will be final and no further action may be taken.

Do you claim an exception to any specification to this bid? If yes, please explain.

Add / Alternates

| Bid Item No. | Description | Unit | Estimated Quantity | Unit Price | Total |
|---------------------------------------|---|-------------|---------------------------|-------------------|--------------|
| A-1 | Alternate No. 1 – Tegular Style Ceiling Tiles in lieu of Drop-in Tiles | LS | 1 | | |
| | | | | | |
| B. BID ALTERNATE NO. 1 - TOTAL | | | | | |

GRAND TOTAL (BASE BID + ADD ALT) IN WORDS _____
 _____ (\$ _____)

The City reserves the right to not use the bid alternatives in the determining of the low bid value. If the City decides to award any bid alternatives, those bid alternatives would be used in determining the low bid.

Pay Item Descriptions:

| BID ITEM NO. | ITEM | DESCRIPTION |
|---------------------|-----------------------------|--|
| 1. | GENERAL CONDITIONS | Administrative project costs, bonds, equipment fees and mobilization, supervision, and project management. |
| 2. | SELECTIVE DEMOLITION | Removal and disposal of all equipment and building materials as described in the contract documents |
| 3. | CONCRETE | As indicated in contract drawings: Cast-in-Place Concrete for in-fill and repairs; Precast Lintels |
| 4. | MASONRY | Masonry walls and in-fill as indicated in contract drawings |

IFB #18-24 LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS

| | | |
|------|---|--|
| 5. | METALS | As indicated in contract drawings: Structural Beams; Miscellaneous Metals, Shoring, & Lintels |
| 6. | OPENINGS / DOORS & WINDOWS | Interior Doors and Frames; Aluminum Storefronts; Hardware |
| 7. | FINISHES | Interior Walls and Partitions; Drywall; Tile; Solid Surface; Ceiling System; Acoustical Wall Panels; Vinyl / Rubber / Carpet; Painting |
| 8. | SPECIALTIES | Toilet Accessories (including Adult Changing Table); Mirrors; Fire Extinguishers and Cabinets; Signage; Toilet Partitions |
| 9. | EQUIPMENT | Breakroom Equipment as shown in drawings |
| 10. | MILLWORK / CASEWORK | Millwork / Casework for Reception Area, STEM Classroom, and Trophy Case |
| 10. | PLUMBING | Plumbing Equipment; Domestic Water Supply and Insulation; Sanitary Sewer; D/W/V Piping |
| 11. | HVAC / MECHANICAL | HVAC Equipment; Sheet Metal - Ductwork, Insulation and Accessories; Air Inlets/Outlets (Grills, Registers, Diffusers); Testing and Balancing |
| 12. | ELECTRICAL | Panelboards; Devices, including Data/Comm/AV Outlets and ESS Infrastructure; Conduit and Wiring; Lighting Fixtures; Fire Alarm System as shown in drawings |
| 13.1 | HAZMAT ABATEMENT ALLOWANCE | Refer to Specification Section 012100 |
| 13.2 | FIRE ALARM: FULL SYSTEM UPGRADE ALLOWANCE | Refer to Specification Section 012100 |
| 13.3 | SUPPLEMENTAL HVAC SYSTEM (FITNESS ROOM) ALLOWANCE | Refer to Specification Section 012100 |
| A-1 | ALTERNATE NO. 1 – FURNISH & INSTALL REGULAR CEILING TILES IN LIEU OF DROP-IN TILES | Refer to Specification Section 012300 |

ADDENDUM In the event that any addenda to this solicitation are issued, all solicitation terms and conditions will retain in effect unless they are specifically changed in the addendum. It is the responsibility of the bidder to make inquiry as to addenda issued. Oral answers to questions relative to interpretation of specifications or the proposal process will not be binding on the City.

Such addendums, if issued, will posted via the city's designated electronic, software solution:

<https://contracts.rockvillemd.gov/gateway/Default.aspx>

Please note, that it is the bidder's responsibility to check this site frequently for Addendums, which may impact pricing, this document's requirements, terms and/or conditions. Failure to acknowledge an addendum on the bid proposal form or to sign and return an Addendum with your response may result in disqualification of proposal.

Acknowledgment is hereby made of the following Addenda (identified by number) received since the issuance of this bid:

| | | | |
|------------------|------------|------------------|------------|
| Addendum # _____ | Date _____ | Addendum # _____ | Date _____ |
| Addendum # _____ | Date _____ | Addendum # _____ | Date _____ |

THE BIDDER IS HEREBY NOTIFIED THAT THIS DOCUMENT SHALL BE SIGNED IN INK IN ORDER FOR THE BID TO BE ACCEPTED. BY SIGNING, THE BIDDER CERTIFIES THAT HE/SHE WILL COMPLY IN EVERY ASPECT WITH THESE SPECIFICATIONS.

The bid, if submitted by an individual, shall be signed by an individual; if submitted by a partnership, shall be signed by such member or members of the partnership as have authority to bind the partnership; if submitted by a corporation the same shall be signed by the President and attested by the Secretary or an Assistant Secretary. If not signed by the President as aforesaid, there must be attached a copy of that portion of the By-Laws, or a copy of a Board resolution, duly certified by the Secretary, showing the authority of the person so signing on behalf of the corporation. In lieu thereof, the corporation may file such evidence with the Administration, duly certified by the Secretary, together with a list of the names of those officers having authority to execute documents on behalf of the corporation, duly certified by the Secretary, which listing shall remain in full force and effect until such time as the Administration is advised in writing to the contrary. In any case where a bid is signed by an Attorney in Fact the same must be accompanied by a copy of the appointing document, duly certified.

IF AN INDIVIDUAL:

NAME: _____

_____ Street and/or P.O. Box

| | | | |
|------------|-------------|----------------|---------------------|
| _____ City | _____ State | _____ Zip Code | _____ Fed ID or SSN |
|------------|-------------|----------------|---------------------|

| | | |
|-----------------|--------------|------------|
| _____ Signature | (SEAL) _____ | _____ Date |
|-----------------|--------------|------------|

_____ Print Signature

WITNESS: _____

Signature

_____ Print Signature

IF A PARTNERSHIP:

NAME OF PARTNERSHIP: _____

Street and/or P.O. Box

City State Zip Code Fed ID or SSN

BY: _____ (SEAL) _____
Member Signature Date

Print Signature

TITLE: _____ WITNESS: _____
Signature

Print Signature

IF A CORPORATION:

NAME OF CORPORATION: _____

Street and/or P.O. Box

City State Zip Code Fed ID or SSN

STATE OF INCORPORATION: _____

BY: _____ (SEAL) _____
Signature Date

Print Signature

TITLE: _____ WITNESS: _____
Secretary's Signature

Print Signature

CONTACT FOR ADMINISTRATION

NAME: _____

PHONE: _____ FAX: _____

E-MAIL ADDRESS: _____

EMERGENCY SERVICE (24hr.) PHONE: _____

REMITTANCE ADDRESS (if different than above)

_____ Street and/or P.O. Box

_____ City State Zip Code

RESPONDENT'S QUESTIONNAIRE

In order to be considered for award the bidder must complete in its entirety and submit with the bid. The bidder must answer all questions. If additional space is required, attach continuation sheets and clearly indicate the question being answered. The City reserves the right to verify any information contained within this report and to request additional information or clarification. The City reserves the right to reject the bid of a bidder who has previously failed to perform properly or to complete in a timely manner contracts of a similar nature, or if investigation shows the bidder unable to perform the requirements of the Contract or if the bidder fails to complete and submit the Respondent's Questionnaire in its entirety. If additional sheets are necessary, please attach to this form and reference the applicable number.

Submitted by _____
Signature of Authorized Representative: _____
Name of Firm: _____
Address _____
Organized under the laws of State of: _____
DUNS #: _____

1. ORGANIZATION

1.1 How many years has your organization been in business as a Contractor?

1.2 How many years has your organization been in business under its present business name?

1.3 Under what **other** or former names has your organization operated?

1.4 If your organization is a corporation, answer the following:

Date of incorporation:

State of incorporation:

President's name:

Vice-president's name(s):

Secretary's name:

Treasurer's name:

1.5 If your organization is a partnership, answer the following:

Date of organization:

Type of partnership (if applicable):

Name(s) of general partner(s):

1.6 If your organization is individually owned, answer the following:

Date of organization:

Name of owner:

1.7 If the form of your organization is other than those listed above, describe it, and name the principals:

2. LICENSING

1.1 List ALL jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

3. EXPERIENCE

3.1 List the categories of work that your organization normally performs with its own forces.

3.2 Has your organization ever failed to complete any work awarded to it? If yes, please provide details on a separate sheet.

3.3 Are there any judgment, claims, arbitration, proceedings, or suits pending or outstanding against your organization or its officers?

3.4 Within the past five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? If yes, please provide details.

3.5 Within the last two years, has any owner of any project threatened to impose or imposed liquidated damages against your organization? If yes, provide details.

3.6 Within the last two years, has your organization constructed any projects where the date of substantial completion was more than 30 days after the contract completion date as determined by the contract and any changes orders? If yes, provide details.

3.7 Within the last 2 years, has your organization constructed any projects where the change orders exceeded 10% of the contract price? If yes, provide details.

3.8 State the total worth of work in progress and under contract:

3.9 State the average annual amount of construction work performed during the past five years:

4. FINANCIAL

4.1 State that you will provide a copy of your company's audited financial statements for the past two (2) years, if requested, by the City of Rockville.

4.2 Is your company currently for sale or involved in any transaction to expend or to become acquired by another business entity? If yes, please explain the impact both in organizational and directional terms.

4.3 Is your company currently in default on any loan agreement or financing agreement with any bank, financial institution, or other entity? If yes, specify date(s), details, circumstances, and prospects for resolution.

CERTIFICATION

The above statements are certified to be true and accurate.

BY: _____
Signature

Date

Print Signature/Title

ATTACHMENT A

AFFIDAVIT

I hereby affirm that: I am the _____ and the duly authorized representative of the firm of _____ whose address is _____

and that I possess the legal authority to make this affidavit on behalf of myself and the firm for which I am acting.

I further affirm:

AFFIDAVIT OF QUALIFICATION TO CONTRACT WITH A PUBLIC BODY

1. Except as described in Paragraph 2 below, neither I nor the above firm no, to the best of my knowledge, any of its controlling stockholders, officers, directors, or partners, performing contracts with any public body (the State or any unit thereof, or any local governmental entity in the state, including any bi-county or multi-county entity), has:

A. been convicted under the laws of the State of Maryland, any other state, or the United States of any of the following:

- (1) bribery, attempted bribery, or conspiracy to bribe.
- (2) a criminal offense incident to obtaining, attempting to obtain, or performing a public or private contract.
- (3) fraud, embezzlement, theft, forgery, falsification or destruction of records, or receiving stolen property.
- (4) a criminal violation of an anti-trust statute.
- (5) a violation of the Racketeer Influenced and Corrupt Organization act, or the Mail Fraud Act, for acts in connection with the submission of bids or proposals for a public or private contract.
- (6) a violation of Section 14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland.
- (7) conspiracy to commit any of the foregoing.

B. pled nolo contendere to, or received probation before verdict for, a charge of any offense set forth in subsection A of this paragraph.

C. been found civilly liable under an anti-trust statute of the State of Maryland, another state, or the United States for acts or omissions in connection with the submission of bids or proposals for a public or private contract.

D. during the course of an official investigation or other proceeding, admitted, in writing or under oath, an act or omission that would constitute grounds for conviction or liability under any law or statute described in subsection A or C of this paragraph.

2. [State "none," or as appropriate, list any conviction, plea or admission as described in Paragraph 1 above, with the date, court, official or administrative body, the individuals involved and their position with the firm, and the sentence or disposition, if any]. _____

3. I further affirm that neither I nor the above firm shall knowingly enter into a contract with the Mayor and Council of Rockville under which a person or business debarred or suspended from contracting with a public body under Title 16 of the State Finance and Procurement Article of the Annotated Code of Maryland, will provide, directly or indirectly, supplies, services, architectural services, construction related services, leases of real property, or construction.

I acknowledge that this Affidavit is to be furnished to the Mayor and Council of Rockville and, where appropriate, to the State Board of Public Works and to the Attorney General. I acknowledge that I am executing this Affidavit in compliance with the provisions of Title 16 of the State Finance and Procurement Article of the Annotated Code of Maryland which provides that persons who have engaged in certain prohibited activity may be disqualified, either by operation in law or after a hearing, from entering into contracts with the Mayor and Council of Rockville. I further acknowledge that if the representations set forth in this Affidavit are not true and correct, the Mayor and Council of Rockville may terminate any contract awarded and take any other appropriate action.

NON—COLLUSION AFFIDAVIT

1. Am fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such bid;

2. Such bid is genuine and is not a collusive or sham bid

3. Neither the said bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other bidder, firm or person to submit a collusive or sham bid in connection with the Contract for which the attached bid has been submitted or to refrain from bidding in connection with Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the attached bid or of any other bidder, or to fix any overhead, profit or cost element of the bid price or the bid price of any other bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Mayor and Council of Rockville, Maryland (Local Public Agency) or any person interested in the proposed Contract; and

4. The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant. I do solemnly declare and affirm under the penalties of perjury that the contents of these affidavits are true and correct.

Signature and

Title _____

Date _____

**ATTACHMENT B
INVITATION FOR BID #18-24
LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS**

CITY OF ROCKVILLE BIDDER REFERENCE FORM

The City of Rockville reserves the right to reject bids from any company not meeting the minimum qualifications. The Bidder shall be a competent and experienced contractor with an established reputation within the community performing the type of work required for this contract. The bidder shall have performed similar work for a minimum period of five (5) years. Indicate below a listing of three recent projects completed by your firm that can substantiate past work performance and experience in the type of work required for this contract. The City may make such investigations as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the City all such information and data for this purpose as the City may request.

1. Company Name _____

Address: _____

Contact Person: _____ Current phone #: _____

Email Address: _____

Contract Amount: _____ Name of your project supervisor: _____

Description of Work Performed: _____

2. Company Name _____

Address: _____

Contact Person: _____ Current phone #: _____

Email Address: _____

Contract Amount: _____ Name of your project supervisor: _____

Description of Work Performed: _____

3. Company Name _____

Address: _____

Contact Person: _____ Current phone #: _____

Email Address: _____

Contract Amount: _____ Name of your project supervisor: _____

Description of Work Performed: _____

4. Company Name _____

Address: _____

Contact Person: _____ Current phone #: _____

Email Address: _____

Contract Amount: _____ Name of your project supervisor: _____

Scheduled completion date: _____ Percent complete: _____

Percent of work by own forces: _____ Actual completion date: _____

Description of Work Performed _____

5. Company Name _____

Address: _____

Contact Person: _____ Current phone #: _____

Email Address: _____

Contract Amount: _____ Name of your project supervisor: _____

Scheduled completion date: _____ Percent complete: _____

Percent of work by own forces: _____ Actual completion date: _____

Description of Work Performed _____



CONTRACT PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we (1) _____
_____ a (2) _____
hereinafter called "Principal" and (3) _____
of _____, State of _____ hereinafter called the "Surety", are held
and firmly bound unto (4) The Mayor and Council of Rockville, Maryland, hereinafter called "Owner", in the
penal sum of *(100% of Contract Amount)* _____
Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly
to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally,
firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain
contract with the Owner, dated the ___ day of _____, 20_____, a copy of which is hereto
attached and made a part hereof for the construction of: _____

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the
undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof,
and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if
he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save
harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall
reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any
default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no
change, extension of time, alteration or addition to the terms of the contract or to the work to be performed
thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond,
and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of
the contract or to the work or to the specifications.

CONTRACT PERFORMANCE BOND

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IT WITNESS WHEREOF, this instrument is executed in two (2) counterparts, each one of which shall be deemed an original, this the day of _____, 20____.

ATTEST:

Corporate Secretary or Asst. Secretary

(Print or Type Name and Title)

Principal
By _____ (Seal)
President or Vice President

(Print or Type Name and Title)

(Address)

ATTEST:

Witness as to Surety

(Print or Type Name and Title)

Surety
By _____ (Seal)
Attorney-in-Fact

(Print or Type Name)

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

- (1) Correct name of Contractor
- (2) A Corporation, a Partnership or an Individual
- (3) Name of Surety
- (4) Name of Owner
- (5) If Contract is Partnership, all partners should execute bond

IFB #18-24 LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS



CONTRACT PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we (1) _____
_____ a (2) _____
hereinafter called "Principal" and (3) _____
of _____, State of _____ hereinafter called the
"Surety", are held and firmly bound unto (4) The Mayor and Council, of Rockville, Maryland, hereinafter
called "Owner", in the penal sum of *(100% of Contract Amount)* _____
_____ Dollars (\$ _____
_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind
ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain
contract with the Owner, dated the _____ day of _____ 20____, a copy of which is hereto
attached and made a part hereof for the construction of: _____

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms,
subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work
provided for in such contract, and any authorized extension or modification thereof, including all amounts
due for materials, lubricants, oil, gasoline, coal, repairs on machinery, equipment and tools, consumed or
used in connection with the construction of such work, and all insurance premiums on said work, and for
all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void;
otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no
change, extension of time, alteration or addition to the terms of the contact or to the work to be performed
thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond,
and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms
of the contact or to the work or to the specifications

IFB #18-24 LINCOLN PARK COMMUNITY CENTER IMPROVEMENTS

CONTRACT PAYMENT BOND

PAGE 2

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in two (2) counterparts, each one of which shall be deemed an original, this the ____ day of _____ 20__.

ATTEST:

Corporate Secretary or Asst. Secretary

(Print or Type Name and Title)

ATTEST:

Witness as to Surety

(Print or Type Name and Title)

(Address)

Principal

By _____ (Seal)
President or Vice President

(Print or Type Name and Title)

(Address)

Surety

By _____ (Seal)
Attorney-in-Fact

(Print or Type Name)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

- (1) Correct name of Contractor
- (2) A Corporation, a Partnership or an Individual
- (3) Name of Surety
- (4) Name of Owner
- (5) If Contract is Partnership, all partners should execute bond

SAMPLE - DO NOT COMPLETE OR RETURN
CITY OF ROCKVILLE, MARYLAND
CONSTRUCTION CONTRACT AGREEMENT (STIPULATED PRICE)

This Construction Contract Agreement (this “**Agreement**”) is entered into as of this ____ day of May, 2024, (the “**Effective Date**”) by and between **THE MAYOR AND COUNCIL OF ROCKVILLE**, a body corporate and politic and municipal corporation of the State of Maryland with an address of 111 Maryland Avenue, Rockville, Maryland (the “**Mayor and Council**”, “**City**” or the “**Owner**”), acting by and through its City Manager, and _____ [Contractor Name], a _____ [Contractor State of Incorporation] company with a principal office address of _____ [Contractor Address] (the “**Contractor**”). Individually, the Mayor and Council and the Contractor may each be referred to hereinafter as the “**Party**,” or collectively as the “**Parties**.”

RECITALS

On _____, 2024, the City Manager caused to be issued an Invitation for Bid (“**IFB #**_____”) for [Project Scope].

On _____, 2024, the IFB # _____ closed and Contractor, was determined to be the best qualified responsive bidder.

On _____, 2024, Mayor and Council awarded this Agreement to Contractor and authorized the City Manager to execute this Agreement.

For ease of reference, Exhibit A to this Agreement is the Form of the Performance Bond; Exhibit B to this Agreement is the Form of the Payment Bond; Exhibit C to this Agreement is the General Conditions; and Exhibit D to this Agreement is the Contractor’s Bid Submission.

Terms used in this Agreement but not defined have the meanings stated in the General Conditions, attached hereto as Exhibit C.

For good and valuable consideration, each to the other given, the receipt and sufficiency of which each Party acknowledges, Owner and Contractor agree as follows:

The Parties agree and acknowledge that the Recitals stated above are incorporated and form a material part of this Agreement.

ARTICLE 1—WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents which are defined in Article 7 of this Agreement, and include the details set forth in IFB #_____. The Work is generally described as follows: Contractor shall provide construction and construction-related services including but not limited to _____ [Insert Project Scope], and incidental items of work as shown on the “**Drawings**”, as defined in Exhibit C, attached and incorporated in this Agreement, and more particularly provided as a part of IFB #_____, and referred to herein as the “**Contract Drawings**”, specified herein and/or in the other Contract Documents, or as may be directed by the Owner and/or Architect. In addition, the Work includes, without limitation, the following additional components: Add Alternates _____ [Insert Add Alts if applicable]. The Work and scope thereof are set forth in further detail herein and in the other Contract Documents. All

of the same, all other work, services, labor, materials and supplies associated with the Project and to be performed, acquired and/or installed, incorporated or otherwise included by or on behalf of the Contractor, and all of Contractor's obligations under or in connection with any of the Contract Documents are collectively referred to as the "**Work**".

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: [Insert Project Title] as advertised in IFB # , including all addenda, attachments, and enclosures. The Project is located at [Project Address] , Rockville, Maryland 20850. The Project is as defined in the General Conditions and as further described in the other Contract Documents. For purposes of all Contract Documents and the "**Project**", the "**Proposal**" or "**Contractor's Proposal**" means that certain response to the IFB # from the Contractor and proposal to the City Manager for completion of the Work and the Project, including all attachments and other materials, answers to clarifications and other inquiries, and including all external documents, materials and things referenced therein, as accepted by the City in connection with award of the Contract.

ARTICLE 3—ARCHITECT

3.01 The Owner has retained [Design Representative] , a [State of Incorporation] corporation ("**Architect**") to act as Owner's representative, assume all duties and responsibilities of Architect, and have the rights and authority assigned to Architect in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by the Architect.

ARTICLE 4—CONTRACT TIMES AND DAMAGES

4.01 *Time is of the Essence*

A. All time, time limits, dates and deadlines for completion and delivery of the Work and the Project, including Substantial Completion, Final Completion and all other respective requirements and obligations of the parties, including completion and readiness for final payment as stated in the Contract Documents, and all other aspects of the Work and the Project, including Contractor's performance, are of the essence of the Contract. "**Substantial Completion**" and "**Final Completion**" are defined in Exhibit C, General Conditions, Subsection 62.

4.02 *Contract Times: Days*

A. Contractor shall begin performance of the Work within 10 calendar days of Owner's issuance of a City of "Rockville Purchase Order" (the "**Notice to Proceed**"). Contractor shall finally complete all Work within consecutive calendar days from the date of the Notice to Proceed. The City may, but is not obligated to, issue a limited Notice to Proceed (a "**LNTP**") to allow for mobilization, coordination, field measuring, shop drawing review/approval, submission of Work plan and ordering long lead time components, and possible Work.

4.03 *Final Completion Date*

A. Contractor shall achieve Final Completion of the Work and the Project on or before [Completion Date] , the date that is consecutive calendar days from the date of the Notice to Proceed.

4.04 *Liquidated Damages*

- A. Contractor and Owner recognize and agree that time is of the essence for all purposes of the Work and the Project and that Owner will suffer, without implied limitation, financial and other losses if the Work is not completed and milestones not achieved within the Contract Times. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
1. *Substantial Completion:* Contractor shall pay Owner Four Hundred and 00/100 Dollars (\$400.00) for each calendar day that expires after the time (as duly adjusted pursuant to the Contract) specified in this Agreement or elsewhere in the other Contract Documents for Substantial Completion, until the Work is substantially complete in all respects.
 2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse or fail to complete any component of the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner Four Hundred and 00/100 Dollars (\$400.00) for each calendar day that expires after such time until the Work is finally completed in all respects and ready for final payment.
 3. Liquidated damages for failing to timely attain any Project milestone, Substantial Completion, Final Completion or any other component of the Work or Project are not additive, and will not be imposed concurrently or cumulatively, all of the same to be assessed and imposed severally.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages shall in no event be deemed Owner's sole and exclusive remedy for such delay, and Owner shall be entitled to seek and recover any and all other losses and other damages, whether actual, direct, excess, consequential or otherwise, for such delay, as well as any and all other remedies and relief available at law, in equity or otherwise, except only such special damages (if any) expressly specified in the General Conditions.
- C. Owner and Contractor acknowledge and agree that Owner's actual losses and damages in any of the foregoing circumstances, as well as in the event of any other event or circumstance entitling Owner to liquidated damages related to the Project, are extremely difficult, if not impossible, to ascertain and calculate as of the Effective Date and that the aforementioned amounts represent the good faith, reasonable estimation and approximation of the anticipated compensation for such losses and damages by and between the parties hereto, determined as of the Effective Date.

4.05 *Special Damages*

- A. Contractor shall reimburse Owner upon demand (1) for any and all fines and penalties imposed on Owner in connection with the Contractor's failure to attain Substantial Completion, Final Completion or any other date for performance according to the Contract Times, and (2) for any and all costs and expenses, including reasonable attorneys' fees, incurred by Owner for engineering, construction observation, inspection, administrative services, or any other work or services needed or otherwise utilized or obtained after the time specified for performance.

- B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse or fail to complete any component of the remaining Work within the Contract Times, Contractor shall reimburse Owner for any and all costs and expenses, including reasonable attorneys' fees, incurred by Owner for engineering, construction observation, inspection, administrative services, or any other work or services needed or otherwise utilized or obtained after the time specified for Work to be completed and ready for final payment.
- C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.
- D. For the avoidance of doubt, Owner may, but in no event be obligated to, complete all or any portion of the Work not timely performed in full by Contractor, on behalf of Contractor and at Contractor's sole cost and expense. Contractor shall, on demand, reimburse Owner the positive difference, if any, between (i) all costs and expenses incurred by Owner in connection with so performing on behalf of Contractor, including reasonable attorneys' fees, and (ii) the Contract Sum.

ARTICLE 5—CONTRACT SUM

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow:
- A. For all Work, including all Work for Add Alternates _____, a lump sum of _____ [Insert Written Value] _____ and 00/100 Dollars (_____ [Insert Numerical Value] _____) (the "**Contract Sum**"), as set forth in further detail in the Proposal. Of such Contract Sum, _____ [Individual Breakdown of Add Alternates] _____, in total for both, all as set forth in further detail in the Proposal. The Contract Sum represents Contractor's full compensation for performance of the Work and completion of the Project. All specific cash allowances are included in the above price.
 - B. Notwithstanding the foregoing, for all items of Work for which a unit price ("**Unit Price**" has been allocated in the Proposal ("**Unit Price Work**") necessitated beyond the amounts set forth in the Proposal, Owner shall pay Contractor an amount equal to the amount reached by multiplying the unit price of such items as set forth in the Proposal by the actual quantity of that item installed or otherwise incorporated into the Work. The amounts for Unit Price Work set forth in the Proposal are based on estimated quantities and remain estimates only as of the Effective Date. Estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Architect.
 - C. Total of Contract Sum and Unit Price Work (subject to final Unit Price adjustment), inclusive of Add Alternates _____, is _____ [Contract Value, Written and Numerical] _____.
 - D. For all Work, at the prices stated in Contractor's Proposal.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit "**Applications for Payment**" in substantially the form identified in Subsections 57 ("Progress Payments and Retainage") and 58 ("Final Payment Request") of the

General Conditions. Applications for Payment will be processed by Architect as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment within 30 days of receipt, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will, in the case of Unit Price Work, be based on the number of units completed.
 - 1. Progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract or otherwise authorized pursuant to any one or more Laws and Regulations.
 - a. ninety-five percent (95%) of the value of the Work completed (with the balance being retainage) as set forth in further detail in the General Conditions.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work and the Project, Owner shall pay Contractor the remainder of the Contract Sum.

6.04 *Consent of Surety*

- A. Owner will not make final payment nor return or release retainage at Final Completion or any other time unless Contractor submits written consent of the surety to such payment, return or release in each instance, as the case may be.

6.05 *Interest*

- A. All amounts not paid when due and payable will bear interest at the rate of two percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

- A. The Contract Documents consist of all of the following including any and all exhibits, schedules, addenda, attachments and other documents, materials and things attached thereto and/or referenced, linked or otherwise incorporated therein:
 - 1. This Agreement.
 - 2. Bonds:
 - a. Performance bond (together with power of attorney).
 - b. Payment bond (together with power of attorney).
 - 3. General Conditions.
 - 4. The IFB # _____.
 - 5. Contractor's Proposal/Bid.

6. All Plans, Specifications, and Drawings. The following Contract Drawings are included, without limitation:
 - (a) [List all Permits here] ;
7. Exhibits to this Agreement (enumerated as follows):
 - a. form of Performance Bond
 - b. form of Payment Bond
 - c. General Conditions
 - d. Contractor's Proposal/Bid(the IFB #_____ and Plans, Drawings and Specifications are not attached as exhibits to this Agreement.)
8. The following which may be delivered or issued on or after the Effective Date of this Agreement and are not attached hereto:
 - a. Limited Notice to Proceed and/or Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
 - e. Warranty Bond, if any.
- B. There are no Contract Documents other than those listed above in this Article 7. All Contract Documents are incorporated into this Agreement by reference as if fully restated herein.
- C. This Agreement and all other Contract Documents may only be amended, modified, or supplemented by written agreement duly authorized and executed by Owner and Contractor as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations, warranties and certifications to Owner that:
 1. Contractor has examined and carefully studied the Contract Documents, including all addenda, attachments, supplements, and materials referenced and/or linked therein.
 2. Contractor has visited the Project site, conducted a thorough examination of the Site and adjacent areas, and become familiar with the general, local, Site and other conditions that may affect cost, progress, and/or performance of the Work.
 3. Contractor is familiar with all laws and regulations, as defined in the Exhibit C, General Conditions, Subsection 9 "Legal Requirements"), that may affect cost, progress and/or performance of the Work or that are otherwise applicable to any component of the Work or Project.
 4. Contractor has carefully studied all reports of explorations and tests of subsurface conditions at and adjacent to the Site and the drawings of physical conditions relating to

existing surface or subsurface structures and other conditions and characteristics at the Site.

5. Contractor has carefully studied all reports and drawings relating to hazardous, toxic, or otherwise dangerous or harmful (or potentially so) environmental conditions, if any, at, near and adjacent to the Site.
6. Contractor has considered all information known to Contractor itself; all information commonly known to contractors doing business in the locality of the Site; all information and observations obtained from visits to the Site; the Contract Documents; and all technical specifications and other information and data set forth in the IFB ("**Technical Data**"), with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress and/or performance of the Work; (b) the means, methods, techniques, sequences and/or procedures of construction to be employed by Contractor; (c) Contractor's safety precautions and programs; and (d) any other aspect or component of the Work or Project.
7. Based on the information, observations and Technical Data referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, data or other information or materials are necessary for the performance of the Work at the Contract Sum, within the Contract Times, and in accordance with all terms and conditions of the Contract.
8. Contractor is aware of the nature of work to be performed by Owner and others at the Site that relates to the Work, whether in whole or in part, as may be indicated in the Contract Documents.
9. Contractor has given Architect written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and that all of the same have been resolved or otherwise rectified to Owner's full satisfaction as of the Effective Date.
10. The Contract Documents are sufficient to indicate and convey clear understanding of all terms and conditions for performance and furnishing of the Work, and Contractor does, in fact, have such an understanding thereof.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in this Agreement are premised upon performing and furnishing the Work required by the Contract Documents.
12. Contractor is a duly formed, registered and qualified entity in good standing in all applicable jurisdictions and is otherwise fully authorized to do business in the State of Maryland, and further that the Person executing this Agreement on behalf of Contractor is a duly qualified officer of Contractor and that he or she is duly authorized to execute, acknowledge and deliver this Agreement and all other Contract Documents to the Owner such that all of the same shall be binding upon Contractor in accordance with their terms.
13. Contractor (a) has adequate power and authority to enter into this Agreement and all other Contract Documents and to fully perform Contractor's obligations under these Contract Documents; (b) possesses full authority to execute and deliver this Agreement and all other Contract Documents and that same does not contravene any of the Laws and Regulations; (c) neither Contractor nor any principal (or beneficiary) of Contractor is

subject to any pending, threatened or current litigation, merger or acquisition, corporate or other restructuring or financial oversight; (d) neither Contractor nor any of Contractor's principals (or beneficiaries) is currently subject to any voluntary or involuntary bankruptcy or other insolvency, reorganization, bankruptcy, receivership or other similar proceeding, Contractor has no knowledge of any of the same pending or being imminent, none of such parties have been subject to any of the same at any time during the 10 year period immediately preceding the Effective Date, and Contractor has not made an assignment for the benefit of its creditors; (e) Contractor is not in violation of any order, decree or judgment arising out of, connected with or otherwise related to the design, construction, operation or management of any facility, building, project or system; (f) all representations, warranties, certifications and other statements set forth in the Proposal or otherwise made by, under, through or at the direction of Contractor in or in connection with the Proposal or Contractor's response to the IFB # _____ and/or other aspect of the Project were true, complete and correct when made and remain true, complete and correct as of the Effective Date; (g) Contractor is financially and professionally positioned and has all appropriate wherewithal to perform all covenants and other obligations on the part of Contractor to be performed and observed under or in connection with this Agreement or any of the other Contract Documents, all in accordance with their terms and by the dates and other deadlines set forth in the Agreements and other Contract Documents; (h) this Agreement and the other Contract Documents is and shall be binding upon the Contractor in accordance with their respective terms, provisions and conditions; (i) neither Contractor's entering into the Contract nor performing in accordance therewith shall breach or contravene any contract, agreement or relationship to which Contractor is a party or is otherwise bound, and there are no additional impediments whatsoever; (j) Contractor is in compliance with all Laws and Regulations of both the State of Maryland and the City of Rockville, Maryland, including all of the same related to campaign finance and/or contribution.

All representations, warranties and certifications of Contractor set forth in this Agreement or elsewhere in the Contract Documents shall remain true, correct, and complete for the Duration of the Project through and including Contractor's final completion of the Work, and Contractor shall immediately inform Owner of any and all changes thereto arising during the Project.

8.02 *Contractor's Certifications*

- A. Contractor further certifies to Owner that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
1. **"corrupt practice"** means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. **"fraudulent practice"** means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “**collusive practice**” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. “**coercive practice**” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 *General Conditions*

- A. The general conditions of the Contract are attached as Exhibit C (the “**General Conditions**”). Owner and Contractor agree to perform in accordance with the terms, conditions and provisions of this Agreement, the General Conditions, and all other Contract Documents.

ARTICLE 9—MISCELLANEOUS PROVISIONS

9.01 *Governing Law*

This Agreement and all other Contract Documents are entered into in and shall be construed in accordance with the laws and regulations of the State of Maryland without regard to the choice-of-law rules thereof.

9.02 *Party Contacts*

Except for matters requiring compliance with the notice provisions of the General Conditions, the parties’ respective contacts for emergencies and all other purposes of the Contract are as follows:

City Contact:

[Contact Name]
City of Rockville
111 Maryland Ave
Rockville, MD 20850
Phone: [Contact Phone Number]
Email: [Contact Email]

Contractor Contact:

[Contact Name]
[Contractor]
[Street Address]
[City, State, Zip]
Phone: [Contact Phone Number]
Email: [Contact Email]

9.03 *Certificate of Good Standing*

Contractor shall deliver to Owner no later than the Effective Date an original Certificate of Good Standing issued by the State of Maryland or its applicable department or agency showing Contractor in good standing as of the Effective Date for all intents and purposes of contracting and otherwise transacting business in the State of Maryland.

9.04 *Integration; Incorporation*

The Contract Documents collectively represent the entire and integrated agreement between the City and the Contractor with respect to the subject matter and supersede all prior negotiations, representations and agreements, either written or oral, concerning the same. All other Contract Documents and all exhibits, schedules and other attachments hereto, as well as all other external documents, instruments

and things expressly referenced herein, are hereby incorporated into this Agreement by reference and made a part hereof. Further, the parties acknowledge and agree that one (1) or more of the Laws and Regulations may require that certain legally required provisions be contained in the Contract. Accordingly, while every attempt to expressly include all of the same in the Contract, any and all legally required provisions not expressly set forth in the Contract are hereby deemed incorporated into this Agreement as if fully set forth herein.

9.05 *Precedence of Documents for Interpretation*

In the event of a material conflict between/among the provisions of this Agreement, the General Conditions, the IFB #____ and/or the Proposal, the provisions govern and control in accordance with the following order of precedence: first, provisions of this Agreement shall govern and control over all others; second, provisions of the General Conditions shall govern and control over those of the IFB #____ and those of the Proposal; third, provisions of the IFB #____ shall govern and control over those of the Proposal.

9.06 *Owner's Appropriation*

The Owner's obligations under the Contract are subject to Owner having appropriated all funds sufficient to carry out its obligations thereunder in accordance with applicable Laws and Regulations.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK. SIGNATURES TO FOLLOW.]

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement, intending to be legally bound.
This Agreement will be effective as of and on the Effective Date (which is the Effective Date stated above).

Owner:
MAYOR AND COUNCIL OF ROCKVILLE, MD

Contractor:
[Contractor]

By: _____
Name: Jeffrey J. Mihelich
Title: City Manager
Signature Date: _____

By: _____
Name: _____
Title: _____
Signature Date: _____

Attest: _____
Name: Sara Taylor-Ferrell
Title: City Clerk
Signature Date: _____

Attest: _____
Name: _____
Title: _____
Signature Date: _____

Approved as to form and legality:

By: _____
Name: Robert Dawson, Esq.
Title: City Attorney
Signature Date: _____

EXHIBIT A – FORM OF PERFORMANCE BOND
SAMPLE - DO NOT COMPLETE OR RETURN
CONTRACT PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we (1) _____
_____ a (2) _____
hereinafter called "Principal" and (3) _____
of _____, State of _____ hereinafter called the "Surety", are held
and firmly bound unto (4) The Mayor and Council of Rockville, Maryland, hereinafter called "Owner", in the
penal sum of *(100% of Contract Amount)* _____
Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly
to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally,
firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract
with the Owner, dated the ___ day of _____, 20_____, a copy of which is hereto
attached and made a part hereof for the construction of: _____

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings,
covenants, terms, conditions, and agreements of said contract during the original term thereof, and any
extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall
satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the
Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and
repay the Owner all outlay and expense which the Owner may incur in making good any default, then this
obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no
change, extension of time, alteration or addition to the terms of the contract or to the work to be performed
thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond,
and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms
of the contract or to the work or to the specifications.

EXHIBIT A – FORM OF PERFORMANCE BOND

CONTRACT PERFORMANCE BOND

PAGE 2

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IT WITNESS WHEREOF, this instrument is executed in two (2) counterparts, each one of which shall be deemed an original, this the day of _____, 20__.

ATTEST:

Principal

Corporate Secretary or Asst. Secretary

By _____ (Seal)
President or Vice President

(Print or Type Name and Title)

(Print or Type Name and Title)

(Address)

ATTEST:

Surety

Witness as to Surety

By _____ (Seal)
Attorney-in-Fact

(Print or Type Name and Title)

(Print or Type Name)

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

- (1) Correct name of Contractor
- (2) A Corporation, a Partnership or an Individual
- (3) Name of Surety
- (4) Name of Owner
- (5) If Contract is Partnership, all partners should execute bond

EXHIBIT B – FORM OF PAYMENT BOND

EXHIBIT B – FORM OF PAYMENT BOND

SAMPLE - DO NOT COMPLETE OR RETURN
CONTRACT PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we (1) _____

_____ a (2) _____

hereinafter called "Principal" and (3) _____

of _____, State of _____ hereinafter called the "Surety", are held and firmly bound unto (4) The Mayor and Council, of Rockville, Maryland, hereinafter called "Owner", in the penal sum of *(100% of Contract Amount)* _____

_____ Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____ 20____, a copy of which is hereto attached and made a part hereof for the construction of: _____

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contact or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contact or to the work or to the specifications

EXHIBIT B – FORM OF PAYMENT BOND

CONTRACT PAYMENT BOND

PAGE 2

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in two (2) counterparts, each one of which shall be deemed an original, this the ____ day of _____ 20__.

| | |
|--|--|
| <p>ATTEST:</p> <p>_____</p> <p>Corporate Secretary or Asst. Secretary</p> <p>_____</p> <p>(Print or Type Name and Title)</p> | <p>_____</p> <p>Principal</p> <p>By _____ (Seal)</p> <p>President or Vice President</p> <p>_____</p> <p>(Print or Type Name and Title)</p> |
|--|--|

(Address)

| | |
|--|--|
| <p>ATTEST:</p> <p>_____</p> <p>Witness as to Surety</p> <p>_____</p> <p>(Print or Type Name and Title)</p> | <p>_____</p> <p>Surety</p> <p>By _____ (Seal)</p> <p>Attorney-in-Fact</p> <p>_____</p> <p>(Print or Type Name)</p> |
|--|--|

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

- (1) Correct name of Contractor
- (2) A Corporation, a Partnership or an Individual
- (3) Name of Surety
- (4) Name of Owner
- (5) If Contract is Partnership, all partners should execute bond

Exhibit C – General Conditions

SAMPLE - DO NOT COMPLETE OR RETURN

GENERAL CONDITIONS

CITY OF ROCKVILLE, MD IFB # _____

[Project Name]

1. TERMS AND CONDITIONS; DEFINITIONS The terms and conditions of this document govern in event of conflict with any terms of the bidder's proposal and are not subject to change by reasons of written or verbal statement by the Contractor unless accepted in writing. Words and abbreviations which have well known technical, or trade, meanings are used in accordance with such meanings. Terms used but not defined in these Conditions shall have the definition ascribed in the Agreement. Further, the following terms shall have the following definitions for all purposes of all Contract Documents:

"City" is synonymous with "Owner", meaning the Mayor and Council of Rockville.

"City Manager" means the City Manager or the Manager's designee.

"Contract" means, collectively, all Contract Documents and the relationship of the Parties in connection to the Contract.

"Contract Time" or "Contract Times" means the amount of time available for delivery or performance as required by any of the Contract Documents, as well as the dates and deadlines by which any aspect or component of the Work or the Project shall be completed, delivered or otherwise satisfied as required by the Contract Documents.

"Drawings" means any and all approved drawings and other graphic representations contained within or included with any of the Contract Documents or otherwise associated with the Work or the Project, including all profiles, cross sections and shop drawings.

"Person" means any individual, corporation, company, partnership, venture, association or other form of legal entity, including public and private entities of all types and natures.

"Plans" means any and all approved design, engineering, site and other plans contained within or included with any of the Contract Documents or otherwise associated with the Work or the Project.

"Project" means that certain Owner's [Project Name] as advertised by the City in the IFB # _____ and located at [Project Address], Rockville, Maryland 20850 and as is further described throughout the Contract Documents.

"Project Manager" is synonymous with "Architect" as defined in the Agreement.

"Special Provisions" means the provisions set forth in Section III of the IFB # _____.

Exhibit C – General Conditions

“Specifications” means any and all approved specifications, details and standards contained within or included with any of the Contract Documents or otherwise associated with the Work or the Project, including all technical specifications.

“State” means the State of Maryland.

2. COVID-19 VACCINATION REQUIREMENT All COVID-19 vaccination requirements have been repealed by Mayor and Council.

3. SENSITIVE DOCUMENTS All project participants needing either electronic or hardcopy documents dealing with critical facilities or sensitive information will be required to make application with, and receive approval from, the City prior to receiving this information. Permission to receive said documents (“sensitive”) will pertain only to the individual approved. Sensitive documents (either electronic or hardcopy documents dealing with critical facilities or sensitive information) received from the City must be handled consistent with the terms of non-disclosure required for application. Contractor is responsible to restrict use of sensitive documents to project participants only and shall take appropriate measure to prevent distribution of sensitive document to anyone inside or outside of the Contractor’s company except Contractor’s project participants. After completion of the project, all sensitive documents remaining in the Contractor’s possession shall continue to be governed under the terms of non-disclosure and must continue to be stored in a secure manner. After such records are no longer needed for record purposes, the records shall be destroyed or returned to the City. Where services require the Contractor to access the City’s electronic information resources and/or its electronic data assets, the Contractor shall adhere to all requirements, terms and conditions of the City’s Contractor/Vendor On-Site and Remote Access Confidentiality Agreement, which can be viewed at the following web address: <https://www.rockvillemd.gov/documentcenter/view/36407>

4. DOCUMENTS, MATERIALS AND DATA All documents, materials, or data developed as a result of the Contract are the City’s property. The City has the right to use and reproduce any documents, materials, and data, including confidential information, used in the performance of, or developed as a result of the Contract. The City may use this information for its own purposes, including reporting to state and federal agencies. The Contractor warrants that it has title to or right to use all documents, materials or data used or developed in connection with this contract. The Contractor must keep confidential all documents, materials and data prepared or developed by the Contractor or supplied by the City.

5. INSPECTION OF THE WORK SITE Contractor shall visit the site of the Work and become fully acquainted with the existing conditions and fully informed as to any facility involved, and the difficulties and restrictions attending the performance of the Contract. Applicable Drawings and Specifications and all Contract Documents shall be thoroughly examined by Contractor. The Contractor shall in no way be relieved of any obligation due under the executed Agreement by the failure to examine any form of instrument or to visit the site.

6. RISK OF LOSS AND CONDITION OF SITE The City makes no representation and assumes no responsibility for the condition of the site or applicable structures on the site. The Contractor shall accept the site and the contents thereon in the condition in which they are represented. Any damages or loss whatsoever

Exhibit C – General Conditions

while the Contract is in effect (whether by reason of fire, theft, breakage, or other happenings) shall not relieve the Contractor from any obligations under the Contract. The Contractor shall store any materials on site as not to damage the materials and shall maintain such storage areas, as directed by the City, in hazard free condition.

7. SUBCONTRACTORS Nothing contained in the Contract Documents shall create any contractual relationship between the City and any subcontractor or sub-subcontractor. Unless otherwise indicated, if the Contractor proposes to subcontract the delivery, installation, or other portion of the Work, it will submit to the Project Manager, prior to the start of Work, the following information:

- 1) A description of the items proposed to be subcontracted,
- 2) the proposed subcontractor's name, address, and telephone number, and
- 3) the nature and extent of the Work utilized during the life of the Contract.

Subcontractors shall be considered agents of the Contractor, who shall be held fully accountable for all the subcontractor services, labor, and materials relative to the Contract.

Contractor may not subcontract any component or portion of the Work or the Project to a subcontractor or other party without the City's prior written consent in each instance, except only as expressly identified and detailed in Contractor's Proposal accepted by the City.

8. BONDS

A.) PERFORMANCE BOND The Contractor shall execute and deliver to the City the required Performance Bond for 100% of the bid amount by no later than the Effective Date.

B.) PAYMENT BOND The Contractor shall execute and deliver to the City the required payment bond in an amount equal to 100% of the bid amount by no later than the Effective Date.

Bonds shall name the City as beneficiary and shall be in the forms attached to the Agreement as Exhibits A and B and shall be provided and executed by a surety company authorized to do business in the State of Maryland rated "A" or better per current A.M. Best Company ratings, and whose name appears on U.S. Treasury Department Circular 570. Contractor shall pay all costs and expenses of and associated with obtaining and maintaining all bonds during the life of the Project and thereafter as required by the Contract Documents.

9. LEGAL REQUIREMENTS All materials, equipment, supplies and services shall conform to applicable Federal, State, County, City and other laws, statutes, rules, ordinances, orders, codes, and regulations. The Contractor shall observe and comply with all Laws and Regulations applicable to or that otherwise affect or may affect the Work to be done or any portion of the Project. The provisions of the Contract shall be governed by the laws of the State of Maryland.

10. INDEMNIFICATION To the fullest extent permitted by law, the Contractor shall indemnify, defend and save harmless the City, the Mayor and Council, and all of their respective officers, employees, agents,

Exhibit C – General Conditions

representatives, consultants and contractors from and against any and all suits, actions and damages, costs, losses, injuries and other recoveries of every name and description, including all reasonable attorneys' fees, to which any of the foregoing may be subjected or put by reason of, in relation to, or otherwise in connection with, whether in whole or in part: (i) injury to persons or property as a result of any portion of the Work or the performance thereof, whether caused by negligence or carelessness on the part of the Contractor, or subcontractors or agents thereof, or otherwise; (ii) any breach of, default under or other failure on the part of Contractor to fully perform pursuant to the Agreement or any of the other Contract Documents by and in accordance with all terms, conditions and provisions thereof strictly by the dates and other deadlines established therein; (iii) any negligence, willful misconduct or other act or omission of Contractor or any Contractor Party; or (iv) any labor, product, material or supply furnished and/or utilized in connection with any portion of the Work or the Project or any other aspect of the Work or Project or performance thereof. The foregoing provisions of this Section 10 shall not apply to losses, injuries or damages caused directly and in full by the City's gross negligence or willful misconduct.

11. DELIVERY Time is of the essence. The Contractor shall expedite the Work and achieve Substantial Completion and Final Completion within the Contract Time. Defective or unsuitable materials or workmanship shall be rejected and shall be made good by the Contractor, notwithstanding that such materials/workmanship may have previously been overlooked and accepted.

12. CHANGES IN QUANTITIES/ITEMS The City reserves the right to add or delete any item(s) from the Contract in whole or in part at the City's discretion as given in the IFB # _____ or Proposal wherever it deems it advisable or necessary so to do and such changes shall in no way vitiate the Contract nor affect the Contract Sum or other prices for any item or remaining Work. Unit prices submitted in the Proposal shall not be increased or decreased regardless of changes in quantity. The Contractor will be paid for the actual amount of authorized Work done or material furnished under any item of the Proposal at the price set forth in the Proposal. In case any quantity is increased, the Contractor shall not be entitled to any increased compensation over and above the unit price for such item, or any claim for damages on account of loss of anticipated profits should any quantities be decreased. The Contractor shall be responsible for confirming the accuracy of the specified quantities prior to ordering materials or supplies and the City's payment shall be based on the actual quantities incorporated in the Work in accordance with the Contract. The quantities must not exceed the Contract specified quantities without specific prior written authorization of the Project Manager and it is the Contractor's responsibility to obtain said authorization.

13. MATERIALS All materials shall be new and free from defects. They shall be standard products of current manufacture. Unless otherwise expressly noted in the Contract Documents, the Contractor shall abide by specific manufacturer instructions and recommendations on installation and operation.

14. DEFECTIVE MATERIALS/WORKMANSHIP Defective or unsuitable materials or workmanship shall be rejected and shall be made good by the Contractor. If any portion or component of the Work shall be found to be defective or to have been damaged before final acceptance, the Contractor shall make good such defect in a manner satisfactory to the City, without extra compensation even though said defect or injury may have not been due to any act or negligence of the Contractor. Contractor further agrees to return to the Project site at any time during the one-year period following Final Completion to fix, repair

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and/or replace any component of the Work found to be noncompliant with any provision of any one or more of the Contract Documents, notwithstanding acceptance or payment.

15. TIME OF BEGINNING AND COMPLETION Contractor shall begin work on the Contract and shall diligently prosecute the same, so that it shall be fully completed within the time as stated in the Contract, all as set forth in Section 4.02 of the Agreement. The Contractor shall not commence any work under the Contract until a written Notice to Proceed or LNTP is received from the Purchasing Agent.

16. FAILURE TO COMPLETE WORK ON TIME/ LIQUIDATED DAMAGES The Contractor accepts the Contract with the understanding and intention to perform fully and in an acceptable manner within the time stated. Should Contractor fail to complete fully, to all intent and purpose, the Work specified in the time specified, or within the time as it may have been extended by the City, the Contractor shall pay, for each calendar day that any work shall remain uncompleted the sum of \$400 per calendar day as set forth in and per the provisions of Section 4.04 of the Agreement. This sum is agreed upon, not as a penalty, but as liquidated damages and the City shall have the right to deduct the amount of such damages from any moneys due the Contractor under the Contract. The City may, but shall not be obligated to, recover such liquidated damages by deducting the amount thereof out of any moneys due or that may become due the Contractor, and if said moneys are insufficient to cover said damages, then the Contractor or the Surety shall pay the amount due upon demand by the City. The City may also seek any and all other and/or alternative methods of collecting liquidated damages as may be available or allowable at law, in equity or otherwise, there being no limitation implied as to the provisions of this Section 16.

17. AUTHORITY OF THE CITY MANAGER IN DISPUTES Any dispute concerning a question of fact arising under the Agreement which is not disposed of by the Agreement shall be decided by the City Manager who shall notify the Contractor in writing of his determination. The Contractor shall be afforded the opportunity to be heard and offer evidence in support of the claim. Pending final decision of the dispute in question, the Contractor shall proceed diligently with performance under the Agreement and all other Contract Documents. The decision of the City Manager shall be final and conclusive unless an appeal is taken pursuant to the City Purchasing Ordinance.

18. CONTRACT DELAYS/EXTENSION OF TIME The Contractor shall pursue the Contract so as to complete all work within the time allotted. The completion date as set in the Agreement allows for inclement weather, holidays and coordination with other companies and parties. If the Contractor is delayed in the delivery of the supplies, equipment, or services by any act of neglect of the City or by a separate Contractor employed by the City, or by any delay authorized by the City, the City shall review the cause of such delay and shall make an extension of time if warranted. All claims for extensions must be in written notice sent to the Project Manager within 10 calendar days after the date when such alleged cause for extension of time occurred. All such claims shall state specifically the amount of time of the delay the Contractor believes to have suffered. If written notice is not received within the prescribed time, the claim shall be forfeited and invalidated. Relief in the form of time extension shall be the sole and exclusive remedy available to Contractor in connection with any Project delay whatsoever, notwithstanding any contrary provision of any of the other Contract Documents, except that the provisions of this sentence shall not apply in instances in which it has been determined by a court or other tribunal of competent jurisdiction

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that a particular delay was caused by the City's gross negligence or intentional wrongdoing, a fraud perpetrated by the City or an intentional misrepresentation by the City.

19. CONTRACT DELAYS - NO DAMAGE CLAIMS ACCEPTED The Contractor shall make no claim for extra monetary compensation for any delay, whether ordered by the City or not, caused by delays in funding, governmental approvals, private or public companies' actions, inclement weather, site conditions, or from any cause whatsoever. The Contractor shall adjust its operation to continue the Work at other locations under the Contract, if available, and as directed by the City. If it is necessary to discontinue the Work temporarily, the Contractor shall resume Work within 48 hours of notice from the City. The City may adjust the completion date to compensate for the lost day(s) on a day-for-day basis, if the City finds that the Contractor could not make up for such lost day(s) by reallocating its forces or rescheduling the work, up to the time remaining on the original schedule at the time of shutdown.

20. PROGRESS SCHEDULE AND SCHEDULE OF OPERATIONS The construction of the Project will be planned and recorded by the Contractor with an Activities Chart Project Schedule (the "AC Project Schedule" or "AC") and Written Narrative ("WN") unless specifically determined in writing to be unnecessary by the Project Manager. The AC Project Schedule and WN will break down, in detail, the time (working days or completion date) involved in performing major construction activities for the duration of the Project. The AC Project Schedule shall be used for the coordination and monitoring of major Work under the Contract including the activities of subcontractors, vendors, and suppliers. The AC Project Schedule shall be prepared in accordance with the requirements of the Maryland State Highway Administration Standard Specifications for Construction and Materials dated January 1982, and the errata and addenda thereto, subsequent supplement(s) and the Special Provisions as set forth in the IFB #_____, unless otherwise directed or approved by the Project Manager in writing. The schedule shall be consistent with the Contract specified completion date(s) and/or working days. The Contractor is responsible for preparing the AC Project Schedule and Written Narrative.

Preparation of Initial Schedule - The Contractor will complete development of an initial AC Project Schedule and Written Narrative (describing the logical time representations as proposed in the AC Project Schedule) and submit two copies of each AC and WN to the Project Manager for review and approval by no later than 10 calendar days from the Effective Date. Updating Project Schedule: At any time that it becomes apparent the schedule, created as above, and approved by the Project Manager, is not being implemented, either because the Work or service is ahead or behind schedule, the Contractor shall immediately notify the Project Manager and shall submit a revised, written, updated AC and WN for the Project Manager's review, revision, and written approval. The Contractor shall make every effort to meet the original completion date and/or working days allowed unless otherwise so directed by the Project Manager. Payment for Schedule AC/WN: No special compensation will be paid for preparing or revising the Project AC or WN, as the cost shall be considered incidental to the Contract with compensation incorporated into the Contract Sum.

21. SPECIFICATIONS The Specifications for the Contract will be those shown below, and additions included in the IFB #_____, if applicable. In the event of conflict, the City's determination shall govern. The following specifications and standards, listed below, including all subsequent addenda, amendments and errata are made part of the Contract to the extent required by the references thereto:

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- (a) Maryland Department of Transportation, State Highway Administration, "Standard Specifications for Construction and Materials" (Maryland Department of Transportation, State Highway Administration), dated January 2008 and all errata and addenda thereto. MDSHA Book of Standards for Highway and Incidental Structures.
- (b) Montgomery County Department of Transportation "Montgomery County Road Construction Code and Standard Specifications."
- (c) Standard Specifications of WSSC dated July 2005.
- (d) Montgomery County Department of Transportation "Design Standards" August 1991.
- (e) Maryland Dept of the Environment "1994 Standards and Specifications Soil Erosion and Sediment Control".
- (f) The U. S. Department of Transportation, Federal Highway Administration, "Manual on Uniform Traffic Control Devices" latest edition.
- (g) Montgomery County Noise Ordinance.

22. CONTRACT DOCUMENTS The Contract Documents are complementary and what is required by one shall be binding as if required by all. Words and abbreviations that have well known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings. On Drawings, the figured dimensions shall govern in the case of discrepancy between the scales and figures. Anything shown on the Plans and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Plans shall have the same effect as if shown or mentioned respectively in both. The City may direct that the Work proceed by any method indicated, specified, or required, in the judgment of the City, by any of the Contract Documents. Such direction by the City shall not constitute the basis for a claim for extra costs by the Contractor. The Contractor acknowledges that it has been afforded the opportunity to request clarification prior to the Effective Date and that Contractor is not entitled to a claim for extra cost or otherwise because of failure to request or receive such clarification. Any discrepancies which may be discovered during the execution of Work between actual conditions and those represented by the Contract Documents shall be reported to the City and Work shall not proceed until written instruction has been received by the Contractor from the City.

23. INTERPRETATION Any questions concerning terms, conditions and definitions of the contract and bidding regulations shall be directed in writing to the Project Manager. Any questions concerning any of the Specifications and Drawings shall be directed in writing to the Project Manager. The Contractor shall take no advantage of any error or omission in any of the Contract Documents.

24. PROJECT MEETINGS; PRE-CONSTRUCTION MEETING A pre-construction meeting(s) may be held in person or virtually as set forth in the IFB # _____. The meeting(s) must be attended by the Contractor. Further, Contractor agrees to attend, participate in, and otherwise perform in accordance with the IFB

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_____ and other Contract Documents regarding additional Project meetings, including keeping all minutes thereof and details of attendance. No compensation will be made by the City to the Contractor for meetings.

25. EMERGENCY CONTACT The Contractor has provided the following two local telephone numbers which may be used for contacting an official of the Contractor at all times, 24 hours per day, seven days per week, at which numbers person(s) of responsibility will be available to respond to City directives relative to the contract: [Contractor Emergency Contact Phone Numbers]. The Contractor shall have available sufficient personnel and equipment to immediately respond to emergency needs, as determined by the City. There will be no special compensation paid for this requirement, but the cost is to be considered incidental to the other Contract pay items.

26. SUPERVISION AND DIRECTION OF WORK The Work shall be under the general supervision of the Project Manager. While it is intended that the Contractor shall be allowed in general to carry on the Contract in accordance with such general plan as may appear to the Contractor most desirable, the Project Manager, at the Project Manager's discretion, may from time to time, direct the order in which, and points at which, the Work shall be prosecuted and may exercise such general control over the conduct of the Work at a time or place, as shall be required, in the Project Manager's opinion, to safeguard the interests of the City, and the Contractor shall have no claims for damages or extra compensation on account of the fact that it shall have been necessary to carry on the work in different sequence from that which the Contractor may have contemplated. The Contractor shall immediately comply with all orders and instructions given by the Project Manager, but nothing herein contained shall be considered such an assumption of control over the Work by the City or the Project Manager as to relieve the Contractor of any obligations or liabilities under the Contract.

27. INSPECTION Work and materials will be inspected promptly to see that the same strictly correspond with the Drawings and Specifications and all Contract Documents, but if, for any reason, delay should occur in connection with such inspection, the Contractor shall have thereby no claim for damages or extra compensation. Materials and workmanship shall be always subject to the approval of the Project Manager, but no inspection, approval or acceptance of any part of the Work or of the materials used therein, nor any payment on account thereof shall prevent the rejection of said materials or Work at any time thereafter, should said Work or materials be found to be defective or not in accordance with the requirements of the Contract Documents. Any costs for any "re-inspection" of the job shall be the responsibility of the Contractor.

28. DEFAULT AND TERMINATION The Contract may be terminated by the City in whole or in part by written notice of default to the Contractor upon nonperformance or violation of contract terms as set forth in further detail below in this Section 28. In either event, the Contractor shall, without limitation, be liable to the City for all costs and expenses of the City in excess of the Contract Sum, and the Contractor shall continue the performance of the Contract to the extent not terminated under the provisions of this clause. The Contract may be terminated by the Contractor only as expressly set forth in this Section 28.

(a) Except as set forth to the contrary in subsection (b) below, either party to the Contract may terminate the Contract should the other party fail to perform in accordance with any provision thereof; provided,

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however, that prior to terminating the Contract, the terminating party must have delivered a 30 day written notice of such failure to perform and must have allowed the other party 30 days (unless a different cure period is specifically provided for in this Section 28, in which case such period shall apply) in which to cure the same. Notwithstanding the foregoing, if a party's failure to perform is such that it cannot reasonably be cured within 30 days, the other party shall not have the right to terminate the Contract by reason thereof as long as the non-performing party commences to cure within the applicable cure period and thereafter diligently pursues the same towards completion. Notwithstanding the foregoing or any other provision of the Contract to the contrary, any failure to perform a covenant under or in connection with the Contract performable by the payment of money shall be subject only to a seven-day cure period following notice from the other party thereof.

(b) In addition to all other rights and remedies set forth in the Contract, including those set forth elsewhere in this Section 28, the City may terminate the Contract, by notice to Contractor if the Contractor:

- (i) fails to submit or deliver any item by the date required by the Contract, or if no date is indicated, within a reasonable time consistent with the date of Substantial Completion of the Project;
- (ii) refuses or fails to supply proper materials or the appropriate subcontractors or enough properly skilled workers;
- (iii) fails to make timely payment to any subcontractor or consultant, except only if the Contractor has a good faith claim against such subcontractor or consultant;
- (iv) disregards or violates any of the Laws and Regulations or any other requirement;
- (v) has breached any material provision of the Contract or has at any time provided a representation, warranty, or certification to the City in connection with the Project that was untrue, misleading, incorrect or incomplete; or
- (vi) files for bankruptcy, receivership, or other manner of insolvency, has any of the same filed against it, admits it cannot pay any one or more of its debts as they become due, makes an assignment for the benefit of creditors, or becomes otherwise financially positioned such that Contractor can no longer perform the Contract in accordance with its terms.

(c) Notwithstanding the provisions of Section 28(a) above, when any of the above reasons (i), (ii), (iii) or (v) in Section 28(b) exist, the City may, without prejudice to any other rights or remedies of the City, immediately terminate the Contract, with a three day curing option to the Contractor, and, for items (iv) and (vi) in Section 28(b), the City may immediately terminate the Contract. Further, in any of such events described in the above sections (i) through (vi) shall occur, the City shall, without prejudice to any other right or remedy of the City, also be entitled to:

- (i) Exclude the Contractor from the Project site and take possession of the Work and Project and all materials, equipment, tools, and construction equipment and machinery thereon or thereat owned or controlled by the Contractor;
- (ii) Accept assignment of one or more of the subcontractor, consulting and/or other agreements entered into by Contractor in connection with any aspect of the Project (although the City shall under no circumstances be obligated to do so); and

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(iii) Finish the Work, at the sole cost and expense of the Contractor, by whatever means and method the City may deem appropriate.

29. TERMINATION FOR CONVENIENCE The Contract may be terminated, in whole or in part, upon written notice to the Contractor when the City determines that such termination is in its best interest. The termination is effective 10 days after the notice is issued unless a different time is given in the notice. The City is liable only for payment for goods and services delivered, accepted, and approved by the City prior to the effective date of the termination.

30. EMPLOYEES The Contractor shall employ only competent, skillful persons to do the Work, and whenever the Project Manager shall notify the Contractor in writing that any person employed on the Work is, in his opinion, incompetent, disobedient, disorderly, discourteous or otherwise unsatisfactory, such person shall be discharged from the work and shall not again be employed for the Contract or the Project except with the prior written consent of the Project Manager.

31. NON-WORKDAY The City observes the following holidays: New Year's Day, Martin Luther King's Birthday, President's Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Thanksgiving Friday and Christmas Day, all days of general and congressional elections throughout the State, and a five-day work week. The Contractor will not be permitted to do any work which requires the services of the City's inspection, supervisory or line and grade forces on the days on which the above-mentioned holidays are observed by the City or on Saturdays or Sundays, unless otherwise authorized by the Project Manager in writing. However, the Contractor, with verbal permission of the Project Manager, may be permitted to perform clean up and such other items for which no specific payment is involved on Saturdays and holidays. The normal number of working hours per day on the Contract will be limited to eight, unless otherwise authorized by the Project Manager in writing. In case of an emergency which may require the services of the City on Saturdays, Sundays, holidays or longer than eight hours per day, the Contractor shall request permission of the Project Manager to work. If, in the opinion of the Project Manager the emergency is bona fide, he will grant permission to the Contractor to work such hours as may be necessary. Also, if in the opinion of the Project Manager, a bona fide emergency exists, the Project Manager may direct the Contractor to work such hours as may be necessary whether the Contractor requests permission to do so or not, and Contractor shall abide by such direction.

32. LANGUAGE The Contractor shall appoint one or more crewmembers or supervisors to act as liaison with the City and emergency services personnel. All liaisons shall be fluently and sufficiently proficient in English and the Contractor's employees' language(s), and at least one liaison shall be always present at each work site when any of the Contractor's employees or agents are at the site.

33. IMMIGRATION REFORM AND CONTROL ACT

Contractor represents and warrants to Owner (i) that it does not and shall not hire, recruit or refer for a fee, for employment under the Contract, an individual knowing the individual is an unauthorized individual and hire any individual without complying with the requirements of the Immigration Reform and Control Act of 1986 (the "Act"), including but not limited to any verification and record keeping requirements, and (ii) that, in accordance with the Act, it does not and will not discriminate against an individual with respect to hiring, or recruitment or referral for a fee, of the individual for employment or

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the discharging of the individual from employment because of such individual's national origin or in the case of a citizen or intending citizen, because of such individual's citizenship status.

34. EQUAL EMPLOYMENT OPPORTUNITY The Contractor will not discriminate against any employee or applicant for employment because of age (in accordance with applicable law), ancestry, color, national origin, race, ethnicity, religion, disability, genetics, marital status, pregnancy, presence of children, gender, sexual orientation, gender identity or expression, or veteran status. The Contractor will take affirmative action to ensure that applicants are employed, and the employees are treated fairly and equally during employment with regard to the above. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment, layoff or termination, rates of pay or other form of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause. Contractors must also include the same nondiscrimination language in all subcontracts. If the Contractor fails to comply with any nondiscrimination clause of the Contract or fails to include such contract provisions in all subcontracts that subcontractors will not discriminate against any employee or applicant for employment in the manner described above, the Contract may be declared void AB INITIO, cancelled, terminated or suspended in whole or in part at the City's discretion and, without limitation, the Contractor may be declared ineligible for further contracts with the City of Rockville. Any employee, applicant for employment, or prospective employee with information concerning any breach of these requirements may communicate such information to the City Manager who shall commence a prompt investigation of the alleged violation. Pursuant to such investigation, the Contractor will permit access to the Contractor's books, records, and accounts. If the City Manager concludes that the Contractor has failed to comply with any of the applicable nondiscrimination clauses, the remedies set out above may be invoked.

35. ETHICS REQUIREMENTS In accordance with the City's financial disclosure and ethical conduct policy and/or ordinances a prerequisite for payment pursuant to the terms of the Contract is that the Contractor may be required to furnish explicit statements, under oath, that the City Manager, and/or any other officer, agent, and/or employee of the City, and any member of the governing body of the City of Rockville or any member or employee of a Commission, Board, or Corporation controlled or appointed by the City Council, Rockville, Maryland has not received or has not been promised directly or indirectly any financial benefit by way of fee, commission, finder's fee, or in any other manner, remuneration arising from directly or indirectly related to the Contract, and that upon request by the City Manager, or other authorized agent, as a prerequisite to payment pursuant to the terms of the Contract, the Contractor will furnish to the Mayor and Council of the City of Rockville, under oath, answers to any interrogatories to a possible conflict of interest as herein embodied.

36. DRAWINGS TO BE FOLLOWED The approved Drawings show the location, details and dimensions of the Work contemplated, which shall be performed by Contractor in strict accordance therewith and in accordance with the Specifications. Any deviation(s) from the Drawings or Specifications as may be required by the exigencies of construction in all cases will be determined by the Project Manager. There shall be no such deviations without the prior written authorization of the Project Manager in each instance. On all Drawings, Plans and Specifications, the figured dimensions shall govern in the case of discrepancy between the scales and figures. The Contractor shall take no advantage of any error or

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omission in the Drawings, Plans or Specifications. The Project Manager shall make such corrections and interpretations as he or she may deem necessary for the fulfillment of the intent of the Specifications and of the Drawings as construed by the Project Manager whose decision shall be final.

37. CERTIFICATION Under no circumstances will Contractor be paid for materials utilized on or in connection with the Contract unless certified to in writing by the Project Manager. The Contractor must not incorporate any materials into the Project without prior written authorization and certification of the Project Manager, unless necessary to eliminate or avoid hazardous conditions. In the event of such hazardous conditions, the responsibility for notification to the Project Manager and quantity/quality confirmation rests with the Contractor, and Contractor must obtain written confirmation within 24 hours of the commencement of the first of the hazardous conditions in question.

38. DECISIONS AND EXPLANATIONS BY PROJECT MANAGER The Project Manager shall make all necessary explanations as to the meaning and intent of the Specifications and Drawings, and shall give all orders and directions, either contemplated therein or thereby, or in every case in which a difficult or unforeseen condition arises during the prosecution of the Work. Should there be any discrepancy, or should any misunderstanding arise as to the intent of anything contained in the Drawings and Specifications, the decision of the Project Manager shall be final and binding. The Project Manager shall in all cases determine the amount, quality, acceptability and estimates of the Work to be paid for under the Contract and shall decide all questions in relation to the Work. In case any question arises between the parties hereto relating to the Contract, a decision to such question shall be a condition precedent to the right of the Contractor to receive payment under that part of the Contract which is in dispute.

39. WORK TO BE DONE AND MATERIALS TO BE FURNISHED The Contractor shall do all the Work and furnish all the labor, materials, tools, and equipment necessary or proper for performing the Work required by the Contract, in the manner called for by the Drawings and Specifications and all other provisions of the Contract Documents and within the Contract Time. The Contractor shall complete the entire Project and all Work together with such extra work as may be required, at the prices fixed therefore, to the satisfaction of the Project Manager and in accordance with the Specifications and Drawings.

40. NOTIFICATION TO OTHER AGENCIES The Contractor will be responsible for notifying all concerned agencies affected by the Work a minimum of 48 hours in advance of any activity, as prescribed by said agencies, including, but not limited to: the Washington Gas, PEPCO, Verizon Comcast Cable, Transcontinental Gas, City of Rockville Utilities Division, Montgomery County Government, State Highway Administration and the Washington Suburban Sanitary Commission. The Contractor must notify MISS UTILITY at 1-800-257-7777 a minimum of 72 hours and no more than five working days prior to removal of any pavement or beginning any excavation. There shall be no measurement or direct payment to the Contractor for such notification, working around, the protection of, or repair of damage to such existing utilities caused by the proposed construction activities directly or indirectly.

41. PERMITS AND REGULATIONS The City is listed as the applicant for all permits, and it is Contractor's responsibility to comply with all permit terms and conditions, including maintenance and warranty requirements. Unless stipulated elsewhere in the Specifications, the Contractor shall be responsible for obtaining and paying for all applicable permits. Where signatures of the City are required in connection

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with the obtaining of such permits, certificates, etc., the Contractor shall prepare the proper paperwork and present it to the City for signature. City of Rockville Permit fees shall be waived. If the Contractor ascertains at any time that any requirement of the Contract is at variance with any one or more of the Laws and Regulations, notification to the Project Manager by Contractor shall be made immediately. Without proper notice to the Project Manager, the Contractor shall bear all costs arising from the performance of Work the Contractor knows to be contrary to such laws, ordinances, etc. The Contractor is solely responsible for implementation and compliance with all conditions of all permits, including those listed below, and is also responsible for obtaining additional trade/utility permits in order to successfully complete the Work and the Project:

- **[List Applicable Permits Here]**

42. EXCAVATION Unless specifically provided in the Specifications, all trench and roadway excavation is unclassified as to the character of materials. The lump sum or unit price, as specified, for or including excavation shall constitute full payment for removal and disposal of all materials, regardless of type, encountered in trenching and roadway excavation, within the limits of the Contract, as necessary and as shown to be removed on the Drawings and/or as directed by the Project Manager, except as otherwise provided for under the Contract. Contractor hereby represents, warrants, and certifies to Owner that it has familiarized itself with all site conditions including subsurface and the proximity of all adjacent and other nearby features.

43. SERVICE OF NOTICES The mailing a written communication, notice or order, addressed to the Owner or Contractor in accordance with this Section 43 at the respective addresses set forth below shall be considered as sufficient service upon the Owner or Contractor, as applicable, of such communication, notice or order, and the date of said service shall be one (1) business day from the date of such mailing or shipping. All of the same shall be either (i) mailed by U.S. First Class certified mail for next business day delivery, postage prepaid, or (ii) shipped by nationally recognized courier service, such as Federal Express, for next business day delivery, with all shipping and other charges prepaid. Unless and until changed by Owner or Contractor by way of written notice delivered to the other in accordance with the provisions of this Section 43, each parties’ respective address for notice and service is:

If to Owner:

City of Rockville, MD
Attn: [Contact Name]
111 Maryland Avenue
Rockville, MD 20850

with copies to:

City Attorney’s Office
City of Rockville, MD
Attn: Robert Dawson, City Attorney.
111 Maryland Avenue
Rockville, MD 20850

If to Contractor:

[Contractor]
Attn: [Contact Name]
[Contractor Street Address]
[City, State, Zip]

with a copy to:

[Legal Representative]
Attn: [Contact Name]
[Street Address]
[City, State, Zip]

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and to:

West Group Law, PLLC
Attn: Managing Partner
81 Main Street, Suite 510
White Plains, NY 10601

44. PATENT RIGHTS Whenever any article, material, equipment, process, composition, means, or thing called for by the Specifications is covered by letters of patent, Contractor shall secure, before using or employing such article, material, equipment, process, composition, means, or thing, the assent in writing of the owner or licensee of such letters of patent and file the same with the City. The said assent is to cover not only the use, employment, and incorporation of said article, material, equipment, process, composition, combination, means, or thing in the construction and completion of the Work but also the permanent use thereof thereafter by or on behalf of the City, in the operation and maintenance of the project for the purposes for which it is intended or adapted. The Contractor shall be responsible for any claims made against the City, its agents and/or employees and for any actual or alleged infringement of patents by the use of any such patented articles, etc., in the construction and completion of the Work, and shall save harmless and indemnify the City, its agents and employees from all costs, expenses (including all reasonable attorneys' fees), and damages, including Solicitor's and Attorney's fees which the City may be obligated to pay by reason of any actual or alleged infringement of any patent used in the construction and/or completion of the Work.

45. CARE AND PROTECTION OF WORK From the Effective Date until its Final Completion, the Contractor shall be solely responsible for the care of the Work and all injury or damage to the same, from whatever cause, shall be made good by the Contractor at the Contractor's own expense, before the final estimate is made. The Contractor shall provide suitable means of protection for all materials intended to be used in the Work and for Work in progress, as well as completed Work.

46. ABANDONMENT OF OR DELAY IN WORK If the Work under the Contract shall be abandoned by the Contractor, or if at any time the Project Manager shall be of the opinion and shall so state, in writing, to the Contractor, that the performance of the Contract is unnecessarily or unreasonably delayed, or that the Contractor has violated any of the provisions of the Contract or is executing the same in bad faith or if the Work is not fully completed within the time specified for its completion, together with such extension of time as may have been granted, the City by written notice, may order the Contractor to discontinue all Work, or any part thereof, within the number of days specified on such notice. At the expiration of said time the Contractor shall discontinue the Work, or such part thereof, and the City shall have the power, by Contract, or otherwise, to complete said work and deduct the entire cost, including reasonable attorneys' fees, thereof from any monies due or to become due the Contractor under the Contract. For such completion of Work the City may, for itself or its contractors, take possession of and use or cause to be used any or all materials, tools, and equipment found on the site of said Work. When any part of the Contract is being carried on by the City, as herein provided, the Contractor shall continue the remainder of the Work in conformity with the terms of the Contract and in such manner as not to interfere with the City's workmen.

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47. SUBLETTING OR ASSIGNING OF CONTRACT The City and the Contractor each bind themselves and their respective successors, assigns and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents. Neither party to the contract shall sublet, sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of the Work provided for therein, or of Contractor's right, title, or interest therein to any person, to any person without the City's prior written consent, nor shall the Contractor assign any monies due or to become due hereunder without the previous written consent of the City. Notwithstanding the foregoing, Contractor may subcontract to the subcontractor expressly identified in the Proposal for the express purposes set forth therein.

48. NO WAIVER OF CONTRACT Neither the acceptance by the City or its Project Manager nor any order, measurement, certificate or payment of money, of the whole or any part of the Work, nor any extension of time nor possession taken by the City or its Project Manager shall operate as a waiver of any portion of the Contract, or any right to damage therein provided. The failure of the City to strictly enforce any provision of the Contract shall not be a waiver of any subsequent breach of the same or different nature.

49. DUTIES, OBLIGATIONS, RIGHTS AND REMEDIES The duties and obligations imposed by the Contract Documents and every one of the rights, relief, and remedies available thereunder are cumulative, shall be in addition to and not a limitation of the duties, obligations, rights, and remedies otherwise imposed or available by law or in equity, unless so indicated.

50. IMPLIED WORK All incidental work required by the drawings or specifications for which no payment is specifically provided, and any work or materials not therein specified which are required to complete the Work and which may fairly be implied as included in the Contract, and which the Project Manager shall judge to be so included, shall be done or furnished by the Contractor without extra compensation. The Project and the Work represent a complete work or improvement which the Contractor undertakes to do in full compliance with the Contract Documents together with any authorized alterations, special provisions, and supplemental agreements.

51. MEASUREMENT OF WORK AND MATERIAL The work and material to be paid for will be measured and determined by the Project Manager according to the Specifications and Drawings, and the working lines that may be given. No allowance will be made for any excess above the quantities required by the Specifications, Drawings, and lines on any part of the Work, except only where such excess material has been supplied or work done by written order of the Project Manager and in the absence of default or negligence on the part of the Contractor. Should the dimensions of any part of the Work or of the materials be less than those required by the Drawings or the directions of the Project Manager, only the actual quantities placed will be allowed in measurement for purposes of payment.

52. EXTRA COSTS If the Contractor claims that any instructions by the Contract Documents or otherwise involve extra compensation or extension of time, a written protest must be submitted to the Project Manager within 10 calendar days after receipt of such instructions and before proceeding to execute the Work, stating in detail the basis for objection. No such claim will be considered unless so made.

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53. CONTINGENT ITEMS & QUANTITIES Items and quantities identified as being contingent are provided in the Contract for use when and as directed by the Project Manager in writing. Such items have been included for the purpose of obtaining a price for Contractor's performance and delivery thereof. The quantities for these contingent items may be increased or decreased by the City without any adjustment to the Contract Sum or any unit price(s) or the contingent items may be deleted entirely from the Contract by the Project Manager without negotiation, all at the City's sole discretion. The Contractor shall submit no claim against the City for any adjustment to the Contract Sum or any unit price should the contingent items be increased, decreased, or eliminated entirely. Payment for any contingent items used will be made based on the quantities as actually measured and as specified in the Specifications. Materials, construction requirements and basis of payment shall be as specified elsewhere in the Contract Documents.

54. CHANGES IN THE SCOPE OR EXTRA WORK The City, without invalidating the Contract, may issue written changes in the Work consisting of additions, deletions, or modifications with the Contract Sum and completion date being adjusted accordingly. The Contract Sum shall be adjusted in accordance with the unit prices set forth in the Proposal, if covered thereby, or otherwise in accordance with a written change order executed by both the City and the Contractor. All such changes, or additional Work must be authorized in writing by the Architect prior to starting such Work. Costs shall be limited to the actual, verified, and substantiated cost of materials, labor, field supervision and field office personnel directly involved in and directly attributed to the change. All costs and/or credits to the City for a change in the Work shall be determined by the unit price bid or by mutual written agreement, where any agreed upon charges related to overhead may not exceed 5% of the total cost of the changes and any agreed upon charges to profit may not exceed 10% of the total cost of the changes. The Contractor shall do all Work that may be required to complete such Work contemplated at the unit prices bid or at a lump sum price to be mutually agreed upon. The Contractor shall perform extra Work, for which there is no quantity or price included in the Contract, whenever it is deemed necessary or desirable to complete fully the Work as contemplated, and such Work shall be done in accordance with the Specifications therefore, or in the best workmanlike manner as directed. Where such a price or sum cannot be agreed upon by both parties, or where this method of payment is impracticable, the Project Manager may order the Contractor to do such Work on a force account basis, which will be paid for as set forth below in Section 55.

55. FORCE ACCOUNT WORK When the Contractor is required to perform Work as a result of additions or changes to the Contract for which there are no applicable unit prices in the Contract, the City and Contractor shall make every effort to come to an agreed upon price for the performance of such Work and reduce same to writing. If a written agreement cannot be reached, the City may require the Contractor to do such Work on a force account basis to be compensated in accordance with the following:

A. Labor. For all labor and for foremen in direct charge of the specific operations the Contractor shall receive the actual wages for each and every hour that said labor and foremen are actually engaged in such work.

B. Materials. For materials accepted by the Project Manager in writing and incorporated into the Project, the Contractor shall receive the actual cost of such materials, including transportation charges paid by Contractor (exclusive of machinery and special equipment rentals as hereinafter set forth). Excess

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materials delivered to the job site and not incorporated into the Project will not be paid for and it is the Contractor's responsibility to remove said excess material from the job site.

C. Equipment. For any machinery or special equipment (other than small equipment tools, whether rented or owned), the use of which has been authorized in writing by the Project Manager, the Contractor shall receive the rates agreed upon in writing before such work is begun which price shall include fuel, oil and miscellaneous necessities, or the Contractor shall receive those rates which may be specified elsewhere in the Special Provisions. For the purpose of definition, equipment with a new cost of \$1000 or less will be considered small tools and equipment.

D. Materials and Supplies Not Incorporated in the Work. For materials and supplies expended in the performance of the Work (excluding those required for rented machinery and equipment as discussed above) and approved by the Project Manager in writing, the Contractor shall receive the actual cost of such materials and supplies used.

E. Subcontractors. The Contractor shall receive the actual cost of work performed by a subcontractor approved by the City in writing. Subcontractor's cost is to be determined as in A., B., C., and D. above, plus the fixed fee for overhead and profit allowance computed as in G.

F. Superintendence. No additional allowance shall be made for general superintendence, the use of small tools, or other costs for which no specific allowance is provided in this Section 55.

G. Contractor's Fixed Fee. The City and the Contractor shall negotiate a fixed fee for force account Work performed pursuant to the Contract by his force and by his subcontractors. The City shall pay 10 percent of A as compensation for overhead and profit for the work performed. The Contractor shall proceed diligently with the performance of the force account Work to completion. The Contractor's fixed fee shall include an amount equal to the sum of 65 percent of A, which shall include, but not be limited to the following:

(1) Compensation for all costs paid to, or on behalf of, workmen by reason of subsistence and travel allowances, health and welfare benefits, pension fund benefits or other benefits that may be required by collective bargaining agreement or other employment contract generally applicable to the laborers employed in the Work; and

(2) Bond premiums, property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and Social Security taxes on the force account Work. In addition, the Contractor's fixed fee may include an amount not to exceed 10 percent of B. unless specifically authorized by the Project Manager in advance of the Work; 5 percent of D., and 5 percent of E except for that portion chargeable to machinery and/or equipment as defined above.

H. Compensation. The compensation as set forth above shall be received by the Contractor as payment in full for change order work done on a force account basis. At the end of each day, the Contractor and the Project Manager shall compare records of the cost of work as ordered on a force account basis.

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Differences shall be immediately resolved, and any unresolved difference shall be brought to the attention of the Project Manager by written notice from the Contractor within two working days of the occurrence.

I. Statements. No payment will be made for any Work performed on a force account basis until the Contractor furnishes the Project Manager duplicate itemized statements of the cost of such force account Work detailed as to the following:

- (1) Name, classification, date, daily hours, total hours, rate, and extension for such workmen. Contractor shall provide certified payrolls;
- (2) Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment. Contractor shall provide original receipted invoices;
- (3) Quantities of materials, prices, and extensions. Contractor shall provide original receipted invoices; and
- (4) Transportation of materials. Contractor shall provide original receipted invoices.

If, however, the materials used in the force account Work are not specifically purchased for such Work but are taken from the Contractor's stock, then in lieu of the original invoices the statements shall contain or be accompanied by an affidavit of the Contractor which shall certify that such materials were taken from Contractor's stock and that the quantity claimed was actually used and that the price and transportation of the material as claimed represent actual cost. Any request for payment under this Section should be submitted in the order outlined by the above. The Contractor shall be responsible for all damages resulting from Work done on a force-account basis, the same as if such Work had been included in the original Contract. Work performed without previous written order by the Project Manager will not be paid. Notwithstanding the foregoing or any other provision of these general conditions or any one or more of the other Contract Documents to the contrary, Contractor shall only be compensated for Work actually performed and for materials and supplies actually installed or otherwise incorporated into the work, all such costs and expenses to be properly and sufficiently verified and substantiated by reliable documentation.

56. ALLOWANCES The parties acknowledge and agree that the Contract Sum includes the entire amount of all Project allowances. The expenditure of these allowances is to be at the Purchasing Manager's direction. However, the allowance expenditure is limited to items properly inferable from the title and description of the allowance. Unexpended balances are to be credited to the City. Compensation payable to the Contractor for expenditure of allowances directed by the Purchasing Manager shall be based on the cost to the Contractor as shown by actual invoices or receipts, and no additional overhead or profit shall be payable to the Contractor for any such allowances.

57. PROGRESS PAYMENTS AND RETAINAGE The Contractor shall submit a detailed application for payment on a monthly basis, preferable on an AIA G702 form (an "Application for Payment") to the Project Manager. Such Application for Payment, notarized, if required, must be accompanied by supporting data and documents substantiating the Contractor's right to payment and reflecting a retainage of five percent (5%) of the Contract Sum. Applications for Payment shall not include payment for equipment or materials delivered to the site but not installed or for materials or equipment properly stored off-site unless specifically approved by the Project Manager in writing in advance. If such approval is granted, the

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Contractor must submit with the Application for Payment, bills of sale, or other such documentation satisfactory to the City to establish the City's title to such materials or equipment or otherwise to protect the City's interest, including applicable insurance and transportation to the site for materials and equipment stored off site. Such approvals are typically reserved for "big ticket" items that individually exceed five percent of the Contract Sum. The Contractor shall promptly pay each subcontractor and supplier for Work completed upon receipt of payment from the City the amount to which said subcontractor is entitled, reflecting any percentage retained from payments to the Contractor on account of each subcontractors Work. The Contractor shall, by an appropriate agreement with each subcontractor, require each subcontractor to make prompt payments to its subcontractors in a similar manner. The City shall be under no obligation to pay or to see to the payment of any moneys to any subcontractor except as may otherwise be required by Laws and Regulations. No certificate of payment or partial or entire use of the Work or Project by the City shall constitute an acceptance of any Work which is not in accordance with the Contract Documents.

Payments Withheld – The City may decline to certify payment or because of subsequently discovered evidence or observations, nullify the whole or any part of any certification of payment previously issued, as may be necessary to protect the City from loss because of: (1) defective Work not remedied, (2) third party claim filed or evidence indicating probable filing of such claim, (3) failure of the Contractor to make payments properly to subcontractors or suppliers, (4) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum, (5) reasonable evidence that the Work will not be completed within the Contract Time, (6) persistent failure to carry out the Work.

58. FINAL PAYMENT REQUEST Upon reaching Substantial Completion, as defined herein, the Contractor shall submit a written application for final payment. All supporting documentation and data shall be submitted with the request for final payment as is applicable to the monthly requests for payment referenced heretofore. Out of the amount representing the total of the final payment request the City shall deduct five) percent, which shall be in addition to any and all other amounts which, under the Contract, it is entitled or required to retain and shall hold said sum for a period of 120 days after the date of acceptance of the Work by the City. Within 30 days of the approval of the final payment request, the City will pay to the Contractor the amount remaining after deducting from the total amount of the final estimate all sums and amounts as have already been paid to the Contractor under the provision of the Contract and also such amounts as the City has reserved or retained and/or that the City may be authorized under the Contract to reserve or retain. Neither the final payment nor the remaining retainage shall become due until the Contractor submits to the Project Manager:

1. An affidavit that all payrolls, bills for materials and equipment and other indebtedness connected with the work for which the City or his property might in any way be responsible, have been paid;
2. Consent of surety to final payment;
3. If requested, data establishing payment or satisfaction of obligations, such as receipt, release and waivers of liens arising out of the Contract; and
4. All punch list items are completed to the satisfaction of the Project Manager.

If any subcontractor refuses to furnish a release or waiver of liens required by the City, the Contractor may furnish a bond satisfactory to the City to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the City all moneys that the latter

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may be compelled to pay in discharging such lien, including all costs and reasonable attorney fees. Acceptance by the Contractor of final payment (*i.e.*, final payment under the Contract except for retainage and other amounts otherwise withheld by the City) shall operate as a release of the City, the Mayor and the Council and every officer, employee, representative and agent thereof, from all claims and liabilities to the Contractor for anything done or furnished or relating to the Work under the Contract, except only for any surviving right to retainage or other amount(s) otherwise withheld by the City.

59. RELEASE OF RETAINAGE Upon the expiration of the 120 days succeeding the date of acceptance, the City will pay to the Contractor all sums reserved or retained, less such amount as it may be empowered under the provisions of the Contract or any of the Laws and Regulations to retain. Notwithstanding any provision of any of the Contract Documents to the contrary, the City and the Contractor agree to and shall abide by all provisions of the Maryland Little Miller Act, Md. Code Ann., State Fin. & Proc. § 17-101 *et seq.*, as and to the extent applicable, applying to retainage in connection with the Project.

60. GUARANTEES / WARRANTIES All guarantees and warranties required shall be furnished by the Contractor and shall be delivered to the Project Manager before final payment is made. The Contractor guarantees that the items conform to the Contract Documents.

61. GUARANTEE PERIOD The Contractor shall warrant and guarantee the Work required under the Contract for a period of 12 months from the date of final acceptance. The Contractor warrants and guarantees to the City that materials and equipment furnished under the Contract shall be of good quality and new unless otherwise required or permitted by the Contract Documents, that all Work will be in accordance with the Contract Documents, and that all Work will be of good quality, free from faults and defects. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the City, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The Contractor's obligation to perform and complete the Work in a workmanlike manner, free from faults and defects and in accordance with the Contract Documents shall be absolute. The Contractor shall remedy, at its own expense, and without additional cost to the Owner, all defects arising from either workmanship or materials, as determined by the City, or City's representative. The obligations of the Contractor under this Paragraph shall not include normal wear and tear under normal usage. If the Contractor does not, within ten (10) days after notification from the Project Manager, signify his intention in writing or in action to correct work, as described above, then the Project Manager may proceed with the Work and charge the cost thereof to the account of the Contract as herein before provided.

62. SUBSTANTIAL COMPLETION / FINAL COMPLETION "Substantial Completion" (including similar and like phrases, such as "substantially complete" and "substantially completed") and "Final Completion" (including similar and like phrases, such as "finally complete" and "finally completed") of the Project or the portion thereof shall have the meaning respectively ascribed to such terms in this Section 62. "Substantial Completion" means the Work and the Project have been substantially complete to permit utilization of the Project or the Work, or portion thereof, for its intended purpose with only agreed-to punch list items remaining. Substantial completion requires not only that the Work be sufficiently completed to permit utilization, but that the City can *effectively* utilize the substantially completed Work. "Final Completion" means that the Work and the Project are finally, fully and completely installed and completed in

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accordance with the Contract Documents, with all punch list items having been finally and fully completed to the City's satisfaction and no outstanding item of Work or other Project obligation on the part of Contractor remains. Determination of substantial completion and final completion is solely at the discretion of the City and shall be determined and certified by the City in writing (for purposes of the Project, all Work, and all Contract Documents, a "Certificate of Substantial Completion" and a "Certificate of Final Completion", respectively). Substantial completion of all or any part of the project entitle the Contractor to acceptance under the contract. At such time as the Contractor believes it has substantially completed the Work and the Project and prior to requesting a final inspection, the Contractor shall make written request for an inspection for substantial completion. Such request shall be made no less than seven calendar days prior to the requested date of inspection. An inspection will be made by the City and a determination will be made as to whether or not the Work is in fact substantially complete. If the City determines that the Work and the Project are substantially complete, a "punch list" will be developed and agreed to in writing by the parties. "Punch Lists" generated by Contractor containing numerous items or items which may affect the intended use of the work will be considered cause to delay issuance by the City of a Certificate of Substantial Completion. Operation and Maintenance manuals shall be submitted and approved by the City prior to issuance of any Certificate of Substantial Completion.

63. TRANSFER OF TITLE The Contractor warrants that title to all work, materials and equipment covered by any Application for Payment will pass to the City either by incorporation in construction or upon the receipt of payment by the Contractor, free and clear of all liens, claims, interests or encumbrances, and that no Work, materials, or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any person performing the Work at the site or furnishing materials or equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person(s). Notwithstanding any provision hereof or of any one or more of the Contract Documents to the contrary, the City shall have all, full, sole and exclusive right, title and ownership of, in and to all aspects and components of the Work and the Project for which the City has remitted payment to the Contractor, immediately thereupon and free and clear of all liens, claims, interests and other encumbrances of all types and natures.

64. USE OF PREMISES Whenever, in the opinion of the Project Manager, any portion of the Work is completed or is in an acceptable condition for use, it shall be used for the purpose it was intended, however, such use shall not be held as acceptance of that portion of the Work, or as a waiver of any of the provisions of the Contract.

65. DETERMINATION OF CITY'S LIABILITY The acceptance by the Contractor of payment made as aforesaid in Sections 58 and 59 above shall operate as and be a release to the City, the Mayor, the Council and every officer and agent thereof, from all claims by and liabilities to the Contractor for anything done or furnished for or relating to or affecting the Work under the Contract.

66. LIMITATIONS OF LIABILITY The mention of any specific duty or liability of the Contractor in any part of the Specifications shall not be construed as a limitation or restriction upon any general or other liability or duty imposed upon the Contractor. Except only as expressly set forth to the contrary elsewhere in the Contract Documents, the Contractor waives recovery of any and all punitive, special, indirect and consequential damages, including damages, losses and other injuries incurred by the Contractor for

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principal office expenses, including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of overhead and profit, from the City arising out of, relating to or connected with, whether in whole or in part, the Contract, the Work and/or the Project, and Contractor hereby agrees not to seek any of the same from the City. Said waiver is applicable to all punitive, special, indirect, and consequential damages in any way related to the City's termination in accordance with any provision of the Contract or as otherwise authorized by any one or more of the Laws and Regulations. Notwithstanding the foregoing, Contractor does not waive damages arising out of bodily injury to any Person or damage to any property caused by or resulting from the sole negligence of the City or its agents or employees.

67. PRESERVATION OF MONUMENTS AND TREES The Contractor shall be responsible for the preservation of all public and private property, trees, monuments, highway signs, markers, fences, and curbs or other appurtenances, and shall use every precaution to prevent damage or injury thereto. Any expense necessary to provide adequate protection, whether such designated item be on or off the right-of-way, shall be assumed by the Contractor.

68. PUBLIC ACCESS The Contractor shall at all times conduct the Work in such a manner as to ensure the least obstruction to traffic practicable. The convenience and safety of the general public and the residents along the improvement and anywhere near the Project site shall be provided for by Contractor in an adequate and satisfactory manner. Fire hydrants shall be kept accessible to fire apparatus at all times. ADA access shall remain accessible. Contractor hereby acknowledges and agrees that the Project site is part of a greater public space which is frequented by members of the public on a regular basis for various reasons and uses, and Contractor shall take all necessary and advisable precautions to and for such persons, reasons and uses.

69. HAZARDOUS AND TOXIC SUBSTANCES Manufacturers and distributors are required by Federal "Hazard Communication" provision (29 CFR 1910.1200), and the Maryland "Access to Information About Hazardous and Toxic Substances" law to label each hazardous material or chemical container, and to provide Material Safety Data Sheets to the purchaser. The Contractor must comply with these laws and must provide the City with copies of all relevant documents, including Material Safety Data Sheets, prior to performance of services or contemporaneous with the delivery of goods. Further, Contractor shall at all times during or in connection with performance of the Work or the Project observe and follow (and require all subcontractors and all other persons whatsoever to observe and follow) all applicable local, county, state, federal and other laws, statutes, rules, orders, regulations, codes, ordinances, bylaws, orders, requirements and the like governing or addressing in any manner any one or more substances, materials or things which are or may be dangerous or harmful to health and/or the environment or that have otherwise been deemed hazardous, toxic or dangerous (including potentially so) (each a "Hazardous Substance"). Contractor shall be solely responsible for full compliance with all applicable Laws and Regulations governing or otherwise addressing any Hazardous Substance in connection with any aspect of the Project.

70. MAINTENANCE OF VEHICULAR TRAFFIC If applicable and unless otherwise directed by the Project Manager, traffic must be maintained on all roadways within the construction area continuously or with the least amount of interruption during the construction period necessary to minimize accidents and

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accident severity and maintain safety while at the same time minimizing inconvenience to the traveling public and the Contractor. The Project Manager shall have the exclusive right to order a road to be closed or to remain open. No equipment will be stored or permitted to stand within the limits of the roadway right-of-way where traffic must be maintained. Any earth or other object dropped on the surface of the existing road shall be removed immediately to avoid possible hazardous conditions. The Contractor shall prepare and submit a Traffic Control Plan (“TCP”) for the Project Manager's review, revision, and approval, at least ten days before beginning Work, unless otherwise directed. All Traffic Control Devices shall be in accordance with the Manual on Uniform Traffic Control Devices (“MUTCD”), latest edition (and all revisions). With the approved TCP implemented, the Contractor will be permitted to work with the following provisions:

- (a) Traffic Lanes; General. All traffic lanes must be restored by Contractor at the end of each day unless specifically authorized otherwise, in advance in writing, by the Project Manager. The City reserves the right to modify or expand on the methods of traffic control specified and to restrict working hours if, in the opinion of the Project Manager, the Contractor's operations are a detriment to traffic during rush hour periods.
- (b) Signage. Signs on fixed supports shall be mounted on two posts. Signs mounted on portable supports are suitable for temporary conditions. During periods of partial shutdown, or extended periods when no Work is being performed, the Contractor shall remove or adequately cover all construction signs as directed by the Project Manager. The Contractor shall be responsible for removing, storing, covering, and resetting all existing traffic signs and delineators that become inapplicable and will confuse traffic during the various stages of construction, the cost of which is included in the Contract Sum and it shall be accomplished by Contractor at no additional compensation, as incidental to the Contract. Any signs lost or damaged will be replaced by the Contractor at its expense. The Contractor shall provide, maintain in new condition, and move when necessary or directed all traffic control devices used for the guidance and protection of vehicles. The Contractor shall be responsible for providing the appropriate signs to reflect varying traffic patterns prior to the commencement of a new stage of construction. Traffic must be safely maintained at all times throughout the entire length of the Project. No additional compensation shall be paid to the Contractor for traffic maintenance, even if the Contract Time exceeds the contractually specified completion date or working days. When required lane shifts are implemented, existing painted lane markings no longer applicable shall be removed by Contractor to the satisfaction of the Project Manager.
- (c) Crash Cushions. Temporary crash cushions are to be installed as shown on the Plans. Unless otherwise specified, sand containers shall be used. The crash cushions shall conform to Subsection 104.10 of the MDSHA Specifications. Crash cushions shall be reset to reflect changing traffic patterns caused by different stages of Traffic Control. The crash cushions shall be reset at locations shown on the Plans or as directed by the Project Manager. Should any of the sand container components be damaged during the resetting of the system or during the course of the Project, the Contractor shall replace the damaged components at its own expense.

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- (d) Flaggers; Traffic Control. The Contractor shall have flaggers on the Project for the purpose of controlling traffic while maneuvering heavy equipment. This may require a temporary lane closure in any of the specified Traffic Control Phases. These temporary lane shutdowns shall be kept to a minimum and the normal traffic pattern for the Traffic Phase shall be restored as quickly as possible. The Contractor shall comply with Section B-20 of the MUTCD regarding flagger signing. Prior to stopping Work each day the Contractor will be required to reshape all graded areas and eliminate all drop-offs not protected by barriers by filling with compacted stone at maximum of 8:1 slope. All barriers and barricades shall be adequately illuminated at night, as specified herein or elsewhere in the Contract Documents, and all lights for this purpose shall be kept operative from sunset to sunrise. No Work shall be commenced in any stage of construction until the barriers and barricades for that stage, indicated on the Plans, or as specified by the Project Manager, are completely in place. The Contractor will be solely responsible for all accidents and damages to any persons and property resulting from its operations. Compliance with prescribed precautions contained herein, elsewhere in the Contract Documents or in the MSHA Specifications or Manual on Uniform Traffic and Control shall not relieve the Contractor of its primary responsibility to take all necessary measures to protect and safeguard the Work, nor relieve the Contractor from any responsibilities prescribed by GP-7 of the January 2001 MSHA Standard Specifications for Construction and Materials. The Contractor shall notify and obtain approval in writing from the Project Manager at least 48 hours before changing any Traffic Control Phase. Any construction materials or debris dropped on the roadway surface shall be removed immediately to avoid possible hazardous conditions.
- (e) Materials. The Contractor shall provide, maintain in first class condition, replace, and move when necessary or directed all materials, devices, flagging, etc., required to maintain traffic in accordance with the Traffic Control Plans or as directed by the Project Manager. Reference is made to the latest edition of the MUTCD, wherein all such items are fully described with regard to use, application, warranties, size, color and placement, and wherein typical traffic control device layouts are shown, as all such devices and techniques planned for use on the Project shall strictly conform to the Manual's requirements except as noted on the Plans. When any of the following items have been established on the Plans or as directed by the Project Manager, the Specifications will be adhered to in accordance with the respective sections.
- (f) Lights; Warnings. All banners and imitation barrels shall be adequately illuminated at night, and all lights for this purpose shall be kept operative from sunset to sunrise. Steady burning warning lights shall be used to delineate channelization through and around obstructions in a construction or maintenance area, on detour curves, on lane closures, and in other similar conditions (MUTCD 6E-4, 6E-5). Flashing warning lights shall be the means for identifying a particular and individual hazard and shall not be used in sequence, in clusters, or for delineation (MUTCD: 6E-5, 6E-6). Where noted on the Plans the first two (2) warning signs shall include a "High Level Warning Device." In addition to the flags the signs shall also be equipped with a Type "B" High Intensity Flag Warning Light. This device must meet the requirements of MUTCD 6C-11 and 6E-5. The device is included in the Contract Sum and shall be considered incidental, and no special compensation will be paid.

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- (g) **Barriers.** Temporary concrete barriers shall be installed on the roadway approaches as shown on the Plans or as approved in writing. Any permanent facilities damaged as a result of anchoring temporary concrete barriers (anchor holes, etc.) shall be repaired to the satisfaction of the Project Manager using an epoxy grout or other material as may be specified by the Project Manager. Epoxy grout shall consist of sand and epoxy, mixed by volume according to manufacturer's recommendations.
- (h) **Method of Measurement and Basis of Payment.** All work and materials required under the TCP are included in the Contract Sum and Contractor agrees that there will be no special compensation paid for maintenance of vehicular traffic as described above and the cost shall be considered incidental to the Contract and included in the Contract Sum.

71. PARKING, STORAGE AND STAGING AREAS Parking, storage, and staging areas for the Contractor's use during the Project must have prior written approval of the Project Manager. All areas used for storage of equipment or material shall be restored to their original condition, immediately upon completion of the Work. No additional compensation will be provided for restoring, re-grading, placement of topsoil, and seed and mulch in these areas.

72. PEDESTRIAN TRAFFIC Pedestrians shall be safeguarded by the use of signs, lights, barricades and barriers as shown on the traffic control plan and/or directed by the Project Manager. Pedestrian traffic shall be maintained by Contractor at all times unless specifically authorized otherwise, in advance in writing, by the Project Manager. The Contractor shall submit a pedestrian traffic safety plan in accordance with the MUTCD, incorporating safety measures and other provisions to fully implement the intent of this paragraph. All work and materials required to prepare and implement the pedestrian traffic safety plan are included in the Contract Sum and shall be considered incidental to the Contract and there shall be no special compensation paid for this item. No additional compensation shall be paid for maintenance of vehicular and pedestrian traffic if for whatever reason the Project time extends beyond the Contract-specified completion date or working days.

73. ADA ACCESS Where ADA access exists within the line of work under the Contract, it will be the Contractor's responsibility to maintain said access during the life of the Contract. This service is included in the Contract Sum and is considered to be incidental to the Contract and no special compensation will be paid for this service.

74. TOILET FACILITIES Toilet facilities meeting MOSHA standards shall be provided at the job site. All costs and expenses thereof are included in the Contract Sum. No special compensation shall be paid therefor.

75. STAKEOUT-CONSTRUCTION CONTROL Survey construction control provided by the City shall be limited to the baseline with stations not over 100 feet, and the elevation of the top of each marked point. P.C.s, P.T.s, P.I.s, P.V.T.s, and at least one point on the tangent beyond the end of each curve will be staked. The Contractor shall request baseline stakeout a minimum of five days in advance of construction. Stakeout data other than stated above will be furnished by the construction Contractor per MDSHA Section 815 for structures, otherwise per WSSC specs. section 01000(H) and as described in detail below and in any one or more of the other Contract Documents. The City's responsibility for stakeout for the

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entire Project shall be limited to that data described above and this shall be provided only once. The Contractor shall preserve or otherwise ensure adequate survey controls exist throughout the life of the Contract.

Surveys and stakeout shall be accomplished by the Contractor as outlined above and in conformance with WSSC specifications Section 01000-10-I I(H), entitled "Construction Stakeout By Contractor." The provisions therein are primarily for pipeline stakeout. The Contractor's responsibilities under the Contract are hereby expanded to include, in addition to pipeline stakeout, similar responsibilities for all phases of stakeout necessary to construct all facilities, systems and other improvements under the Contract including but not limited to clearing and grubbing excavation, pavement, curbs and gutters, storm drainage pipes and facilities, culverts, structures, storm water management facilities, street lights, traffic signal conduits and components, noise walls, retaining walls, ditches and sediment control features. The stakeout and survey record data shall be preserved and turned over to the City for filing following completion of specific components of Work.

Method of Measurement and Payment Generally: stakeout is included in the Contract Sum and shall be considered incidental to the Contract and no special compensation shall be paid therefor. Where payment is provided, progress payments for stakeout shall be made based on the percentage resulting from the price bid for stakeout divided by the total bid, multiplied by the monthly payment exclusive of the stakeout payment, except the final payment shall be adjusted as necessary to equal the total price bid for stakeout.

Grade Sheet by Contractor: Grade sheets showing hub and design elevations for roadway, water mains, drainage structures and piping, walks, lights, infiltration facilities clearing/grubbing, excavation, and related components will be provided by the Contractor at least 8 hours in advance of construction and will be subject to approval by the Project Manager. Stakeout for curb and gutter in all vertical and horizontal curves is to be at intervals of 25 feet or less unless otherwise specifically authorized by the Project Manager. This Work is considered incidental to the Contract and no extra compensation will be paid.

76. DEBRIS Under no circumstance will any open fires be permitted within the City of Rockville. All debris will be removed and hauled from site (except when otherwise specifically authorized in the bid document) and disposed in accordance with all applicable Laws and Regulations. No special compensation will be paid as all costs for off-site disposal are included in the Contract Sum and shall be considered incidental to the Contract.

77. CLEAN UP In addition to any provisions regarding clean up in any one or more of the other Contract Documents, clean up, including the restoration of areas of construction, shall proceed as quickly as is practicable. The period between construction and final clean up shall normally not exceed one week. If at any time during the course of the Work the cleaning operation in any given area becomes delinquent in the opinion of the Project Manager, the Project Manager may order that construction be stopped until such cleaning is completed. Any such order shall not extend the Final Completion date under the Contract. Unless otherwise indicated, all materials razed, demolished, or otherwise removed from the Work site shall become the property of the Contractor and shall be disposed of legally and properly off site by

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Contractor at its expense. Upon Final Completion of the Work and before acceptance and final payment shall be made, the Contractor shall clean and remove from the street, footways, lawns, and adjacent property, all surplus and discarded materials, rubbish and temporary structures, restore in an acceptable manner all property, both public and private, which has been damaged during the prosecution of the Work, and shall leave the Work area in a neat and presentable condition throughout the entire length of the project under contract. Notwithstanding the foregoing, Contractor shall keep the Work area in a neat and presentable condition at all times during the Project. If the Contractor fails to clean up at Final Completion of the Work or at any other time, the City may do so for and on behalf of Contractor and the cost thereof shall be charged to the Contractor.

78. SEVERABILITY If any clause, provision, paragraph, subsection, Section or Article of the Agreement or these General Conditions shall be ruled invalid by any court of competent jurisdiction or other tribunal having jurisdiction, then the parties shall: (i) promptly negotiate a substitute for such clause, provision, paragraph, subsection, Section or Article which shall, to the greatest extent legally permissible, effectuate the intent of the parties in the invalid clause, provision, paragraph, subsection, Section or Article; (ii) if necessary or desirable to accomplish item (i) above, apply to the court or other tribunal having declared such invalidity for a judicial construction of the invalidated portion hereof or thereof, as the case may be; and (iii) negotiate such changes, in substitution for or addition to the remaining provisions hereof or thereof, as the case may be, as may be necessary in addition to and in conjunction with items (i) and (ii) above to effect the intent of the parties in the invalid provision. The invalidity of such clause, provision, paragraph, subsection, Section or Article shall not affect any of the remaining provisions hereof or of the Agreement, and the Agreement and these General Conditions shall be construed and enforced as if such invalid portion did not exist.

79. CITY'S CONSENT, APPROVAL AND DETERMINATION For all purposes of the Work, the Project and the Contract Documents, in any and all cases and instances in which the City may or is required to approve, consent, opine, accept or otherwise make any decision, choice or determination, including any determination of satisfaction, the City may do so in each instance at the City's sole, absolute and unfettered discretion, notwithstanding any other provision hereof or thereof to the contrary. Without limiting the generality of the foregoing, the parties agree there shall be no implied or constructive acceptance with respect to any portion of the Work or the Project. For purposes of this Section 79, "City" includes the Architect, Project Manager, the City Council, the Mayor and all other officers, employees, agents and representatives of the City.

80. CONTRACTOR'S INSURANCE Prior to the Effective Date, the Contractor must obtain at its own cost and expense and keep in force and effect during the duration of the Work and the Project including all extensions, as well as beyond Final Completion as and to the extent required by any of the Contract Documents, the following insurance with an insurance company/companies licensed to do business in the State of Maryland evidenced by a certificate of insurance and/or copies of the insurance policies. The Contractor's insurance shall be primary. The Contractor must electronically submit to the Purchasing Division a certificate of insurance prior to the start of any Work. In no event may the insurance coverage be less than shown below or otherwise required by any of the Contract Documents. Contractor shall so obtain and maintain insurance as follows:

Exhibit C – General Conditions

| Type of Insurance | Amounts of Insurance | Endorsements and Provisions |
|---|---|---|
| <p>1. <i>Workers' Compensation</i></p> <p>2. <i>Employers' Liability</i></p> | <p>Bodily Injury by Accident: \$100,000 each accident</p> <p>Bodily Injury by Disease: \$500,000 policy limits</p> <p>Bodily Injury by Disease: \$100,000 each employee</p> | <p>Waiver of Subrogation: WC 00 03 13 Waiver of Our Rights to Recover From Others Endorsement signed and dated.</p> |
| <p>3. <i>Commercial General Liability</i></p> <p>a. Bodily Injury</p> <p>b. Property Damage</p> <p>c. Contractual Liability</p> <p>d. Premise/Operations</p> <p>e. Independent Contractors</p> <p>f. Products/Completed Operations</p> <p>g. Personal Injury</p> | <p>Each Occurrence: \$1,000,000</p> | <p>City to be listed as additional insured and provided 30 day notice of cancellation or material change in coverage. CG 20 37 07 04 and CG 20 10 07 04 forms to be both signed and dated.</p> |
| <p>4. <i>Automobile Liability</i></p> <p>a. All Owned Autos</p> <p>b. Hired Autos</p> <p>c. Non-Owned Autos</p> | <p>Combined Single Limit for Bodily Injury and Property Damage - (each accident): \$1,000,000</p> | <p>City to be listed as additional insured and provided 30 day notice of cancellation or material change in coverage. Form CA20 48 02 99 form to be both signed and dated.</p> |
| <p>5. <i>Excess/Umbrella Liability</i></p> | <p>Each Occurrence/Aggregate: \$1,000,000</p> | <p>City to be listed as additional insured and provided 30 day notice of cancellation or material change in coverage.</p> |
| <p>6. <i>Professional Liability</i> NOT REQUIRED</p> | <p>Each Occurrence/Aggregate: \$1,000,000</p> | |

Alternative and/or additional insurance requirements, when outlined under the Special Provisions, shall take precedence over the above requirements in part or in full as described therein.

BUILDERS RISK INSURANCE

In addition to the insurance requirements contained above, a Builders Risk Insurance Policy with coverage limits equivalent to the amount of the construction materials, equipment and property, evidencing the Mayor and Council as an additional insured to the policy is also required.

Contractor's insurance coverage shall be primary insurance as respects the City, its elected and appointed officials, officers, consultants, agents and employees, and any insurance or self-insurance maintained by the City shall be excess of the Contractor's insurance and shall not be called upon to contribute with it.

No change, cancellation or non-renewal shall be made or allowed in or for any insurance coverage without a thirty (30) day prior written notice to the City Purchasing Division in each instance. The Contractor shall electronically furnish a new certificate prior to any change or cancellation date. The failure of the Contractor to deliver a new and valid certificate will result in suspension of all payments and cessation of on-site work activities until a new certificate is furnished.

The Mayor and Council and the City's elected and appointed officials, officers, consultants, agents, and employees must be named as an additional insured on the Contractor's Commercial and Excess/Umbrella Insurance for liability arising out of Contractor's products, goods and/or work or services provided under

Exhibit C – General Conditions

the Contract. Additionally, the Mayor and Council must be named as additional insured on the Contractor's Automobile and General Liability Policies. Endorsements reflecting the Mayor, Council and all others as an additional insured are required to be submitted with the insurance certificate.

For all of Contractor's insurance, the certificate holder shall be the Mayor and the Council shown as follows:

CERTIFICATE HOLDER

The Mayor and Council of Rockville

(Contract #, title)

City Hall

111 Maryland Avenue

Rockville, MD 20850

81. SUBCONTRACTORS' INSURANCE Contractor agrees that all of its subcontractors and consultants and all other parties performing any aspect or component of the Work or the Project for or on behalf of Contractor shall obtain and maintain the same insurance as required of Contractor in Section 80 above and shall otherwise comply in full with all provisions thereof and all of the other Contract Documents respecting insurance. In addition, Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All insurance coverages for Contractor's subcontractors and consultants and all other parties performing any aspect or component of the Work or the Project for or on behalf of Contractor shall be subject to all the requirements stated herein and/or elsewhere in the Contract Documents, including those applicable to insurance.

82. UNCONTROLLABLE CIRCUMSTANCES

- (a) **Definition.** For purposes of the Contract and all Contract Documents, "Uncontrollable Circumstances" (each, an "Uncontrollable Circumstance") means any act, event or condition that is beyond the reasonable control of the party relying thereon as justification for not performing an obligation required of such party hereunder and that materially interferes with or materially increases the cost or time required for performing its obligations hereunder (other than payment or other monetary obligations) to the extent such act, event or condition is not the result of any error, act, omission, negligence, failure to exercise reasonable diligence, willful misconduct, or breach of the Contract by or on the part of such party. The provisions of this Section 82 shall supersede and govern and control over any contrary provision elsewhere in any of the other Contract Documents.
- (b) **Inclusions.** Subject to the foregoing provisions of Section 82(a) and the below provisions of Section 82(c), Uncontrollable Circumstances shall include the following:
- (i) A change in the Laws and Regulations;
 - (ii) Naturally occurring events (but not including reasonably anticipated weather conditions) for the City of Rockville, MD geographic area, such as landslides,

Exhibit C – General Conditions

- underground movement, hurricanes, earthquakes, fires, tornadoes, floods, epidemics, pandemics, lightning strikes, and other natural occurrences;
- (iii) Explosion, sabotage, or similar occurrence, acts of a declared public enemy, war, terrorism, blockade or insurrection, riot or civil disturbance; and
 - (iv) Strikes in the State of Maryland or nationwide; provided, however, that in the case of Contractor such strike must make the particular goods or services in question effectively unavailable to Contractor.
- (c) Exclusions. The City and Contractor agree that none of the following acts, events or circumstances shall constitute an Uncontrollable Circumstance, notwithstanding the provisions of Sections 82(a) or (b) above:
- (i) Any act, event or circumstance to the extent it would not have occurred if the affected party had complied with its obligations under or in connection with the Contract;
 - (ii) A change in interest rates, inflation rates, wage rates, insurance costs, commodity prices, currency values, exchange rates or other general economic conditions;
 - (iii) A change in the financial condition of the City, the Contractor, or any subcontractor, consultant or other party, person, individual or entity affecting any party's ability to perform its respective obligations in connection with the Project;
 - (iv) Any consequence of error, neglect or omission by the Contractor in the performance of any aspect of the Project;
 - (v) The failure of the Contractor to secure any one or more of the permits, licenses, consents, authorizations or other approvals necessary or advisable for the performance of any aspect of the Project;
 - (vi) Any reasonably anticipated weather condition for the Rockville, MD geographic area;
 - (vii) Any labor or other dispute involving one (1) or more employees of the Contractor or any of the Project subcontractors or consultants;
 - (viii) Any union or labor rule, requirement or demand having the effect of increasing the number of employees employed at the Project or otherwise increasing the cost or burden to the Contractor of performing any aspect of the Project;
 - (ix) The failure of any subcontractor or supplier to furnish any labor, material, service or equipment for any reason other than for an act or event expressly listed in Section 82(b) above as an Uncontrollable Circumstance;
 - (x) Any increase for any reason in premiums charged by the Contractor's insurer(s) or the insurance market generally for any of the insurance policies required by the Contract;
 - (xi) Any impact of prevailing wages, laws, or rates on one (1) or more of Contractor's costs or expenses with respect to wages and/or benefits; and
 - (xii) Any change in the Laws and Regulations pertaining to income taxes or otherwise monetarily affecting Contractor.
- (d) Relief from Obligations. Except as provided elsewhere in the Contract Documents to the contrary, neither the City nor the Contractor shall be liable to the other for any loss, damage, delay, default, or failure to perform any obligation under the Contract to the extent it results directly and wholly from an Uncontrollable Circumstance, provided the Party seeking to rely

Exhibit C – General Conditions

- thereupon for nonperformance timely complies with all provisions of this Section 82. The City and Contractor agree that the relief for an Uncontrollable Circumstance described in this Section 82 shall apply to all obligations in the Contract, except that, notwithstanding the foregoing or any other provision of this Contract to the contrary, no occurrence of an Uncontrollable Circumstance shall excuse or delay (i) the performance of a party's obligation to pay monies due and owing under this Contract, nor (ii) the performance of any obligation not directly affected by the occurrence of the Uncontrollable Circumstance.
- (e) **Notice and Mitigation.** The party relying upon the occurrence of an Uncontrollable Circumstance shall notify the other party by electronic mail as soon as practicable once the party experiencing such Uncontrollable Circumstance first knew or should have known of the occurrence thereof, followed by written notice delivered to the other party within 15 days of said email notice, which subsequent written notice shall detail: (i) the Uncontrollable Circumstance and the cause thereof (to the extent known); (ii) the date the Uncontrollable Circumstance began, its estimated duration, and the estimated period during which the performance of such Party's obligations hereunder shall be delayed or otherwise affected; (iii) its estimated impact on the other obligations of such party under the Contract; and (iv) reasonable mitigating action(s) which the party relying thereupon shall take in response thereto. The affected party shall also provide prompt written notice to the other party of the cessation of such Uncontrollable Circumstance. Whenever an Uncontrollable Circumstance shall occur, the Party claiming to be adversely affected thereby shall, as promptly as practicable, use all reasonable efforts to eliminate the cause thereof and to otherwise resume performance under the Contract. Further, while any Uncontrollable Circumstance continues, the party relying thereupon for nonperformance shall give notice to the other party before the first day of each succeeding month updating the information previously submitted by way of electronic or other notice. The party relying upon an Uncontrollable Circumstance shall bear the burden of proof and shall furnish promptly any additional documents and other information relating to the Uncontrollable Circumstance reasonably requested by the other party.
- (f) **Schedule Relief.** If and to the extent that an Uncontrollable Circumstance does or will delay Contractor's performance of any aspect of the Project or the Work, Contractor shall be entitled to a reasonable and appropriate extension of the Project schedule which properly reflects the interference with performance or the time lost as a result of the Uncontrollable Circumstance, and the Contractor shall perform all other Work without delay. In the event Contractor believes it is entitled to such Project schedule relief on account of any Uncontrollable Circumstance, Contractor shall expressly state the same in the email notice and subsequent written notice discussed in Section 82(e) above. Within 30 days of its receipt of such subsequent written notice from the Contractor, the City shall issue to Contractor a written determination as to the extent, if any, it concurs with the Contractor's claim for Project schedule relief.
- (g) **Acceptance of Relief Constitutes Release.** The Contractor's acceptance of any schedule relief in connection with an Uncontrollable Circumstance shall be deemed a full release of the City

Exhibit C – General Conditions

by the Contractor (as well as all persons claiming by, through or under the Contractor) from any and all losses, costs, expenses, damages, recoveries, remedies, and liabilities resulting from, connected with or otherwise attributable to, the event giving rise to the relief claimed.

83. CONSTRUCTION The various headings and captions to sections, subsections, paragraphs other provisions and parts of these General Conditions and those of the other Contract Documents are inserted for convenience, are not a part hereof or thereof, and shall not be used in the interpretation hereof or thereof. For all purposes of all Contract Documents, “including” means “including without implied limitation”, unless a different meaning is clearly intended. Further, there shall be no limitation implied with respect to any of the provisions of any of the Contract Documents. Notwithstanding any rule or legal principal to the contrary, no one or more of the Contract Documents nor any provision therein shall be read more favorably for or against any particular party by reason of the fact that such party or its representative(s) may have drafted the instrument or provision in question.

84. BINDING EFFECT; RELATIONSHIP OF PARTIES; NO THIRD-PARTY BENEFICIARIES

All Contract Documents are binding upon and inure to the benefit of the City and the Contractor, as well as their respective successors, permitted assigns, and legal representatives. There are no third-party beneficiaries of any of the Contract Documents whatsoever, notwithstanding anything to the contrary contained in any one or more of the same. Notwithstanding the foregoing, any one or more persons or parties associated with the City that are benefitted by any indemnification, defense or hold-harmless provisions hereof or of any of the other Contract Documents may enforce same fully as, if and when applicable, although no such enforcement or any other act or omission by any or such persons or parties shall expose such persons or parties to any liability or obligation whatsoever under or in connection with this Contract at any time. Notwithstanding anything to the contrary contained in elsewhere in any of the other Contract Documents, the City and Contractor are arm’s length contracting parties only for all purposes of the Project and the Contract, and no other association, such as a partnership, joint venture, or other relationship, is established or exists between them.

85. SURVIVAL All indemnification, defense and hold-harmless obligations set forth in any of the Contract Documents or otherwise associated with the Work or the Project, in whole or in part, shall survive the expiration or earlier termination of the Contract. Further, the following shall survive the expiration or earlier termination of the Contract: (i) all respective covenants, obligations and other liabilities of the parties that per the terms hereof or of any one (1) or more of the other Contract Documents expressly survive expiration or earlier termination of the Contract; and (ii) all respective covenants, obligations and other liabilities of the parties designed and/or intended to survive the expiration or termination of the Contract, although such design or intent is not expressly stated. The provisions of this Section 85 shall operate notwithstanding anything to the contrary contained herein or in any of the other Contract Documents to the contrary.

86. CONTRACTOR’S COMPLIANCE, GENERALLY For the avoidance of doubt, Contractor shall abide by and shall cause all its subcontractors and consultants, as well as all other persons and parties performing any portion of the Work by, on behalf of or at the direction of Contractor, all terms, provisions, and conditions set forth in the Contract Documents, timely, fully and completely in accordance with the provisions thereof. Without limiting the generality of the foregoing, Contractor shall follow all Specifications, Plans

Exhibit C – General Conditions

and Drawings, shall comply with all Laws and Regulations in connection with the Work and the Project, and shall otherwise perform and complete all Work and the Project in accordance with all Contract Documents.

87. STANDARD OF PERFORMANCE; LICENSURE The Contractor agrees that all Work and all components of the Project performed by itself or any other person, individual, party or entity shall at all times be performed in accordance with all Laws and Regulations and the following professional standard: All such Work shall be performed consistent with the professional skill and care ordinarily provided by prudent and professional contractors practicing in the same or similar locality under the same or similar circumstances. The Contractor shall perform all Work and shall ensure all Work performed by any other person, individual, party or entity shall be performed as expeditiously as is consistent with such professional skill and care and the orderly progress of the Work and the Project. The Contractor shall staff its office(s) with sufficient personnel and shall otherwise take all actions in order to perform the covenants under or in connection with the Contract in a prompt and continuous manner. Contractor further agrees to ensure that all Work and other aspects and components of the Project required to be provided by certain licensed, registered, authorized, or otherwise qualified persons shall be performed only by persons fully licensed, registered, authorized, and otherwise qualified to perform same, at all times in full compliance with all Laws and Regulations.

88. STATUTE OF REPOSE. To the extent applicable to the Project and required by any one (1) or more of the Laws and Regulations, the City shall not seek contribution or indemnity from Contractor for damages incurred for a claim, action or demand for wrongful death, personal injury or injury to real or personal property resulting from the defective and unsafe condition of an improvement to the real property of which the Project is a part occurring more than ten (10) years after the date the entire Work and Project first became available for their intended use. Application of this Section 1 shall be governed and limited by, as well as construed in accordance with, the provisions of applicable Laws and Regulations, the rights, remedies, and relief of and available to the City being restricted only as required thereby. For purposes of this Section 1, the meaning of “Laws and Regulations” is expanded to include all binding precedential case law of the State of Maryland and of the United States.

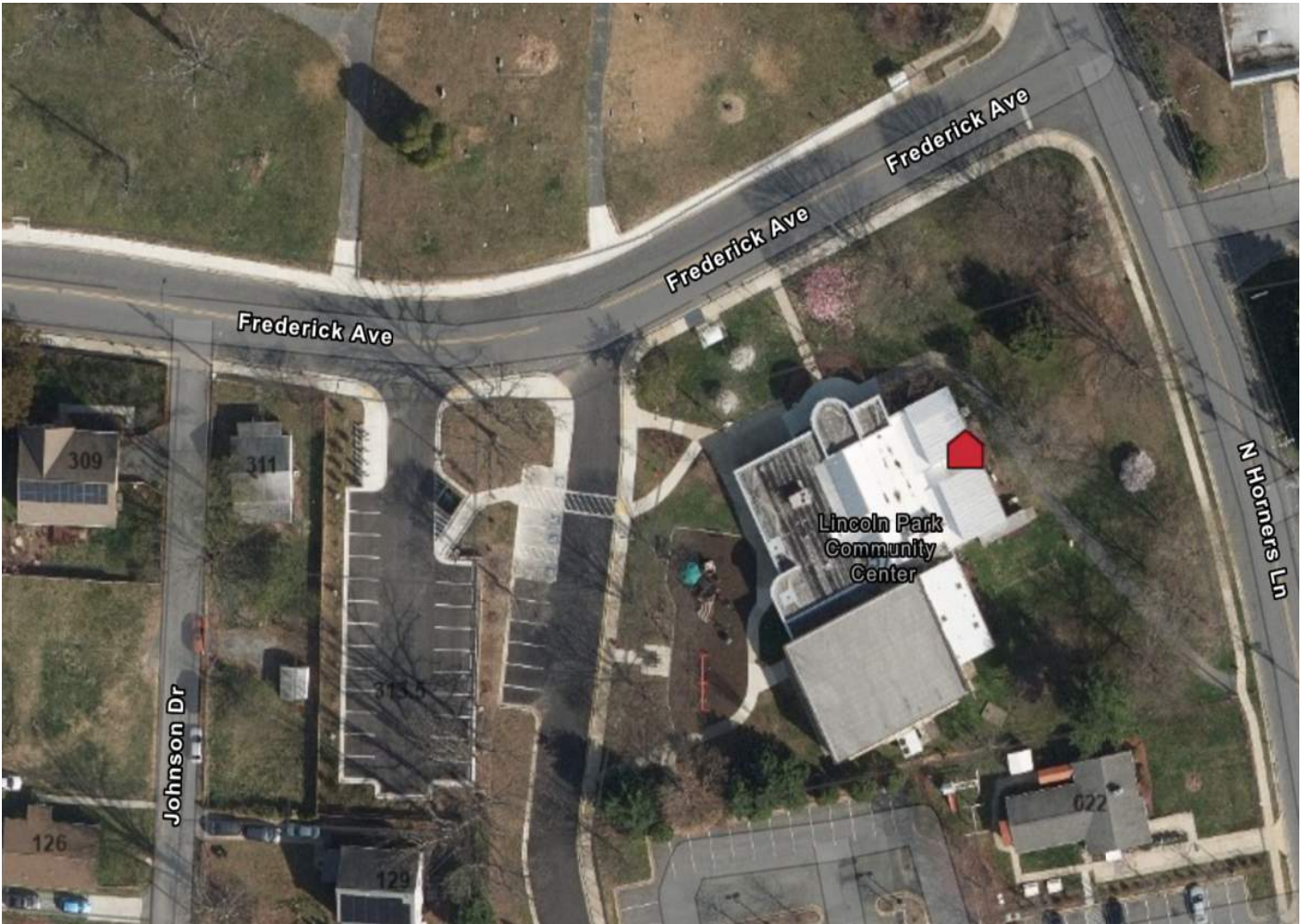
89. MARYLAND PUBLIC INFORMATION ACT. Contractor acknowledges and agrees that the City is subject to and must comply with the State of Maryland’s Public Information Act, Annotated Code of Maryland, Chapter 698, Title 4 of the General Provisions Article (the “PIA”). Contractor accordingly agrees that the City may disclose any and all materials, documents and other things, including photographs, photostats, films, microfilms, recordings, tapes, computerized records, communications, maps, drawings and any copy of a public record, subject to the PIA if requested, unless covered by one (1) or more exceptions to disclosure per the PIA. To the extent legally permissible, the City shall notify Contractor of any imminent disclosure of materials Contractor has delivered to the City labeled “Confidential” to afford Contractor a chance to seek judicial protection from disclosure thereof.

90. DISPUTE RESOLUTION; VENUE; JURISDICTION; CERTAIN WAIVERS Disputes regarding changes in and interpretations of the terms or scope of the Contract and denials of or failures to act upon claims for payment for extra work or materials or otherwise arising out of, related to or connected with the Project, the relationship of the Parties in connection therewith, and/or the Contract or any one or more of the

Exhibit C – General Conditions

other Contract Documents shall be solely and exclusively initiated, filed, tried and maintained in the state court located in Montgomery County, Maryland. The parties each expressly and irrevocably (i) waive any and all rights otherwise provided by any applicable law or legal rule or principle to remove the matter to any other state venue or to a federal venue, (ii) consent to the jurisdiction of such state courts in any such legal proceeding, (iii) waive any objection such party may have to the laying of the jurisdiction of any such legal proceeding, and (iv) waive its right to a trial by jury.

APPENDIX A SITE PLAN AERIAL



APPENDIX B PERMIT APPROVAL SHEET



2204-6907-ALT
THESE PLANS HAVE BEEN
REVIEWED AND APPROVED FOR
CODE COMPLIANCE.
01/31/2024
Chris Dempwolf

THE APPROVED PLANS AND
ATTACHED NOTES SHALL BE
AVAILABLE ON THE JOB SITE AT ALL
TIMES. INSPECTIONS WILL NOT BE
CONDUCTED WITHOUT THE
APPROVED PLANS

The approval of these drawings
does not permit the installation or
alteration of any
required/non-required fire
protection systems. A separate
fire alarm or sprinkler permit MAY
be required.

FM-5
C. Baggus 01/25/2024

SEE FIRE MARSHAL
REVIEW COMMENTS

General Notes: These plans have been reviewed for compliance with the Rockville City Fire Code and the 2018 NFPA 101, Life Safety code. Comments are referenced from 2018 NFPA 1, 2016 NFPA 13, NFPA 13R, & 2019 NFPA 101, unless otherwise indicated and shall be corrected prior to final occupancy inspection. Please contact the reviewer whose name appears above with any questions regarding these comments.

These plans were reviewed under Chapter 13, Existing Assembly Occupancies.
These plans were reviewed under Chapter 39, Existing Business Occupancies.
These plans were reviewed under Chapter 42, Storage Occupancies.
These plans were reviewed under Chapter 43, building Rehabilitation.

Montgomery County Health Department Review is required prior to release of the building permit.

Hazardous areas including but not limited to general storage areas, boiler/furnace rooms, maintenance shops, etc. shall have 1-hour separation, or automatic sprinklers and smoke partitions with self or automatic-closing doors. NFPA 101, 39.3.2.1.

Ceiling height shall be not less than 7 feet 6 inches. Projections from ceiling shall be at least 6 ft. 8 in. above the floor. NFPA 101, 7.1.5.1(1).

No door opening in a means of egress shall be less than 32 in. clear width. All projections into the opening (including door hardware) shall be counted as a reduction in the clear width. NFPA 101, 7.2.1.2.3.2. (1 thru 9).

During its swing, any door in a means of egress shall leave not less than one half the required width of an aisle, corridor, passageway, landing unobstructed. When fully open, door cannot project more than 7 inches into the required width. NFPA 101, 7.2.1.4.3.1.

Special locking arrangements such as delayed egress locks or access controlled egress doors shall comply with requirements of Chapter 7.

Every required exit, exit discharge, and exit access shall be maintained during construction. NFPA 101, 4.5.3.2.

Occupant load calculated at plan review is limited to 435 total occupants (including staff). Final capacity will be determined by the Fire Inspector at time of occupancy inspection.

Means of egress shall be illuminated in accordance with Chapter 7.

Provide exit signs in accordance with Chapter 7.

Exit signs having directional indicators shall comply with Chapter 7. Directional indicator shall be located outside of the exit legend, not less than 3/8 inch from any letter. NFPA 101, 7.10.6.2.

Emergency lighting shall be provided in accordance with Chapter 7.

Provide Fire Inspector with flame spread certificates for all interior finishes. Class A or B in the exits and exit access; Class A, B or C for other areas, smoke development not to exceed 450.

Electrical installations shall be in accordance with NFPA 70, The National Electrical Code. All electrical equipment must be clearly labeled, marked or stamped with the symbol of an electrical testing laboratory approved by the Maryland State Fire Marshal.

CoR Chapter 9, 11.1.7.1.2 In new buildings, excluding one- and two- family dwellings, if the Main Electrical Service Equipment Room does not have direct exit to grade, a shunt trip to disconnect the electrical service to the building must be provided as follows:
(a) In the fire Command Center, where a Fire Command Center is in the building
(b) At the fire alarm annunciator, where there is no Fire Command Center
(c) In an appropriately sized and weatherproof fire department access box on the address side of the building where there is no fire alarm annunciator or Fire Command Center.

In existing buildings, excluding one- and two- family dwellings, where there are significant upgrades to the building electrical service, such as modifying or replacing the switchgear, a disconnecting means must be provided as for new installations.

Ground-fault circuit-interrupter receptacles shall be installed within six- (6) feet of a sink, 2017 NEC 70, Section 210.8 (B)(1) & (5).

Installation/alteration of all HVAC shall be in accordance with NFPA 90A.

Provide duct smoke detection on supply side for all HVAC systems over 2000 CFM. Detectors shall not activate fire alarm.

Provide smoke detection on supply and return sides of all HVAC systems over 15,000 CFM. Detectors shall not activate fire alarm.

All fire dampers, smoke dampers, and ceiling dampers shall be operated prior to the occupancy of a building to determine that they function in accordance with the requirements of this standard. NFPA 90A, 7.2.

Fire/smoke dampers shall be labeled in accordance with 607.4 of the 2018 IMC.

Natural gas lines and appliances shall be installed and tested in accordance with NFPA 54, National Fuel Gas Code.

Flammable and combustible liquids shall be stored and used in accordance with NFPA 30. Please obtain a hazardous materials permit from Barbara Moore, Hazmat Permitting Program Specialist Hazardous Materials Use Permits Office of Emergency Management and Homeland Security at 240.777.2327.

Provide a Knox Box key lock box (NFPA 1, 18.2.2.1.) in a location approved by City of Rockville Fire Marshal Office. See attachment or Call 240.314.8256 or 8263 to discuss the requirements with the fire department Knox Box contact person.

Fire extinguishers shall be conspicuously located where they are readily accessible and immediately available in the event of fire. NFPA 10, 6.1.3.1.

Review and permit issuance by the City of Rockville Fire Marshal's Office shall not relieve the applicant of the responsibility of compliance with this Code. NFPA 1, 1.14.4.

When required by the AHJ (Authority Having Jurisdiction), revised construction documents or shop drawings shall be prepared and submitted for review and approval to illustrate corrections or modifications necessitated by field conditions or other revisions to approved plans. NFPA 1, 1.14.5.

LINCOLN PARK COMMUNITY CENTER RENOVATION AND ADA IMPROVEMENTS

357 FREDERICK AVE, ROCKVILLE, MD 20850

PERMIT 10/20/2023

GENERAL COMMENTS

1. All work performed, whether detailed on the approved plans or not, shall comply with all applicable codes, ordinances and referenced standards as adopted and amended by the City of Rockville and the State of Maryland.
2. This construction must comply with all applicable provisions outlined in the Maryland State Accessibility Code.
3. Any changes to the "APPROVED PLANS" shall be submitted to and approved by this Division prior to the change being made in the field.
4. Review all comments prior to scheduling an inspection.
5. Approved plans MUST be on-site for all inspections. INSPECTIONS WILL NOT BE PERFORMED WITHOUT THE APPROVED PLANS PRESENT. Permits must be posted where visible from the street or front entrance.
6. Field inspections shall determine code compliance. Any omissions or errors on the approved plans do not constitute approval of non-compliant installations.
7. The approval of these drawings does not allow the installation of the required/non-required fire protection system. OBTAIN A SEPARATE FIRE ALARM AND SPRINKLER PERMIT.

Refer to trade-specific drawings for trade-specific comments.
No further items found at this time; any future findings will require proper resolution to code conformance.

Other agency approvals may be required prior to the final inspections and or occupancy of this structure.

BUILDING REVIEW COMMENTS

Reviews are in accordance with the 2018 International Building Code, including City of Rockville and State of Maryland Amendments, unless noted otherwise.

1. Interior finishes shall comply with Chapter 8 of the IBC.

ELECTRICAL REVIEW COMMENTS

Reviews are in accordance with the 2017 NFPA 70, National Electrical Code, including City of Rockville and State of Maryland Amendments, unless noted otherwise.

1. Emergency means of egress lighting must be provided in all rooms or spaces required to have more than one exit or exit access. Light must be powered by an emergency electrical system in conformance with Article 700 of NFPA 70, (IBC §1008)
2. All luminaires installed in suspended ceilings shall be supported directly from the building structure. A minimum of 2 wires of size No. 12 steel or larger shall be used. These wires must be tied to opposite corners of the luminaire and attached independently to the building structure. Exception: Circular luminaires with a diameter 12 inches or less may be supported with one wire of No. 12 steel or larger. (NFPA 70 §410.36 (B) amended)
3. All luminaires, lampholders and retrofit kits shall be listed. (NFPA 70 §410.6)
4. GFCI protection shall be provided as applicable in accordance with section 210.8 (B)
 - 4a. All bathroom receptacles shall be provided with GFCI protection.
 - 4b. All kitchen receptacles shall be provided with GFCI protection.
 - 4c. All receptacles within 6 feet of the outside edge of a sink shall be provided with GFCI protection.
 - 4d. All outdoor receptacles shall be provided with GFCI protection.

MECHANICAL REVIEW COMMENTS

Reviews are in accordance with the 2018 International Mechanical Code, including City of Rockville and State of Maryland Amendments, unless noted otherwise.

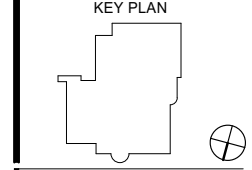
1. Diffusers in suspended ceilings shall be adequately supported independent of the ceiling assembly and tied at opposite ends to the building structure with #12 wire or equivalent. (603.18.3 IMC amended)
2. Balance reports shall be made available to field inspectors.

PLUMBING REVIEW COMMENTS

Reviews are in accordance with the 2018 International Plumbing Code, including City of Rockville and State of Maryland Amendments, unless noted otherwise.

1. Maximum flow rates and consumption for plumbing fixtures and fixture fittings shall not exceed those values listed in Table 604.4 of the 2018 International Plumbing Code (IPC), as amended by the City of Rockville.
2. Sanitary and Storm Lines shall be identified in accordance with the City of Rockville "Identification of Storm and Sanitary Discharge Lines" document.

LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS
PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850
OWNER: THE CITY OF ROCKVILLE
PROJ. NO.: 1916A



| REVISIONS | | |
|-----------|-----------|-------------------------|
| MARK | DATE | ISSUE |
| 1 | 1/23/2023 | PERMIT COMMENT RESPONSE |
| | | |
| | | |
| | | |
| | | |
| | | |

| ISSUANCES | |
|------------|----------|
| DATE | ISSUANCE |
| 10/20/2023 | PERMIT |

COVER SHEET

CS-001

OWNER

CITY OF ROCKVILLE
111 MARYLAND AVENUE
ROCKVILLE, MD 20850
TEL: 240.314.5000

ARCHITECT

HUGHES GROUP ARCHITECTS
22630 DAVIS DRIVE, SUITE 175
STERLING, VA 20164
TEL: 703.437.6600

STRUCTURAL

CAGLEY & ASSOCIATES
6141 EXECUTIVE BLVD
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APPENDIX C

MONTGOMERY COUNTY NOISE ORDINANCE

Chapter 31B – Noise Control

- § 31B-2. Definitions.
- § 31B-3. Regulations.
- § 31B-4. Noise control advisory board.
- § 31B-5. Noise level and noise disturbance violations.
- § 31B-6. Noise level and noise disturbance standards for construction.
- § 31B-7. Measurement of sound.
- § 31B-8. Noise sensitive areas.
- § 31B-9. Leafblowers.
- § 31B-10. Exemptions.
- § 31B-11. Waivers.
- § 31B-12. Enforcement and penalties.

Sec. 31B-1. Declaration of policy.

- (a) The County Council finds that excessive noise harms public health and welfare and impairs enjoyment of property. The intent of this Chapter is to control noise sources to protect public health and welfare and to allow the peaceful enjoyment of property. This Chapter must be liberally construed to carry out this intent.
- (b) The Department of Environmental Protection administers this Chapter.
 - (1) The Department must coordinate noise abatement programs of all County agencies, municipalities, and regional agencies.
 - (2) A County agency, municipality in which this Chapter applies, or regional authority subject to County law must not adopt a standard or regulation that is less stringent than this Chapter or any regulation adopted under this Chapter.
 - (3) The Director may form an Interagency Coordinating Committee to assist the Director in coordinating noise control policy. If the Director forms the Committee, the Director must designate an individual to chair the Committee. The members of the Committee should be designated by County, local, and regional agencies that the Director invites to participate.
 - (4) The Department must establish procedures to identify and reduce noise sources when the County plans and issues permits, variances, exemptions, or approvals.
 - (5) The Department should make recommendations to the County Executive, County Council, and Planning Board regarding noise control policy, regulations, enforcement, and noise sensitive areas. (1996 L.M.C., ch. 32, § 1.)

Editor's note—See County Attorney Opinion dated 3/16/92 explaining that the Washington Metropolitan Area Transportation Authority (esp. Metrorail) is subject to the County's noise control law, although an exemption may be obtained if it is in the public interest.

Sec. 31B-2. Definitions.

In this Chapter, the following words and phrases have the following meanings:

- (a) *Construction* means temporary activities directly associated with site preparation, assembly, erection, repair, alteration, or demolition of structures or roadways.
- (b) *dba* means decibels of sound, as determined by the A-weighting network of a sound level meter or by calculation from octave band or one-third octave band data.
- (c) *Daytime* means the hours from 7 a.m. to 9 p.m. on weekdays and 9 a.m. to 9 p.m. on weekends and holidays.

- (d) Decibel means a unit of measure equal to 10 times the logarithm to the base 10 of the ratio of a particular sound pressure squared to the standard reference pressure squared. For this Chapter, the standard reference pressure is 20 micropascals.
- (e) *Department* means the Department of Environmental Protection.
- (f) *Director* means the Director of the Department of Environmental Protection or the Director's authorized designee.
- (g) *Enforcement officer* means:
 - (1) for a noise originating from any source:
 - (A) an employee or agent of the Department designated by the Director to enforce this Chapter;
 - (B) a police officer; or
 - (C) a person authorized under Section 31B-12(a) to enforce this Chapter;
 - (D) a person authorized by a municipality to enforce this Chapter; or
 - (2) for a noise originating from an animal source, the Director of the Animal Services Division in the Police Department or the Director's authorized designee.
- (h) *Impulsive noise* means short bursts of a acoustical energy, measured at a receiving property line, characterized by a rapid rise to a maximum pressure followed by a somewhat slower decay, having a duration not greater than one second and a field crest factor of 10 dBA or more. Impulsive noise may include, for example, noise from weapons fire, pile drivers, or punch presses.
- (i) *Leaf blower* means any portable device designed or intended to blow, vacuum, or move leaves or any other type of unattached debris or material by generating a concentrated stream of air. Leafblower includes devices or machines that accept vacuum attachments.
- (j) *Nighttime* means the hours from 9 p.m. to 7 a.m. weekdays and 9 p.m. to 9 a.m. weekends and holidays.
- (k) *Noise* means sound, created or controlled by human activity, from one or more sources, heard by an individual.
- (l) *Noise area* means a residential or non-residential noise area:
 - (1) *Residential noise area* means land in a zone established under Section 59-C-1.1, Section 59-C-2.1, Division 59-C-3, Section 59-C-6.1, Section 59-C-7.0, Section 59-C-8.1, Section 59-C-9.1 for which the owner has not transferred the development rights, or Section 59-C-10.1, or land within similar zones established in the future or by a political subdivision where Chapter 59 does not apply.
 - (2) *Non-residential noise area* means land within a zone established under Section 59-C-4.1, Section 59-C-5.1, Section 59-C-9.1 for which the owner has transferred the development rights, or Division 59-C-12, or land in similar zones established in the future or by a political subdivision where Chapter 59 does not apply.
- (m) *Noise disturbance* means any noise that is:
 - (1) unpleasant, annoying, offensive, loud, or obnoxious;
 - (2) unusual for the time of day or location where it is produced or heard; or
 - (3) detrimental to the health, comfort, or safety of any individual or to the reasonable enjoyment of property or the lawful conduct of business because of the loudness, duration, or character of the noise.
- (n) *Noise sensitive area* means land designated by the County Executive as a noise sensitive area under Section 31B-8.

- (o) *Noise-suppression plan* means a written plan to use the most effective noise-suppression equipment, materials, and methods appropriate and reasonably available for a particular type of construction.
- (p) *Person* means an individual, group of individuals, corporation, firm, partnership, or voluntary association; or a department, bureau, agency, or instrument of the County or any municipality, or of any other government to the extent allowed by law.
- (q) *Prominent discrete tone* means a sound, often perceived as a whine or hum, that can be heard distinctly as a single pitch or a set of pitches. A prominent discrete tone exists if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the 2 contiguous one-third octave bands by:
 - (1) 5 dB for center frequencies of 500 Hz and above;
 - (2) 8 dB for center frequencies between 160 and 400 Hz; or
 - (3) 15 dB for center frequencies less than or equal to 125 Hz.
- (r) *Qualifying performing arts facility* means the outdoor area of a building, outdoor seasonal, temporary, or permanent stage, or other clearly defined outdoor area or space, which is:
 - (1) used for an outdoor arts and entertainment activity; and
 - (2) owned or operated by the County; and
 - (3) so designed by the County Executive in an Executive Order published in the County Register. The Executive may revoke a designation at any time by publishing an Executive Order revoking the designation in the County Register.
- (s) *Receiving property* means any real property where people live or work and where noise is heard, including an apartment, condominium unit, or cooperative building unit.
- (t) *Sound* means an auditory sensation evoked by the oscillation of air pressure.
- (u) *Source* means any person, installation, device, or animal causing or contributing to noise. (1996 L.M.C., ch. 32, § 1; 2001 L.M.C., ch. 2, § 1.)

Editor's note—See County Attorney Opinion dated 10/6/00 indicating that long-term parking on public streets is prohibited in certain circumstances, but not based on the size of the vehicle. See County Attorney Opinion dated 3/16/92 explaining that the Washington Metropolitan Area Transportation Authority (esp. Metrorail) is subject to the County's noise control law, although an exemption may be obtained if it is in the public interest.

Sec. 31B-3. Regulations.

The County Executive may establish noise control regulations and standards as necessary to accomplish the purposes and intent of this Chapter. Any regulation must be at least as stringent as this Chapter. The Executive by regulation may set fees that are sufficient to offset the costs of Department reviews or other actions required or authorized by this Chapter. (1996 L.M.C., ch. 32, § 1.)

Sec. 31B-4. Noise control advisory board.

- (a) A Noise Control Advisory Board must advise the County Executive, Director, County Council, and Planning Board on noise control issues, including administration and enforcement of this Chapter.
- (b) The Board consists of 11 members appointed by the Executive and confirmed by the Council.
- (c) The Board must elect one member as Chair and another member as Vice-Chair to serve at the pleasure of the Board. The Board must meet at the call of the chairperson as required to perform its duties, but not less than once each quarter. A majority of the members of the

Board constitutes a quorum for transacting business. The Board may act by a majority vote of those present.

- (d) At least every third year, the Board must evaluate the effectiveness of the County's noise control program and recommend any improvements to the Director, County Executive, County Council, and Planning Board.
- (e) No later than March 1 each year, the Chair of the Board must report to the Director, County Executive, County Council, and Planning Board on activities and actions the Noise Control Advisory Board took during the previous calendar year. (1996 L.M.C., ch. 32, § 1; 1999 L.M.C., ch. 2, § 1.)

Editor's note-1999 L.M.C., ch. 2, § 1, increased the number of Board members from 7 to 11. 1999 L.M.C., ch. 2, § 2, states:

Sec. 2. Transition.

- (a) The terms of the 4 members of the Noise Control Advisory Board added by this Act end:
 - (1) for 1 member, on September 30, 1999, and every third year thereafter;
 - (2) for 2 members, on September 30, 2000, and every third year thereafter; and
 - (3) for 1 member, on September 30, 2001, and every third year thereafter.
- (b) When appointing the first individual to serve in one of the 4 new positions, the County Executive must designate the term in subsection (a) for which the Executive is appointing the individual.
- (c) This Act does not affect the term of any current member of the Board.
Cross reference-Boards and commissions generally, § 2-141 et seq.

Sec. 31B-5. Noise level and noise disturbance violations.

- (a) *Maximum allowable noise levels.*
 - (1) Except as otherwise provided in Sections 31B-6(a) and 31B-8, a person must not cause or permit noise levels that exceed the following levels:

| <i>Maximum Allowable Noise Levels (dBA) for Receiving Noise Areas</i> | | |
|---|----------------|------------------|
| | <i>Daytime</i> | <i>Nighttime</i> |
| Non-residential noise area | 67 | 62 |
| Residential noise area | 65 | 55 |

- (2) A person must not cause or permit the emission of a prominent discrete tone or impulsive noise that exceeds a level, at the location on a receiving property where noise from the source is greatest, that is 5 dBA lower than the level set in paragraph (1) for the applicable noise area and time.
 - (3) Sound that crosses between residential and non-residential noise areas must not exceed the levels set in paragraph (1) for residential noise areas.
- (b) *Noise disturbance.* A person must not cause or permit noise that creates a noise disturbance.
- (c) *Examples.* The following examples illustrate common noise-producing acts that violate this section if they exceed the noise level standards set in subsection (a) or create a noise

disturbance. The examples are illustrative only and do not limit or expand the noise level or noise disturbance standards of this section:

- (1) Sounding a horn or other signaling device on any motor vehicle on private property except:
 - (A) in an emergency; or
 - (B) as a danger warning signal during daytime hours if the device complies with noise level limits.
- (2) Operating a sound-producing device on public streets for commercial advertising or to attract public attention.
- (3) Selling anything by outcry.
- (4) Loading, unloading, opening, closing or otherwise handling containers, building materials, construction equipment, or similar objects.
- (5) Operating a device that produces, reproduces, or amplifies sound.
- (6) Allowing an animal to create a noise disturbance.
- (7) Operating power equipment mounted on a motor vehicle or operating other devices powered by a generator or a motor vehicle. (1996 L.M.C., ch. 32, § 1.)

Editor's note—See County Attorney Opinion dated 10/6/00 indicating that long-term parking on public streets is prohibited in certain circumstances, but not based on the size of the vehicle. See County Attorney Opinion dated 3/16/92 explaining that the Washington Metropolitan Area Transportation Authority (esp. Metrorail) is subject to the County's noise control law, although an exemption may be obtained if it is in the public interest.

Sec. 31B-6. Noise level and noise disturbance standards for construction.

- (a) *Maximum allowable noise levels for construction.*
 - (1) A person must not cause or permit noise levels from construction activity that exceed the following levels:
 - (A) From 7 a.m. to 5 p.m. weekdays:
 - (i) 75 dBA if the Department has not approved a noise-suppression plan for the activity; or
 - (ii) 85 dBA if the Department has approved a noise-suppression plan for the activity.
 - (B) The level specified in Section 31B-5 at all other times.
 - (2) Construction noise levels must be measured at the location, at least 50 feet from the source, on a receiving property where noise from the source is greatest.
 - (3) The Department must by regulation establish requirements for noise-suppression plans and adopt procedures for evaluating and approving plans. The regulations must provide that, at least 10 days before approving a noise-suppression plan, the Director must provide public notice reasonably calculated to reach at least a majority of households that might be affected by the construction activity noise levels above 75 dBA.
- (b) *Construction noise disturbance.* The prohibition on noise disturbance in Section 31B- 5(b) applies to construction activities, notwithstanding subsection (a).
- (c) *Examples.* The following examples illustrate common construction noise-producing acts that violate this section if they exceed the noise level standards set in subsection (a) or create a noise disturbance. The examples are illustrative only and do not limit or expand the construction noise level or noise disturbance standards of this section:
 - (1) Delivering materials or equipment, or loading or unloading during nighttime hours in a residential noise area.
 - (2) Operating construction equipment with audible back-up warning devices during nighttime hours. (1996 L.M.C., ch. 32, § 1.)

Sec. 31B-6A. Seasonal noise level standard for qualifying outdoor arts and entertainment activities.

- (a) Each outdoor arts and entertainment activity held at a qualifying performing arts facility must not exceed the following noise decibel limits:
 - (1) from 11 a.m. to 11 p.m. during April 1 through October 31, 75 dBA, as measured on the receiving property; and
 - (2) at all other times, the maximum allowable noise level set in Section 31B-5.
- (b) A qualifying performing arts facility which has complied with this Section must not cause or permit noise levels from an outdoor arts and entertainment activity to exceed the standards in subsection (a).
- (c) Any outdoor arts and entertainment activity conducted at a qualifying performing arts facility which has complied with this Section must not be cited as causing a noise disturbance.
- (d) The Department must annually advise the Executive and Council, and the operator of each qualifying performing arts facility, whether the noise levels specified in this Section remain appropriate for that facility and the extent of compliance with those levels. (2011 L.M.C., ch. 7, § 1)

Sec. 31B-7. Measurement of sound.

- (a) The Department must issue regulations establishing the equipment and techniques it will use to measure sound levels. The Department may rely on currently accepted standards of recognized organizations, including the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), and the United States Environmental Protection Agency.
- (b) For multiple sources of sound, the Department may measure sound levels at any point to determine the source of a noise. (1996 L.M.C., ch. 32, § 1.)

Sec. 31B-8. Noise sensitive areas.

- (a) The County Executive may designate by regulation land within any geographical area as a noise sensitive area to protect public health, safety, and welfare. The regulation may prohibit certain noise producing activities in the noise sensitive area.
- (b) A regulation under subsection (a) must:
 - (1) describe the area by reference to named streets or other geographic features;
 - (2) explain the reasons for the designation;
 - (3) establish specific noise limits or requirements that apply in the noise sensitive area; and
 - (4) describe by example or enumeration activities or sources that violate the limits or requirements.
- (c) A regulation under subsection (a) may establish limits or requirements for a noise sensitive area that are more stringent than those that otherwise would apply to the area under this Chapter. (1996 L.M.C., ch. 32, § 1.)

Sec. 31B-9. Leafblowers.

- (a) Except as provided in this section, a person must not sell, buy, offer for sale, or use a leafblower at any time that has an average sound level exceeding 70 dBA at a distance of 50

- feet. This requirement is in addition to any other noise level or noise disturbance standard that applies under this Chapter.
- (b) An individual who owns or occupies a residence in a residential noise area may use at the individual's residence a leafblower bought or manufactured before July 1, 1990, until July 1, 1998, even if it exceeds the standard in subsection (a). After July 1, 1998, a person must not use any leafblower that violates the standard in subsection (a).
 - (c) The Department must apply the standard in subsection (a) in accordance with the most current leaf-blower testing standard of the American National Standards Institute (ANSI).
 - (d) The Department may inspect, and on its request a person must produce, any leafblower that is sold, offered for sale, or used in the County, to determine whether the leafblower complies with this section. A person who relies in good faith on a manufacturer's written representation of the sound level of a leafblower that has not been modified is not subject to a penalty for violating this section. (1996 L.M.C., ch. 32, § 1.)

Sec. 31B-10. Exemptions.

- (a) This Chapter does not apply to:
 - (1) agricultural field machinery used and maintained in accordance with the manufacturer's specifications;
 - (2) emergency operations by fire and rescue services, police agencies, or public utilities and their contractors;
 - (3) a source or condition expressly subject to any State or federal noise-control law or regulation that is more stringent than this Chapter;
 - (4) sound, not electronically amplified, created between 7 a.m. and 11 p.m. by sports, amusements, or entertainment events or other public gatherings operating according to the requirements of the appropriate permit or licensing authority. This includes athletic contests, carnivals, fairgrounds, parades, band and orchestra activities, and public celebrations.
- (b) The County Executive may issue regulations exempting from Section 31B-5 sources associated with routine residential living during daytime hours, such as home workshops, power tools, and power lawn and garden equipment, when used in accordance with manufacturer specifications. This exception does not apply to repairs or maintenance on a motor vehicle that is not registered for use on public roads. (1996 L.M.C., ch. 32, § 1.)

Sec. 31B-11. Waivers.

- (a) *Temporary waiver.*
 - (1) The Director may waive any part of this Chapter for a temporary event if the noise the event will create or cause in excess of the limits established under this Chapter is offset by the benefits of the event to the public.
 - (2) When the Director receives an application under this subsection, the Director must provide public notice of the application reasonably calculated to reach at least a majority of households that might be affected by noise levels anticipated for the event. The Director must not approve an application under this subsection less than 10 days after the public notice.
- (b) *General waiver.*
 - (1) The Director may waive any part of this Chapter if the Director determines that compliance in a particular case is not practical and would impose undue hardship.
 - (2) When the Director receives an application under this subsection, the Director must schedule a hearing on the application within 60 days.
 - (3) At least 30 days before the hearing, the applicant must advertise the hearing by:

- (A) placing a display advertisement in a newspaper of general circulation in the community where the source that is the subject of the application is located; and
 - (B) posting a sign at the location of the source.
 - (4) Based on evidence presented at the hearing, the Director may grant a waiver for up to 3 years, under terms and conditions appropriate to reduce the impact of the exception.
 - (5) The Director may renew a waiver granted under this subsection if the applicant shows that the circumstances supporting the original waiver have not changed.
- (c) *Violation of waiver.* The Director may suspend, modify, or revoke a waiver granted under this section if a person violates the terms or conditions of the waiver.
- (d) *Regulations and fees.* The County Executive must issue regulations implementing this section that:
- (1) set the procedures and fees to apply for a waiver under subsections (a) or (b);
 - (2) require the applicant to use the best technology and strategy reasonably available to mitigate noise, as determined by the Director;
 - (3) allow temporary waivers under subsection (a) of no more than 30 days, renewable at the discretion of the Director no more than twice; and
 - (4) specify the requirements for the hearing advertisement and sign required under subsection (b)(3). (1996 L.M.C., ch. 32, § 1.)

Sec. 31B-12. Enforcement and penalties.

- (a) The Department must enforce this Chapter. The County Executive may delegate in writing the authority to enforce parts of this Chapter to the Police Department or any other Executive agency.
- (b) A violation of this Chapter is a Class A violation. Each day a violation continues is a separate offense. A violation of Section 31B-6 is a separate offense in addition to any other violation of this Chapter arising from the same act or occurrence.
- (c) The Department may seek injunctive or other appropriate judicial relief to stop or prevent continuing violations of this Chapter.
- (d) If the Director finds that a person has violated this Chapter, the Director may issue a notice of violation and corrective order to the person. The notice must contain the following information:
 - (1) the section of this Chapter that the person violated;
 - (2) the date, nature, and extent of the violation;
 - (3) the action required to correct the violation;
 - (4) if the Director requires a compliance plan, the deadline for submitting the plan to the Director; and
 - (5) the deadline for compliance.
- (e) The compliance plan referred to in subsection (d)(4) must establish a schedule for achieving compliance with this Chapter, as specified in the corrective order. A compliance plan, and amendments to a plan, are not effective until the Director approves the plan or amendment. An action allowed under an approved compliance plan does not violate this Chapter.
- (f) An enforcement officer may issue a civil citation for any violation of this Chapter if the enforcement officer:
 - (1) witnesses the violation; or

- (2) receives complaints from at least 2 witnesses of a noise disturbance. Complaints by 2 witnesses are required to issue a citation under paragraph (2), but are not required to prove that a person violated this Chapter.
- (g) The Director of the Animal Services Division may initiate administrative action before the Animal Matters Hearing Board instead of an enforcement officer issuing a citation under subsection (f) for a violation of this Chapter originating from an animal source.
- (h) A person aggrieved by any action or order of the Director under Sections 31B-9 and 31B-11 may seek reconsideration within 10 days after the date of the action or order. A request for reconsideration must be in writing to the Director, and must specify the date and nature of the action or order, the injury sustained, the remedy requested, and the legal basis for the remedy. If the Director finds that there are material facts in dispute, the Director may refer the matter to a hearing officer under the procedures specified in Chapter 2A. If the Director finds that there are no material facts in dispute, the Director must make a final decision on the request for reconsideration in writing within 45 days after receiving the request. The aggrieved person may appeal from the Director's final decision within 30 days after the Director issues the decision, as provided in Section 2A-11.
- (i) (1) A person responsible for a violation of Section 31B-6 and the person responsible for the management or supervision of the construction site where the source of the violation is located are jointly and severally liable for the violation.
 (2) For recurring violations of Section 31B-6 on the same construction site, in addition to any other penalty under this Chapter, the Director may issue a stop work order, as provided in Section 8-20, for up to:
 (A) 3 consecutive working days for a second violation within 30 days after the first violation;
 (B) 5 consecutive working days for a third violation within 60 days after the first violation; and
 (C) 7 working days per offense for the fourth and subsequent violations within a 120-day period.
 (3) This Chapter does not limit the Director's authority under Chapter 8 to revoke a permit or approval issued under that Chapter.
- (j) Any person aggrieved by a violation of this Chapter may file a civil action in any court with jurisdiction against a person responsible for the alleged violation. The aggrieved person must notify the alleged violator and the Director of the alleged violation at least 60 days before filing the action. A person must not file an action under this subsection if the County Attorney has filed a civil action against the same alleged violator regarding the same violation. (1996 L.M.C., ch. 32, § 1; 2001 L.M.C., ch. 2, § 1.)

Endnotes

Editor's note—In *Burrows v. United States*, 2004 U.S. Dist. LEXIS 1104 (2004), the Court interpreted Montgomery County Code Chapter 31B neither to permit a private cause of action for noise control, nor to permit suit against the federal government. Chapter 31B is discussed in *Miller v. Maloney Concrete Company*, 63 Md.App. 38, 491 A.2d 1218 (1985). *Cross references-Noise from quarries, § 38-14; radio, etc., without earphones prohibited in public transit facilities, § 54A-2; industrial area noise regulations, § 59-A-5.7.

[Note]

APPENDIX D HAZARDOUS MATERIAL REPORT

HAZARDOUS MATERIALS SURVEY



LINCOLN PARK COMMUNITY CENTER

357 FREDERICK AVENUE
ROCKVILLE, MARYLAND 20850

ECS PROJECT NO. 47:18603

FOR: HUGHES GROUP ARCHITECTS

APRIL 4, 2024





April 4, 2024

Mr. Gavin Myers
Hughes Group Architects
22630 Davis Drive
Suite 175
Sterling, Maryland 20164
gmyers@hgaarch.com

ECS Project No. 47:18603

Reference: Hazardous Materials Survey, Lincoln Park Community Center, 357 Frederick Avenue, Rockville, Maryland

Dear Mr. Myers:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide Hughes Group Architects with the results of the above referenced Hazardous Materials Survey performed at Lincoln Park Community Center located at 357 Frederick Avenue in Rockville, Maryland. This report summarizes our observations, analytical results, findings, and recommendations related to the work performed. The work described in this report was performed by ECS in general accordance with the Scope of Services described in ECS Proposal Number 47:28499-EP and the terms and conditions of the agreement authorizing those services.

ECS appreciates this opportunity to provide Hughes Group Architects with our services. If we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,

ECS Mid-Atlantic, LLC

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"ONE FIRM. ONE MISSION."

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1.0 SITE DESCRIPTION

The property consists of a community center located at 357 Frederick Avenue in Rockville, Maryland 20850. Based on the information available, the building contains 9,576 square feet of space and is situated on 1.02 acres of land. The building was reportedly originally constructed in 1970 with various additions through the years. The building includes office spaces, a gymnasium, bathrooms, locker rooms, an activity center, and a weight room.

ECS was provided with a prior *Comprehensive Asbestos Building Survey* completed by CIMAC Limited and dated August 26, 1988. One sample of 12"x12" black with brown floor tile was identified as asbestos-containing. In addition, ECS was provided with abatement records indicating that the floor tile and mastic were abated from the game room, foyer, hallway, art room, kitchen, and "room 01 and room 02." The report indicates that the abatement was completed on March 30, 1992. A copy of both reports are attached to this report.

2.0 PURPOSE

The purpose of the Hazardous Materials Survey was to identify asbestos-containing materials (ACM), lead-based paint (LBP), universal waste and suspect liquid poly-chlorinated biphenyl (PCB) containing equipment in fixtures which require special handling and/or disposal if disturbed during construction activities. The identification of ACMs require trained labor, regulated work practices, and special disposal. The identification of LBP or other lead hazards requires disclosure to contractors and monitoring of lead exposure. The identification of other regulated materials such as universal waste may require personal protective equipment, training, special handling, packaging, and disposal.

3.0 METHODOLOGY

ECS performed the authorized Scope of Services in general accordance with our proposal, standard industry practice(s) and methods specified by regulation(s) for the identification of ACMs, LBPs, and universal waste and suspect liquid PCB-containing equipment and fixtures.

3.1 Asbestos-Containing Materials

The non-invasive/non-destructive asbestos survey was performed by asbestos inspectors who have received EPA accredited training and are licensed by the State of Maryland. Samples of suspect ACMs were collected utilizing hand tools and placed into individual, labeled plastic bags. Unique bulk suspect ACM samples were submitted to Eurofins CEI (Eurofins CEI) in Cary, North Carolina for analysis via Polarized Light Microscopy (PLM) in accordance with current EPA-600 methodology. Materials consisting of additional layers were analyzed separately. Eurofins CEI is listed as an accredited laboratory by the National Voluntary Laboratory Accreditation Plan (NVLAP) managed by the National Institute of Standards and Technology (NIST) for bulk sample analysis by currently approved EPA methodology by PLM.



During the survey, ECS attempted to identify suspect ACMs in readily accessible areas. However, due to the destructive means required to identify some materials, certain areas were deemed inaccessible (i.e. behind walls or sub grade materials) and were not surveyed for suspect ACMs. Activities area and the bathroom associated with the weight room. Unidentified suspect ACMs may be located in these and/or other inaccessible areas.

Samples were collected in general accordance with EPA Standard 40 CFR 763 Subpart E, Asbestos Hazard Emergency Response Act (AHERA) and OSHA Standard 29 CFR 1926.1101 Inspection Protocol. Multiple samples of each unique material were submitted. Samples were analyzed using "Positive Stop" methodology. If one sample of a homogeneous material is reported to contain asbestos, the remaining samples of that material are not analyzed. EPA regulations stipulate that if one sample contains asbestos the entire quantity of that material contains asbestos, regardless of additional analysis.

3.2 Lead in Paint and Surface Coatings

The Lead-Based Paint (LBP) survey was performed by a Maryland licensed Lead Inspector using a X-Ray Fluorescence (XRF) Spectrometer to identify lead concentrations in painted and glazed surfaces.

The survey was conducted utilizing the State of Maryland definition of LBP. Under this definition, painted surfaces that contain lead in concentrations equal to or greater than 0.7 milligrams per square centimeter (≥ 0.7 mg/cm²) are classified as coated with LBP. Paints with concentrations of lead detectable by the XRF are considered lead-containing paints. Additionally, fixtures or components that are manufactured with a factory-applied glazing (i.e., sinks, toilets, ceramic tiles, etc.) are tested as these factory-applied finishes often contain lead. Activities that disturb lead-containing paints and glazing (while not lead-based paints by the U.S. EPA definition) are regulated by OSHA (29 CFR 1926.62).

Because the current or proposed use of the property is not residential or child-occupied, the scope of the LBP survey was not conducted in accordance with HUD Chapter 7 requirements. This representative survey included taking readings from walls, windows, doors, and miscellaneous components. Walls are listed by letter with wall "A" being the entrance of the subject building, proceeding clockwise to "B, C, D", etc.

3.3 Universal Waste and Suspect Liquid PCB-Containing Equipment

ECS performed a visual survey of the interior and exterior of the building for the presence of universal waste materials and suspect liquid PCB-containing equipment. ECS entered the accessible areas to identify universal waste materials including batteries, stored pesticides, mercury-containing equipment, and lamps. Additionally, lamp ballasts suspected of containing PCBs and lead-containing equipment were documented if observed.

No sampling or other characterization was performed as part of this scope of service. Additionally, ECS did not access any energized electrical equipment or other equipment/devices that were in use or that may pose a hazard to ECS personnel or building occupants.



4.0 RESULTS

The following is a summary of laboratory results, findings and observations.

4.1 Asbestos Sampling

In total, 65 bulk samples from 35 homogeneous areas were submitted to the laboratory of which 92 layers were analyzed.

An ACM is defined as any material containing more than one percent (>1%) asbestos as determined using the method specified in Appendix E, Subpart E, 40 CFR Part 763, Section 1, PLM. Materials are categorized by the U.S. EPA in the following categories:

- Friable ACMs are defined as any ACM that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure. Non-friable ACMs are defined as any ACM that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- Category I non-friable ACM are listed as: packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than one percent (>1%) asbestos.
- Category II non-friable ACM are listed as any material, excluding Category I non-friable ACM, containing more than one percent (>1%) asbestos.

Regulated Asbestos Containing Materials (RACM) are friable ACM or non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, been pulverized, or reduced to powder in the course of renovation and/or demolition operations.

Eurofins CEI submitted a signed final laboratory report to ECS on March 21, 2024. **In summary, six (6) of the bulk samples submitted for analysis were reported to contain asbestos in detectable concentrations.** A complete list of the sampled materials submitted for analysis and material locations are included below. Photographs of representative building materials are located in the appendix of this report.

Summary of Asbestos-Containing Materials Identified

| Location | Material Description | Analytical Result | Category |
|----------|---|---|-------------------------|
| Library | 11A- Yellow Carpet Mastic with Grey Leveling Compound over Brown Mottled Vinyl Floor Tile (VFT) with Black Mastic | Yellow Carpet Mastic- No Asbestos Detected (NAD) Leveling Compound- NAD Brown Mottled VFT- Chrysotile 2% Black Mastic- Chrysotile 5% | Category I Non-Friable |
| Library | 12A- Grey Residual Wall Caulk | Chrysotile 5% | Category II Non-Friable |



| Location | Material Description | Analytical Result | Category |
|------------------------------------|--|-------------------|-------------------------|
| Sports Storage Room | 18A- White Interior Window Caulk | Chrysotile 2% | Category II Non-Friable |
| Mens Locker Room | 26A- Tan Door Frame Caulk | Chrysotile 5% | Category II Non-Friable |
| Exterior West Wall | 29A- White Wall Expansion Joint | Chrysotile 5% | Category II Non-Friable |
| Games Room (Now Computer Room) | Previous Report Sample 02- 1'x1' Black with Brown* | 1-5% Chrysotile | Category I Non-Friable |
| *From previous 1988 report. | | | |

4.2 Suspect or Assumed Asbestos-Containing Materials

Due to the inaccessibility or the destructive means that asbestos sampling requires, additional suspect ACMs may remain within the building hidden behind inaccessible areas that include, but are not limited to, sub-grade walls, structural members, topping slabs, sub-grade sealants, flooring located below underlayments, areas behind exterior walls, pipe trenches, and subsurface utilities, etc. These areas were deemed inaccessible and were not assessed.

If these materials are discovered during construction activities, they should be presumed to contain asbestos and be treated as ACMs or be sampled immediately upon discovery and prior to disturbance for asbestos content by a licensed asbestos inspector in accordance with 29 CFR 1926.1101.

Based upon our past experience in the identification of ACMs in similarly constructed buildings, the following additional suspect ACMs may also be located in inaccessible areas of the structure:

- Mirror Mastic
- Wainscotting Mastic
- Sub-grade vapor barrier/waterproofing
- Interior wall cavity vapor barrier/waterproofing
- CMU block insulation
- Ceramic tile mastic and grout
- Vibration dampener
- Roofing materials

4.3 Lead in Paint and Surface Coatings

Paint and surface coatings which contain detectable concentrations of lead considered "lead-containing paints" (LCP). Since OSHA has no specific action level for lead in paint, all paint on the site found to have a measurable concentration of lead should be assumed to be lead containing. Work performed which may disturb lead-containing paint is regulated under OSHA as referenced under 29 CFR 1926.62.



Lead-based paint is defined by the State of Maryland as any paint or other surface coatings that contain lead in excess of 0.7 mg/cm² or 0.5% by weight.

Paint and surface coatings which contain detectable concentrations of lead are considered lead-containing paints. Since OSHA has no specific action level for lead in paint, all paint on the site found to have a measurable concentration of lead should be assumed to be lead-containing. Work performed which may disturb lead-containing paint is regulated under OSHA as referenced under 29 CFR 1926.62. A total of 99 readings were collected during the survey, including calibration readings. Lead was detected in the XRF readings analyzed. Lead-containing paints identified are summarized in the table below and photographs are located in the Appendix.

Summary of XRF Readings

| Location | Substrate | Component | Color | Results | Category |
|-------------------------|------------|-----------------|--------------|------------|-------------------------|
| Learning Center | Metal | Wall | Light Blue | 0.08-0.1 | Lead-Containing Paint |
| Stairwell Wall D | CMU | Wall | White | 3.2 | Lead-Based Paint |
| Learning Center | Metal | Duct | White | 0.13-0.54 | Lead-Containing Paint |
| Learning Center | Wood | Roof Truss | White | 0.01-0.03 | Lead-Containing Paint |
| Hallway Closet | CMU | Wall | Light Green | 0.07-0.44 | Lead-Containing Paint |
| Hallway Closet | Metal | Door/ Doorframe | Light Green | 0.09-0.14 | Lead-Containing Paint |
| Entry to Gym | Concrete | Bulkhead | White | 0.14-0.15 | Lead-Containing Paint |
| Stairwell | Metal | Handrail | White | 0.03-0.05 | Lead-Containing Paint |
| Stairwell | Metal | Balustrade | White | 0.07-0.21 | Lead-Containing Paint |
| Weight Room | Metal | Door/ Doorframe | Blue | 0.016-0.02 | Lead-Containing Paint |
| Weight Room | Metal | Lally Column | White | 0.06 | Lead-Containing Paint |
| Weight Room Closet | Concrete | Floor | Green | 0.31-0.4 | Lead-Containing Paint |

4.4 Universal Waste and Liquid Suspect PCB-Containing Equipment

The disposal of fixtures and equipment in buildings which contain various substances such as mercury or lead are regulated by local, state, and federal regulation. Collectively most mercury-containing materials and batteries which may contain lead, along with stored pesticides are classified as "Universal Waste". The disposal of lamp ballasts and electrical transformers which contain suspect PCB-containing oils is also regulated at the state and federal level.

4.4.1 Suspect Polychlorinated Biphenyl (PCB) Containing Ballasts and Equipment

Poly-chlorinated biphenyls (PCBs) are toxic coolants or lubricating oils used in some electrical transformers and capacitors, hydraulically-operated equipment, light ballasts, and other similar equipment.

As part of our survey, ECS attempted to identify potential liquid PCB containing materials and equipment. At the time of the survey, ECS visually observed several of the fluorescent light ballasts in accessible areas of the structure in an attempt to identify labeling indicating the presence/absence of PCB containing fluids. Labeling was not observed or accessible on the ballasts surveyed. At this time it is recommended that all ballasts be assumed to be suspect PCB containing.

4.4.2 Mercury-Containing Components

The EPA classifies mercury as both hazardous and toxic. The survey included observations for equipment which could contain mercury, such as thermostats, transformers, fluorescent lamps, and switch-containing devices.

As previously discussed, fluorescent lamps were observed. The fluorescent lamps may contain small quantities of mercury. Additionally, exterior pole mounted spot lights should be assumed to contain mercury lamps.

4.4.3 Lead-Acid Batteries

Lead-acid batteries located in emergency lamps, exit signs, alarm panels and associated with electrical components, etc. were observed or are assumed to be present. No evidence of leaking or damage was observed.

4.4.4 Approximate Materials Observed

| Component | Approximate Quantity |
|-----------------------------|----------------------|
| Four-Foot Fluorescent Bulbs | 150 |
| Light Ballasts | 120 |
| Exit Signs | 25 |
| Fire Extinguishers | 15 |
| Emergency Strobes | 20 |
| Emergency Flood Lights | 5 |



5.0 RECOMMENDATIONS AND REGULATORY REQUIREMENTS

Based on our understanding of the purpose of the Hazardous Materials Survey, the results of laboratory analysis, and our findings and observations, ECS presents the following recommendations.

5.1 Asbestos-Containing Materials

General Recommendations

ECS recommends where a material type has been identified as asbestos-containing that other materials with a similar color, texture, age, and size throughout the building's interior and exterior be assumed to contain asbestos. Please refer to Section 4.1 for a complete list of building materials that were reported positive for asbestos and to Section 4.2 for materials that were assumed to contain asbestos.

Asbestos Abatement

Asbestos-containing materials (ACMs) to be disturbed as part of any renovations or demolitions planned for the facility must be properly removed by a Maryland-licensed asbestos abatement contractor prior to disturbance by construction activities. The EPA and State of Maryland require 10 working days notice prior to the removal of regulated ACM (RACM) in quantities greater than or equal to 160 linear feet, 260 square feet, or 35 cubic feet.

If ACMs are to be removed, it is recommended that an industrial hygienist monitor the project. This involves collecting air samples from within and outside the abatement work areas to monitor the abatement contractor's work practices over the course of the project. The industrial hygienist should evaluate if the asbestos abatement work is in accordance with project specifications, U.S. EPA Regulation 40 CFR Part 61 - National Emissions Standard for Hazardous Air Pollutants Subpart M: National Emissions Standard for Asbestos, and U.S. Occupational Safety and Health Administration (OSHA) Regulation 29 CFR Part 1926.1101 - Asbestos in Construction. The industrial hygienist should assess each work area to monitor the removal of ACMs. Only after the industrial hygienist has determined the identified ACMs have been removed should final clearance air samples be collected (if necessary).

Suspect ACMs not observed due to inaccessibility or not sampled due to the destructive means that sampling would require may also be encountered during construction activities. At the time of the survey, only limited destructive means were used to locate or sample suspect ACMs; therefore, additional suspect ACMs may remain within inaccessible areas that include but are not limited to: sub-grade walls, structural members, topping slabs, exterior areas, sub-grade sealants, flooring located below underlayments, vapor barriers, pipe trenches, and other subsurface utilities, etc. If additional suspect ACMs are uncovered that were not accessible during the time of this survey, it is recommended that these materials either be assumed to contain asbestos or be sampled prior to disturbance upon discovery for asbestos content by an asbestos inspector in accordance with 29 CFR 1926.1101.

Asbestos Operations and Maintenance Plan



Should any identified ACM remain in place, ECS recommends the development and implementation of a site-specific Asbestos Operations and Maintenance Plan detailing routine maintenance and repair operations, contractor notification procedures, and all other requirements under OSHA - reference 29 CFR 1926.1101.

5.2 Lead in Paint and Surface Coatings

Based on the findings of the lead survey, detectable concentrations of lead were identified on some paints and surface coatings.

The presence of lead is a concern primarily when conditions exist where it may be inhaled or ingested. Regardless of the analytical results of a material, all painted and/or glazed surfaces may still contain concentrations of lead in the paint, which when disturbed, may generate lead dust greater than the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as an 8-hour Time Weighted Average (TWA) established by the OSHA "Lead Exposure in Construction Rule (29 CFR 1926.62)."

The OSHA standard gives no guidance on acceptable levels of lead in paint at which no exposure to airborne lead (above the action level) would be expected. Rather, OSHA defines airborne concentrations, and references specific types of work practices and operations from which a lead hazard may be generated (reference 29 CFR 1926.62, section d). Environmental and personnel monitoring should be conducted during any removal/demolition process (as appropriate) to verify that actual personal exposures are below the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as an 8-hour Time Weighted Average (TWA). Under OSHA requirements, the contractor performing renovation work will be required to conduct this monitoring and follow applicable requirements under 29 CFR 1926.62 if disturbing lead-containing paint.

If in the future, any portion of the site is to be used for residential or child-occupied use, U.S. EPA Regulations (40 CFR 745) under the Renovation, Repair, and Paint (RRP) Rule apply to all work that will involve window replacement, involve the demolition of painted surfaces, or disturb LBP in excess of 6 square feet per interior room or 20 square feet of exterior space. Should this scenario be relevant now or in the future, a work plan is recommended to be prepared prior to start of work to outline general requirements under RRP regulations and to specify contractor requirements including certification by the U.S. EPA under the RRP rule.

5.3 Universal Waste and Liquid PCBs in Equipment

Fluorescent lamp ballasts manufactured prior to 1979 may contain small quantities of PCBs. Additionally, regardless of "PCB labeling," ballasts produced between 1980 and 1991 may contain di-ethyl hexyl phthalate (DEHP) which is classified as a potential carcinogen by the EPA. Additionally, DEHP contamination on Superfund sites is common and responsible parties are subject to liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) should cleanup of DEHP be necessary. ECS recommends that all ballasts suspected to contain PCBs be properly recycled or disposed of in accordance with US EPA and regulations. In practice many ballasts lacking the "No-PCBs" label have been removed from buildings as part of routine maintenance; however, inspection of each ballast by the contractor performing removal is still recommended to ensure proper disposal into the proper waste stream.



ECS recommends that fluorescent lamp tubes/bulbs suspected to contain mercury be properly recycled or disposed of in accordance with EPA and Maryland regulations. Recycling is the most environmental friendly means of disposal for these materials. Fluorescent lamps may be disposed as universal waste if they remain unbroken during removal. If bulbs are crushed or broken prior to disposal, they are classified as hazardous waste by the EPA.

The disposal of universal waste and lamp ballasts must be performed in a manner by which the individual wastes are segregated and disposed of properly as required by federal regulations. If any of these materials are observed to be leaking or otherwise damaged prior to disposal they must be disposed of as hazardous waste in accordance with EPA regulations. Handling, packaging, labeling, and disposal of hazardous materials should be performed in accordance with EPA and Department of Transportation regulations.

Generators of universal and hazardous waste must obtain an EPA Generator ID number in order to dispose of these materials.

6.0 LIMITATIONS

The conclusions and recommendations presented within this report are based upon a reasonable level of assessment within normal bounds and standards of professional practice for a site in this particular geographic setting. ECS is not responsible or liable for the discovery and elimination of hazards that may potentially cause damage, accidents, or injuries.

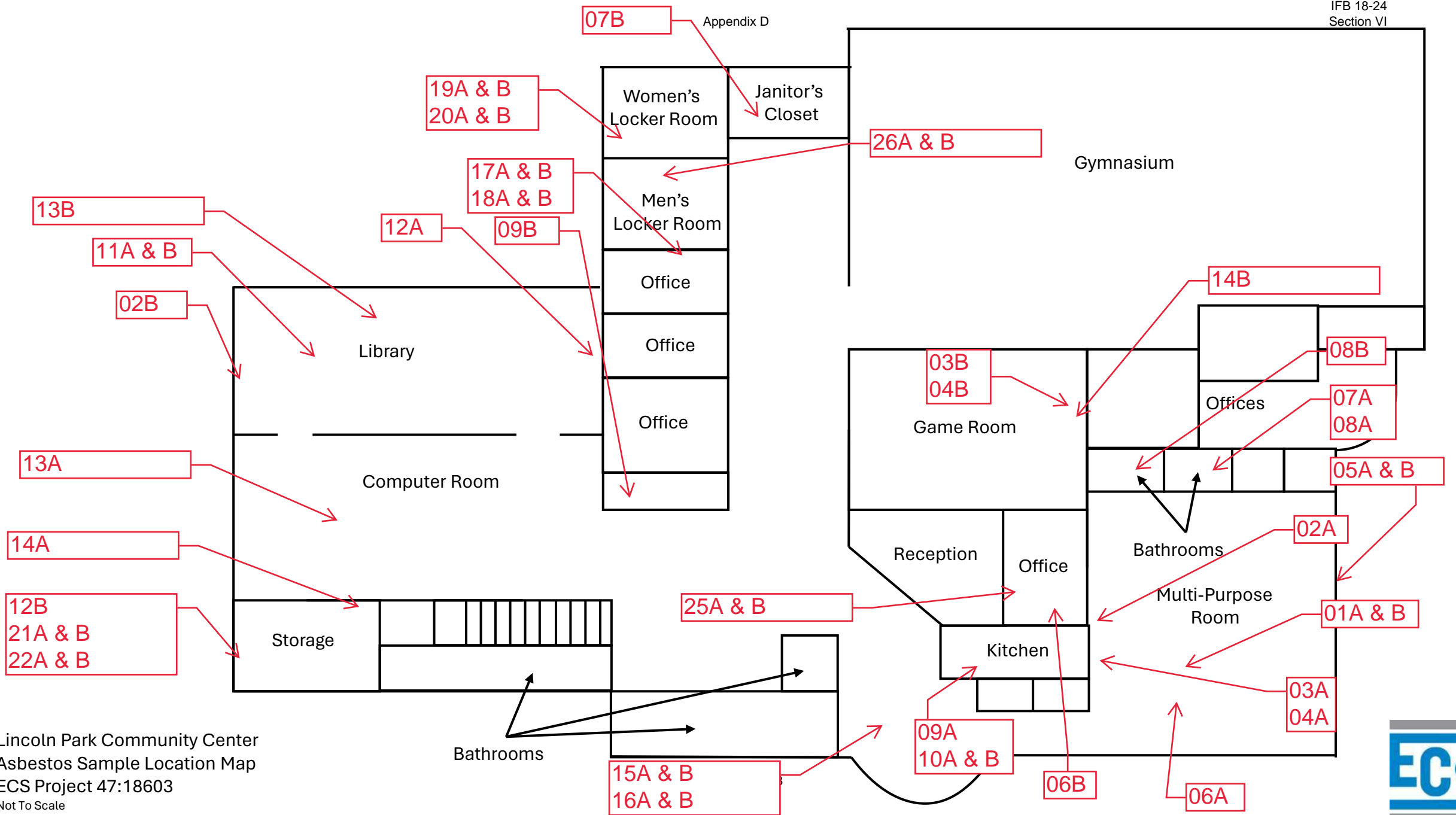
The observations, conclusions, and recommendations pertaining to environmental conditions at the subject site are necessarily limited to conditions observed, and/or materials reviewed at the time this study was undertaken. No warranty, expressed or implied, is made with regard to the conclusions and recommendations presented within this report. This report is provided for the exclusive use of the client. This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties without the written consent of ECS and the client.

Our recommendations are in part based on federal, state, and local regulations and guidelines. ECS does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state, or federal public agencies, any conditions at the site that may present a potential danger to public health, safety, or the environment. Under this scope of services, ECS assumes no responsibility regarding any response actions initiated as a result of these findings. General compliance with regulations and response actions are the sole responsibility of the Client and should be conducted in accordance with local, state, and/or federal requirements.

During this study, samples were submitted for analysis at an accredited laboratory via polarized light microscopy. As with any similar survey of this nature, actual conditions exist only at the precise locations from which samples were collected. Certain inferences are based on the results of this sampling and related testing to form a professional opinion of conditions in areas beyond those from which the samples were collected. No warranty, expressed or implied, is made.



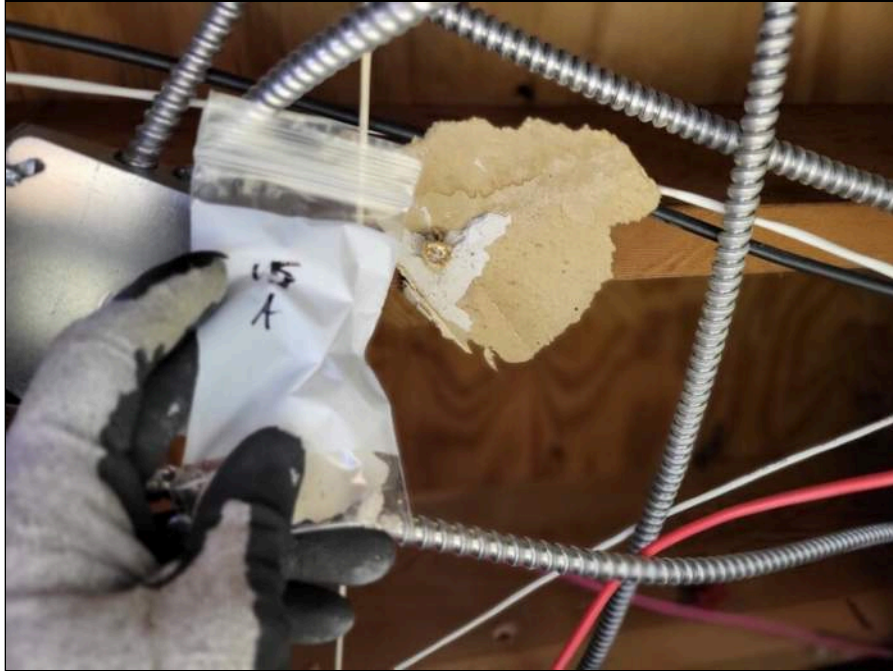
Appendix I: Figures



Lincoln Park Community Center
Asbestos Sample Location Map
ECS Project 47:18603
Not To Scale



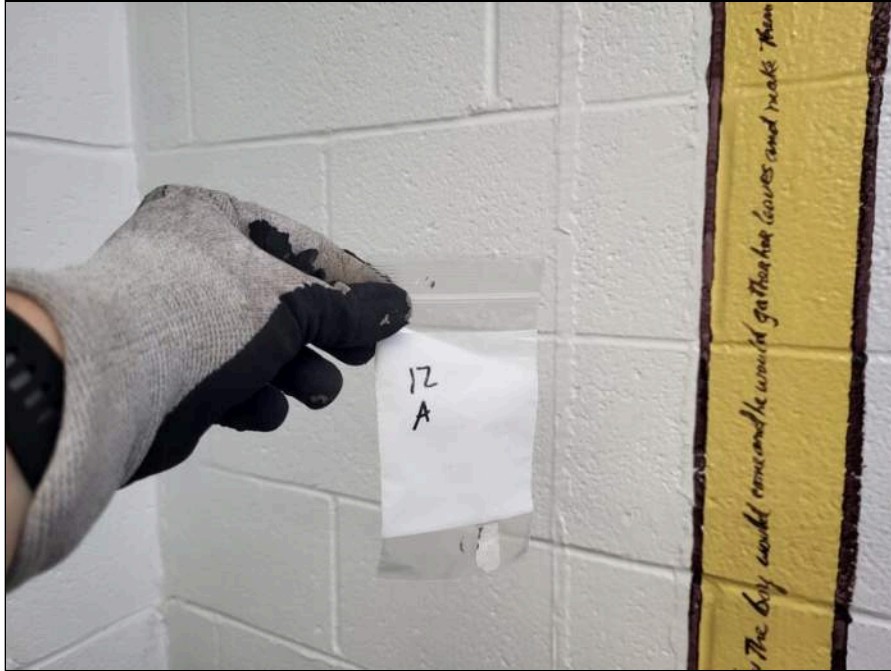
Appendix II: Site Photographs



1 - Old Drywall above Drop Ceiling Tile



2 - Library



3 - Residual Wall Caulk



4 - 2'x2' White Pin and Gouge Drop Ceiling Tile



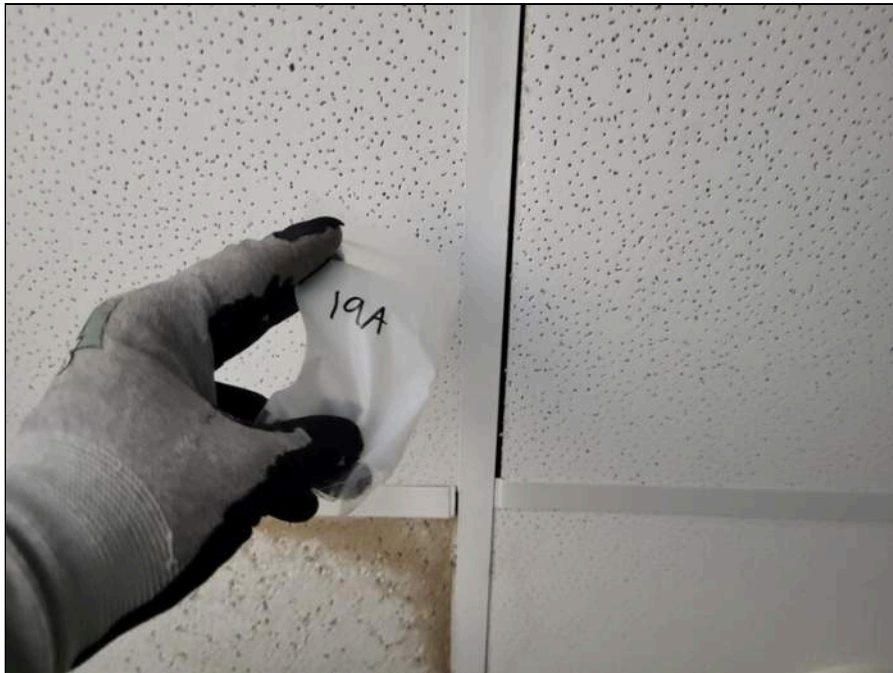
5 - 2'x2' Pin and Worm Drop Ceiling Tile



6 - 12"x12" Black with Red Fleck VFT with Black Mastic



7 - White Interior Window Caulk



8 - 2'x2' Pin Hole DCT



9 - Tan Epoxy Floor



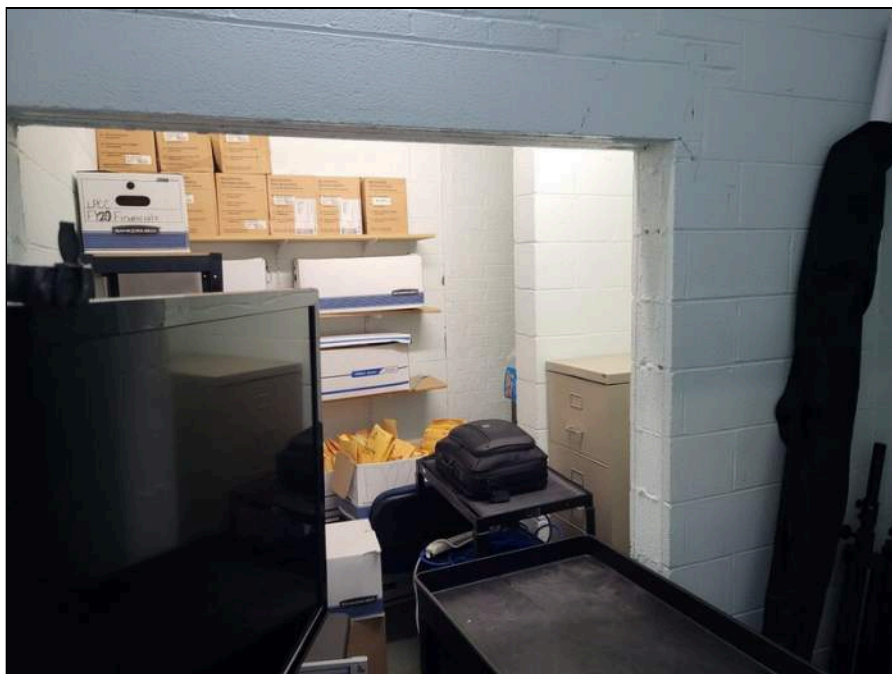
10 - Suspect Black Vibration Dampener



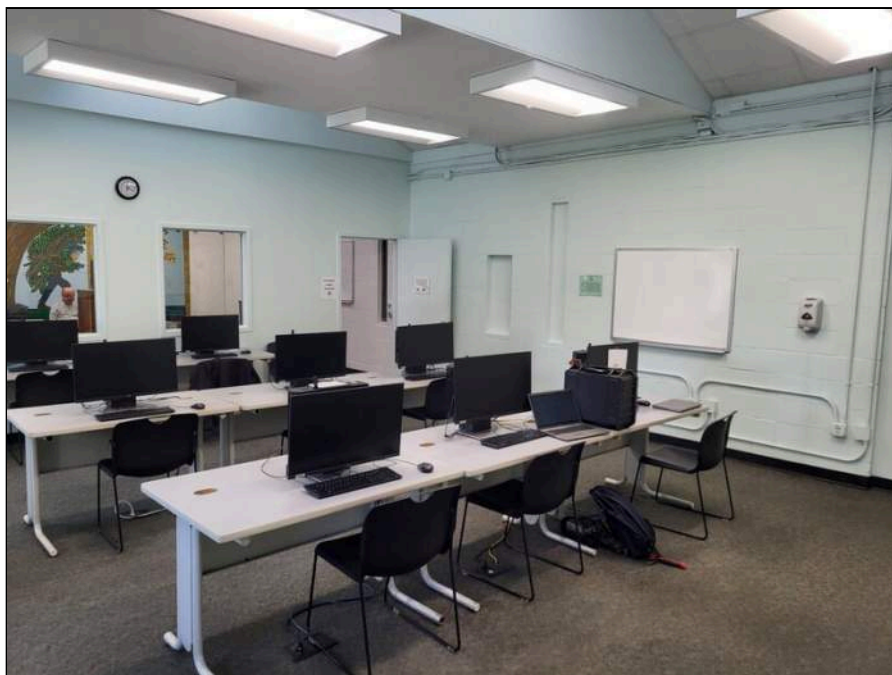
11 - 12"x12" Green VFT 2-Layer with Black Mastic



12 - Red Fire Stop



13 - Library Storage



14 - Computer Room



15 - Gymnasium



16 - Gymnasium Suspect Ceiling



17 - Suspect Duct



18 - Janitor Closet



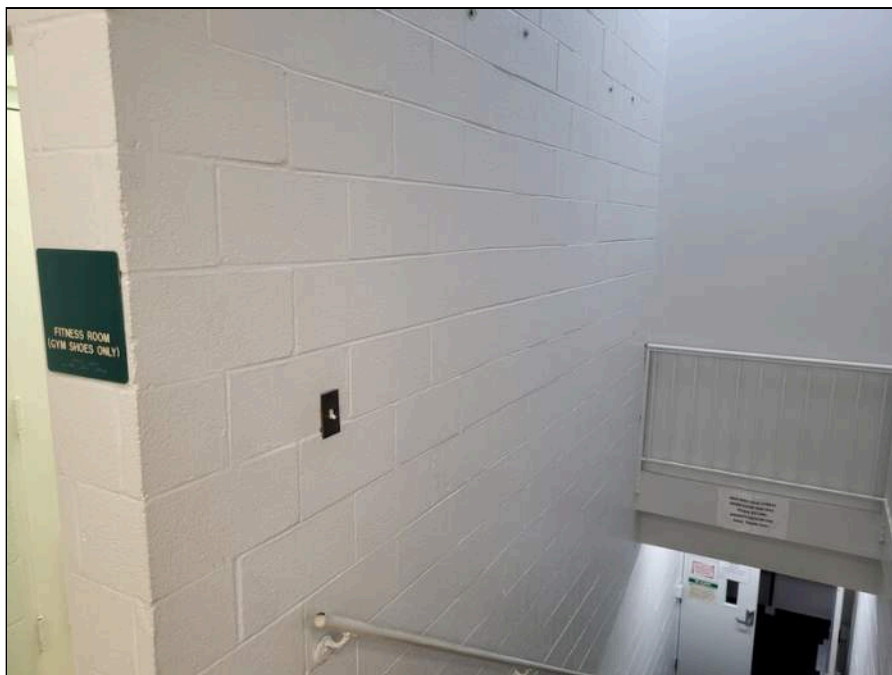
19 - Bare Plumbing



20 - Remnant Green and Yellow Carpet Mastic



21 - Basement



22 - Wall with Lead Based Paint



23 - Brown Wall Expansion Joint



24 - White Window Caulk



25 - White Wall Expansion Joint



26 - 20240314 135503



27 - Grey Window Case CAulk



28 - White Remnant Vent Caulk



29 - Grey Duct Mastic



30 - White Door Caulk



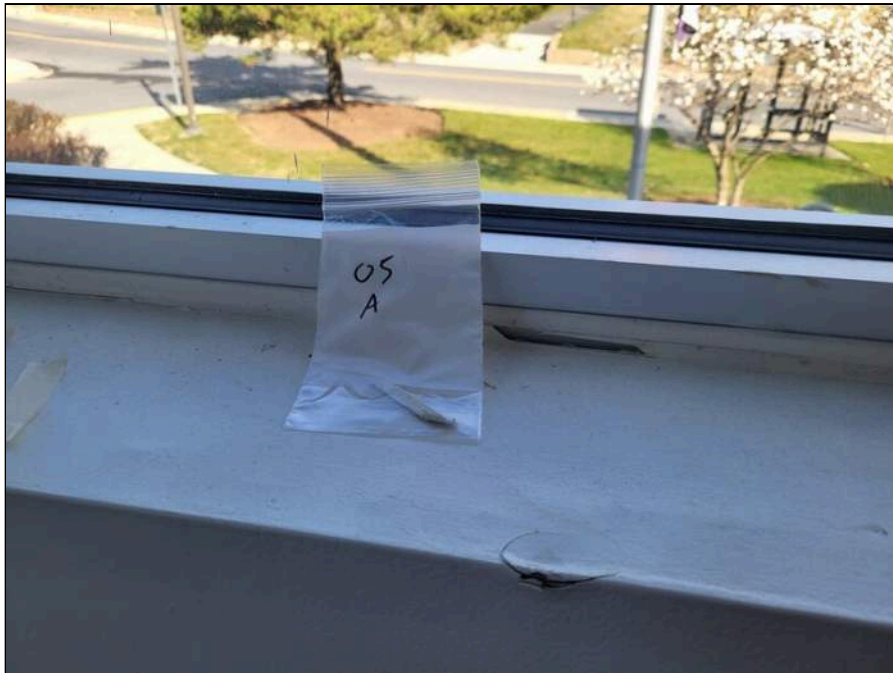
31 - Exterior



32 - 12"x12" Tan Mottled VFT with Yellow Mastic



33 - Yellow Covebase Mastic



34 - White Window Caulk



35 - Above Ceiling



36 - Above Ceiling Plenum



37 - White Bathroom Fixture Caulk



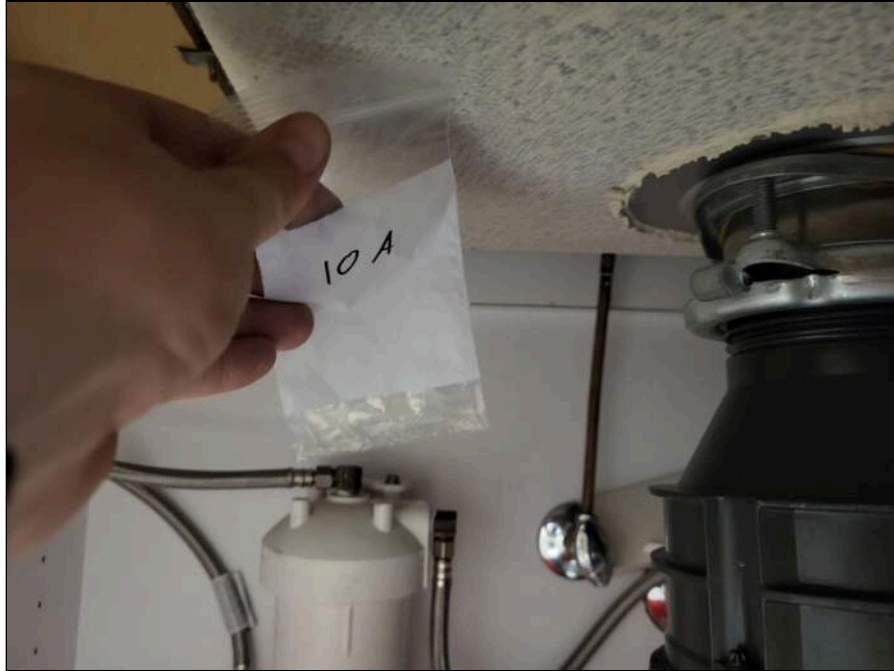
38 - Endcap Mastic on Paper over Foil TSI



39 - Multi Purpose Room



40 - 12"x12" Tan Mottled VFT with Yellow Mastic Second Layer with Black Mastic



41 - White Sink Undercoat



42 - Yellow Carpet Mastic with Grey Leveling Compound over Brown Mottled VFT with Black Mastic

Appendix III: Asbestos Bulk Sample Results

March 21, 2024

ECS Mid-Atlantic
1340 Charwood Road Ste B
Hanover, MD 21076

CLIENT PROJECT: Lincoln Park Community Park Center, 47:18603
CEI LAB CODE: B245348

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on March 18, 2024. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,



Tianbao Bai, Ph.D., CIH
Laboratory Director



ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

ECS Mid-Atlantic

CLIENT PROJECT: Lincoln Park Community Park Center, 47:18603

LAB CODE: B245348

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 03/21/24

TOTAL SAMPLES ANALYZED: 65

SAMPLES >1% ASBESTOS: 6

730 SE Maynard Road • Cary, NC 27511 • 919.481.1413



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Lincoln Park Community Park Center,
47:18603

LAB CODE: B245348

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|---------|-------------|--------------|--------------------|---------------|
| 1A | | B245348.01A | Tan | Vinyl Floor Tile | None Detected |
| | | B245348.01B | Yellow | Mastic | None Detected |
| 1B | | B245348.02A | Tan | Vinyl Floor Tile | None Detected |
| | | B245348.02B | Yellow | Mastic | None Detected |
| 2A | | B245348.03 | Yellow | Covebase Mastic | None Detected |
| 2B | | B245348.04 | Yellow | Covebase Mastic | None Detected |
| 3A | | B245348.05 | White | Drywall | None Detected |
| 3B | | B245348.06 | White | Drywall | None Detected |
| 4A | | B245348.07 | White | Joint Compound | None Detected |
| 4B | | B245348.08 | White | Joint Compound | None Detected |
| 5A | | B245348.09 | White | Window Caulk | None Detected |
| 5B | | B245348.10 | White | Window Caulk | None Detected |
| 6A | | B245348.11 | White | Ceiling Tile | None Detected |
| 6B | | B245348.12 | White | Ceiling Tile | None Detected |
| 7A | Layer 1 | B245348.13 | White | Endcap Mastic | None Detected |
| | Layer 2 | B245348.13 | White,Silver | TSI | None Detected |
| 7B | Layer 1 | B245348.14 | White | Endcap Mastic | None Detected |
| | Layer 2 | B245348.14 | White,Silver | TSI | None Detected |
| 8A | | B245348.15 | White | Caulk | None Detected |
| 8B | | B245348.16 | White | Caulk | None Detected |
| 9A | | B245348.17A | Tan | Vinyl Floor Tile | None Detected |
| | | B245348.17B | Yellow | Mastic | None Detected |
| | | B245348.17C | Tan | Vinyl Floor Tile | None Detected |
| | | B245348.17D | Black | Mastic | None Detected |
| 9B | | B245348.18A | Tan | Vinyl Floor Tile | None Detected |
| | | B245348.18B | Yellow | Mastic | None Detected |
| | | B245348.18C | Dark Gray | Vinyl Floor Tile | None Detected |
| | | B245348.18D | Black | Mastic | None Detected |
| 10A | | B245348.19 | White | Sink Undercoating | None Detected |
| 10B | | B245348.20 | White | Sink Undercoating | None Detected |
| 11A | Layer 1 | B245348.21A | Yellow | Carpet Mastic | None Detected |



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Lincoln Park Community Park Center,
47:18603

LAB CODE: B245348

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|---------|-------------|-------------|-----------------------------|----------------------|
| | Layer 2 | B245348.21A | Gray | Leveling Compound | None Detected |
| | Layer 3 | B245348.21A | Brown | Vinyl Floor Tile | Chrysotile 2% |
| | | B245348.21B | Black | Mastic | Chrysotile 5% |
| 11B | | B245348.22 | | Sample Not Analyzed per COC | |
| 12A | | B245348.23 | Gray | Residual Wall Caulk | Chrysotile 5% |
| 12B | | B245348.24 | | Sample Not Analyzed per COC | |
| 13A | | B245348.25 | White | Ceiling Tile | None Detected |
| 13B | | B245348.26 | White | Ceiling Tile | None Detected |
| 14A | | B245348.27 | White | Door Caulk | None Detected |
| 14B | | B245348.28 | White | Door Caulk | None Detected |
| 15A | | B245348.29 | White | Drywall | None Detected |
| 15B | | B245348.30 | White | Drywall | None Detected |
| 16A | | B245348.31 | White | Ceiling Tile | None Detected |
| 16B | | B245348.32 | White | Ceiling Tile | None Detected |
| 17A | | B245348.33A | Black,Red | Vinyl Floor Tile | None Detected |
| | | B245348.33B | Black | Mastic | None Detected |
| 17B | | B245348.34A | Black,Red | Vinyl Floor Tile | None Detected |
| | | B245348.34B | Black | Mastic | None Detected |
| 18A | | B245348.35 | White,Tan | Window Caulk | Chrysotile 2% |
| 18B | | B245348.36 | | Sample Not Analyzed per COC | |
| 19A | | B245348.37 | White | Ceiling Tile | None Detected |
| 19B | | B245348.38 | White | Ceiling Tile | None Detected |
| 20A | | B245348.39 | Tan | Epoxy Floor | None Detected |
| 20B | | B245348.40 | Tan | Epoxy Floor | None Detected |
| 21A | | B245348.41A | Light Green | Vinyl Floor Tile | None Detected |
| | | B245348.41B | Yellow | Mastic | None Detected |
| | | B245348.41C | Dark Green | Vinyl Floor Tile | None Detected |
| | | B245348.41D | Black | Mastic | None Detected |
| 21B | | B245348.42A | Light Green | Vinyl Floor Tile | None Detected |
| | | B245348.42B | Yellow | Mastic | None Detected |
| | | B245348.42C | Black,Red | Vinyl Floor Tile | None Detected |



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Lincoln Park Community Park Center,
47:18603

LAB CODE: B245348

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|-------|-------------|---------------|-----------------------------|----------------------|
| | | B245348.42D | Black | Mastic | None Detected |
| 22A | | B245348.43 | Red | Fire Stop | None Detected |
| 22B | | B245348.44 | Red | Fire Stop | None Detected |
| 23A | | B245348.45 | Tan | Fire Stop | None Detected |
| 23B | | B245348.46 | Tan | Fire Stop | None Detected |
| 24A | | B245348.47 | Green, Yellow | Floor Mastic | None Detected |
| 24B | | B245348.48 | Green, Yellow | Floor Mastic | None Detected |
| 25A | | B245348.49A | Light Gray | Vinyl Floor Tile | None Detected |
| | | B245348.49B | Yellow | Mastic | None Detected |
| | | B245348.49C | Dark Gray | Vinyl Floor Tile | None Detected |
| | | B245348.49D | Black | Mastic | None Detected |
| 25B | | B245348.50A | Light Gray | Vinyl Floor Tile | None Detected |
| | | B245348.50B | Yellow | Mastic | None Detected |
| | | B245348.50C | Dark Gray | Vinyl Floor Tile | None Detected |
| | | B245348.50D | Black | Mastic | None Detected |
| 26A | | B245348.51 | Tan | Door Frame Caulk | Chrysotile 5% |
| 26B | | B245348.52 | | Sample Not Analyzed per COC | |
| 27A | | B245348.53 | Brown | Door Caulk | None Detected |
| 27B | | B245348.54 | Brown | Door Caulk | None Detected |
| 28A | | B245348.55 | Brown | Wall Expansion Joint | None Detected |
| 28B | | B245348.56 | Brown | Wall Expansion Joint | None Detected |
| 29A | | B245348.57 | White | Wall Expansion Joint | Chrysotile 5% |
| 29B | | B245348.58 | | Sample Not Analyzed per COC | |
| 30A | | B245348.59 | White | Window Caulk | None Detected |
| 30B | | B245348.60 | White | Window Caulk | None Detected |
| 31A | | B245348.61 | Gray | Window Case Caulk | None Detected |
| 31B | | B245348.62 | Gray | Window Case Caulk | None Detected |
| 32A | | B245348.63 | White | Vent Caulk | None Detected |
| 32B | | B245348.64 | White | Vent Caulk | None Detected |
| 33A | | B245348.65 | White | Door Caulk | None Detected |
| 33B | | B245348.66 | White | Door Caulk | None Detected |



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Lincoln Park Community Park Center,
47:18603

LAB CODE: B245348

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|-------|------------|-------|--------------------|---------------|
| 34A | | B245348.67 | Black | Waterproofing | None Detected |
| 34B | | B245348.68 | Black | Waterproofing | None Detected |
| 35A | | B245348.69 | Gray | Duct Mastic | None Detected |
| 35B | | B245348.70 | Gray | Duct Mastic | None Detected |



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: ECS Mid-Atlantic
1340 Charwood Road Ste B
Hanover, MD 21076

Lab Code: B245348
Date Received: 03-18-24
Date Analyzed: 03-21-24
Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|--------------------------|--------------------|---|-------------------------|-------------|-----------------------------|
| | | | Fibrous | Non-Fibrous | |
| 1A B245348.01A | Vinyl Floor Tile | Homogeneous Tan Non-fibrous Bound | 90% | Vinyl | None Detected |
| | | | 10% | Calc Carb | |
| B245348.01B | Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected |
| 1B B245348.02A | Vinyl Floor Tile | Homogeneous Tan Non-fibrous Bound | 90% | Vinyl | None Detected |
| | | | 10% | Calc Carb | |
| B245348.02B | Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected |
| 2A B245348.03 | Covebase Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected |
| 2B B245348.04 | Covebase Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected |
| 3A B245348.05 | Drywall | Homogeneous White Fibrous Bound | 2% | Cellulose | 98% Gypsum None Detected |



ASBESTOS BULK ANALYSIS

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Date Analyzed: 03-21-24
Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|-------------------------|--------------------|--|-------------------------|-------------------------|-------------|------------------------------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| 3B B245348.06 | Drywall | Homogeneous White Fibrous Bound | 2% | Cellulose | 98% | Gypsum | None Detected |
| 4A B245348.07 | Joint Compound | Heterogeneous White Fibrous Bound | 5% | Fiberglass | 5% | Paint Binder Calc Carb | None Detected |
| 4B B245348.08 | Joint Compound | Heterogeneous White Non-fibrous Bound | | | 5% | Paint Binder Calc Carb | None Detected |
| 5A B245348.09 | Window Caulk | Heterogeneous White Non-fibrous Bound | | | 98% | Caulk Paint | None Detected |
| 5B B245348.10 | Window Caulk | Heterogeneous White Non-fibrous Bound | | | 98% | Caulk Paint | None Detected |
| 6A B245348.11 | Ceiling Tile | Heterogeneous White Fibrous Loosely Bound | 35% | Cellulose Fiberglass | 5% | Paint Perlite | None Detected |
| 6B B245348.12 | Ceiling Tile | Heterogeneous White Fibrous Loosely Bound | 35% | Cellulose Fiberglass | 5% | Paint Perlite | None Detected |



ASBESTOS BULK ANALYSIS

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Date Analyzed: 03-21-24
Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|------------------------------------|--------------------|--|-------------------------|-------------------------|-------------|--------------------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| 7A Layer 1 B245348.13 | Endcap Mastic | Homogeneous White Fibrous Bound | 3% | Wollastonite | 97% | Mastic | None Detected |
| Layer 2 B245348.13 | TSI | Heterogeneous White, Silver Fibrous Bound | 75% | Cellulose | 25% | Metal Foil | None Detected |
| 7B Layer 1 B245348.14 | Endcap Mastic | Homogeneous White Fibrous Bound | 3% | Wollastonite | 97% | Mastic | None Detected |
| Layer 2 B245348.14 | TSI | Heterogeneous White, Silver Fibrous Bound | 25% 70% | Cellulose Fiberglass | 5% | Metal Foil | None Detected |
| 8A B245348.15 | Caulk | Homogeneous White Non-fibrous Bound | | | 100% | Caulk | None Detected |
| 8B B245348.16 | Caulk | Homogeneous White Non-fibrous Bound | | | 100% | Caulk | None Detected |
| 9A B245348.17A | Vinyl Floor Tile | Homogeneous Tan Non-fibrous Bound | | | 90% 10% | Vinyl Calc Carb | None Detected |



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Date Analyzed: 03-21-24
Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|--------------------------|--------------------|--|-------------------------|--------------------|---------------|
| | | | Fibrous | Non-Fibrous | |
| B245348.17B | Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected |
| B245348.17C | Vinyl Floor Tile | Homogeneous Tan Non-fibrous Bound | 90% 10% | Vinyl Calc Carb | None Detected |
| B245348.17D | Mastic | Homogeneous Black Non-fibrous Bound | 100% | Mastic | None Detected |
| 9B B245348.18A | Vinyl Floor Tile | Homogeneous Tan Non-fibrous Bound | 90% 10% | Vinyl Calc Carb | None Detected |
| B245348.18B | Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected |
| B245348.18C | Vinyl Floor Tile | Homogeneous Dark Gray Non-fibrous Bound | 90% 10% | Vinyl Calc Carb | None Detected |
| B245348.18D | Mastic | Homogeneous Black Non-fibrous Bound | 100% | Mastic | None Detected |



ASBESTOS BULK ANALYSIS

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Date Analyzed: 03-21-24
Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|--------------------------------------|-----------------------------|---|-------------------------|-----------|-------------|-------------------------|----------------------|
| | | | Fibrous | | Non-Fibrous | | |
| 10A B245348.19 | Sink Undercoating | Homogeneous White Fibrous Bound | 25% | Cellulose | 75% | Mastic | None Detected |
| 10B B245348.20 | Sink Undercoating | Homogeneous White Fibrous Bound | 25% | Cellulose | 75% | Mastic | None Detected |
| 11A Layer 1 B245348.21A | Carpet Mastic | Homogeneous Yellow Non-fibrous Bound | | | 100% | Mastic | None Detected |
| Layer 2 B245348.21A | Leveling Compound | Homogeneous Gray Non-fibrous Bound | <1% | Cellulose | 80% | Binder 20% Calc Carb | None Detected |
| Layer 3 B245348.21A | Vinyl Floor Tile | Homogeneous Brown Fibrous Bound | | | 88% | Vinyl 10% Calc Carb | 2% Chrysotile |
| B245348.21B | Mastic | Homogeneous Black Fibrous Bound | | | 95% | Mastic | 5% Chrysotile |
| 11B B245348.22 | Sample Not Analyzed per COC | | | | | | |
| 12A B245348.23 | Residual Wall Caulk | Heterogeneous Gray Fibrous Bound | | | 5% | Paint 90% Caulk | 5% Chrysotile |



ASBESTOS BULK ANALYSIS

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Date Analyzed: 03-21-24
Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|--------------------------|--------------------------------|--|-------------------------|------------|-------------|---------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| 12B B245348.24 | Sample Not Analyzed per COC | | | | | | |
| 13A B245348.25 | Ceiling Tile | Heterogeneous White Fibrous Loosely Bound | 35% | Cellulose | 5% | Paint | None Detected |
| | | | 35% | Fiberglass | 25% | Perlite | |
| 13B B245348.26 | Ceiling Tile | Heterogeneous White Fibrous Loosely Bound | 35% | Cellulose | 5% | Paint | None Detected |
| | | | 35% | Fiberglass | 25% | Perlite | |
| 14A B245348.27 | Door Caulk | Homogeneous White Non-fibrous Bound | | | 10% | Paint | None Detected |
| | | | | | 90% | Caulk | |
| 14B B245348.28 | Door Caulk | Homogeneous White Non-fibrous Bound | | | 10% | Paint | None Detected |
| | | | | | 90% | Caulk | |
| 15A B245348.29 | Drywall | Homogeneous White Fibrous Bound | 5% | Cellulose | 95% | Gypsum | None Detected |
| | | | | | | | |
| 15B B245348.30 | Drywall | Homogeneous White Fibrous Bound | 5% | Cellulose | 95% | Gypsum | None Detected |
| | | | | | | | |
| 16A B245348.31 | Ceiling Tile | Heterogeneous White Fibrous Loosely Bound | 35% | Cellulose | 5% | Paint | None Detected |
| | | | 35% | Fiberglass | 25% | Perlite | |



ASBESTOS BULK ANALYSIS

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Date Analyzed: 03-21-24
Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|---------------------------|--------------------------------|--|-------------------------|------------|-------------|-----------|----------------------|
| | | | Fibrous | | Non-Fibrous | | |
| 16B B245348.32 | Ceiling Tile | Heterogeneous | 35% | Cellulose | 5% | Paint | None Detected |
| | | White Fibrous Loosely Bound | 35% | Fiberglass | 25% | Perlite | |
| 17A B245348.33A | Vinyl Floor Tile | Homogeneous | | | 90% | Vinyl | None Detected |
| | | Black,Red Non-fibrous Bound | | | 10% | Calc Carb | |
| B245348.33B | Mastic | Homogeneous Black Non-fibrous Bound | | | 100% | Mastic | None Detected |
| 17B B245348.34A | Vinyl Floor Tile | Homogeneous | | | 90% | Vinyl | None Detected |
| | | Black,Red Non-fibrous Bound | | | 10% | Calc Carb | |
| B245348.34B | Mastic | Homogeneous Black Non-fibrous Bound | | | 100% | Mastic | None Detected |
| 18A B245348.35 | Window Caulk | Homogeneous | | | 10% | Paint | 2% Chrysotile |
| | | White,Tan Fibrous Bound | | | 88% | Caulk | |
| 18B B245348.36 | Sample Not Analyzed per COC | | | | | | |
| 19A B245348.37 | Ceiling Tile | Heterogeneous | 35% | Cellulose | 5% | Paint | None Detected |
| | | White Fibrous Loosely Bound | 35% | Fiberglass | 25% | Perlite | |



ASBESTOS BULK ANALYSIS

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Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|---------------------------|--------------------|-------------------------------------|-------------------------|------------|-------------|-----------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| 19B B245348.38 | Ceiling Tile | Heterogeneous | 35% | Cellulose | 5% | Paint | None Detected |
| | | White Fibrous Loosely Bound | 35% | Fiberglass | 25% | Perlite | |
| 20A B245348.39 | Epoxy Floor | Homogeneous | | | 25% | Binder | None Detected |
| | | Tan Non-fibrous Tightly Bound | | | 75% | Gravel | |
| 20B B245348.40 | Epoxy Floor | Homogeneous | | | 25% | Binder | None Detected |
| | | Tan Non-fibrous Tightly Bound | | | 75% | Gravel | |
| 21A B245348.41A | Vinyl Floor Tile | Homogeneous | | | 90% | Vinyl | None Detected |
| | | Light Green Non-fibrous Bound | | | 10% | Calc Carb | |
| B245348.41B | Mastic | Homogeneous | | | 100% | Mastic | None Detected |
| | | Yellow Non-fibrous Bound | | | | | |
| B245348.41C | Vinyl Floor Tile | Homogeneous | | | 90% | Vinyl | None Detected |
| | | Dark Green Non-fibrous Bound | | | 10% | Calc Carb | |
| B245348.41D | Mastic | Homogeneous | | | 100% | Mastic | None Detected |
| | | Black Non-fibrous Bound | | | | | |



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

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Date Reported: 03-21-24

Project: Lincoln Park Community Park Center, 47:18603

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % | | |
|---------------------------|--------------------|---|-------------------------|-------------|---------------|-------|---------------|
| | | | Fibrous | Non-Fibrous | | | |
| 21B B245348.42A | Vinyl Floor Tile | Homogeneous | 90% | Vinyl | None Detected | | |
| | | Light Green Non-fibrous Bound | 10% | Calc Carb | | | |
| B245348.42B | Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected | | |
| B245348.42C | Vinyl Floor Tile | Homogeneous | 90% | Vinyl | None Detected | | |
| | | Black,Red Non-fibrous Bound | 10% | Calc Carb | | | |
| B245348.42D | Mastic | Homogeneous Black Non-fibrous Bound | 100% | Mastic | None Detected | | |
| 22A B245348.43 | Fire Stop | Homogeneous | 10% | Fiberglass | 90% | Caulk | None Detected |
| | | Red Fibrous Bound | | | | | |
| 22B B245348.44 | Fire Stop | Homogeneous | 10% | Fiberglass | 90% | Caulk | None Detected |
| | | Red Fibrous Bound | | | | | |
| 23A B245348.45 | Fire Stop | Homogeneous | 100% | Caulk | | | None Detected |
| | | Tan Non-fibrous Tightly Bound | | | | | |



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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|---------------------------|--------------------|--|-------------------------|---|---------------|
| | | | Fibrous | Non-Fibrous | |
| 23B B245348.46 | Fire Stop | Homogeneous Tan Non-fibrous Tightly Bound | 100% | Caulk | None Detected |
| 24A B245348.47 | Floor Mastic | Heterogeneous Green, Yellow Fibrous Bound | 2% | Synthetic Fiber 73% 25% Mastic Paint | None Detected |
| 24B B245348.48 | Floor Mastic | Heterogeneous Green, Yellow Fibrous Bound | 2% | Synthetic Fiber 73% 25% Mastic Paint | None Detected |
| 25A B245348.49A | Vinyl Floor Tile | Homogeneous Light Gray Non-fibrous Bound | 90% 10% | Vinyl Calc Carb | None Detected |
| B245348.49B | Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected |
| B245348.49C | Vinyl Floor Tile | Homogeneous Dark Gray Non-fibrous Bound | 90% 10% | Vinyl Calc Carb | None Detected |
| B245348.49D | Mastic | Homogeneous Black Non-fibrous Bound | 100% | Mastic | None Detected |



ASBESTOS BULK ANALYSIS

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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % | | |
|---------------------------|-----------------------------|--|-------------------------|-------------|---------------|-------|----------------------|
| | | | Fibrous | Non-Fibrous | | | |
| 25B B245348.50A | Vinyl Floor Tile | Homogeneous | 90% | Vinyl | None Detected | | |
| | | Light Gray Non-fibrous Bound | 10% | Calc Carb | | | |
| B245348.50B | Mastic | Homogeneous Yellow Non-fibrous Bound | 100% | Mastic | None Detected | | |
| B245348.50C | Vinyl Floor Tile | Homogeneous Dark Gray Non-fibrous Bound | 90% | Vinyl | None Detected | | |
| B245348.50D | Mastic | Homogeneous Black Non-fibrous Bound | 100% | Mastic | None Detected | | |
| 26A B245348.51 | Door Frame Caulk | Homogeneous Tan Fibrous Bound | 5% | Cellulose | 90% | Caulk | 5% Chrysotile |
| 26B B245348.52 | Sample Not Analyzed per COC | | | | | | |
| 27A B245348.53 | Door Caulk | Homogeneous Brown Non-fibrous Bound | 100% | Caulk | None Detected | | |
| 27B B245348.54 | Door Caulk | Homogeneous Brown Non-fibrous Bound | 100% | Caulk | None Detected | | |



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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|--------------------------|-----------------------------|--|-------------------------|----------------|----------------------|
| | | | Fibrous | Non-Fibrous | |
| 28A B245348.55 | Wall Expansion Joint | Homogeneous Brown Non-fibrous Bound | 100% | Caulk | None Detected |
| 28B B245348.56 | Wall Expansion Joint | Homogeneous Brown Non-fibrous Bound | 100% | Caulk | None Detected |
| 29A B245348.57 | Wall Expansion Joint | Homogeneous White Fibrous Bound | 90% 5% | Caulk Paint | 5% Chrysotile |
| 29B B245348.58 | Sample Not Analyzed per COC | | | | |
| 30A B245348.59 | Window Caulk | Homogeneous White Non-fibrous Bound | 100% | Caulk | None Detected |
| 30B B245348.60 | Window Caulk | Homogeneous White Non-fibrous Bound | 100% | Caulk | None Detected |
| 31A B245348.61 | Window Case Caulk | Homogeneous Gray Non-fibrous Bound | 100% | Caulk | None Detected |
| 31B B245348.62 | Window Case Caulk | Homogeneous Gray Non-fibrous Bound | 100% | Caulk | None Detected |



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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|--------------------------|--------------------|--|-------------------------|-----------|-------------|----------------------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| 32A B245348.63 | Vent Caulk | Homogeneous White Fibrous Bound | 3% | Talc | 97% | Caulk | None Detected |
| 32B B245348.64 | Vent Caulk | Homogeneous White Fibrous Bound | 3% | Talc | 97% | Caulk | None Detected |
| 33A B245348.65 | Door Caulk | Heterogeneous White Non-fibrous Bound | | | 97% | Caulk 3% Paint | None Detected |
| 33B B245348.66 | Door Caulk | Heterogeneous White Non-fibrous Bound | | | 97% | Caulk 3% Paint | None Detected |
| 34A B245348.67 | Waterproofing | Homogeneous Black Fibrous Bound | 15% | Cellulose | 85% | Tar | None Detected |
| 34B B245348.68 | Waterproofing | Homogeneous Black Fibrous Bound | 15% | Cellulose | 85% | Tar | None Detected |
| 35A B245348.69 | Duct Mastic | Homogeneous Gray Non-fibrous Bound | | | 100% | Mastic | None Detected |



ASBESTOS BULK ANALYSIS

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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|--------------------------|--------------------|---|-------------------------|-------------|---------------|
| | | | Fibrous | Non-Fibrous | |
| 35B B245348.70 | Duct Mastic | Homogeneous Gray Non-fibrous Bound | 100% | Mastic | None Detected |



CEI

LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
 Non-Trem = Non-Asbestiform Tremolite
 Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REPORTING LIMIT FOR POINT COUNTS: 0.25% by 400 Points or 0.1% by 1,000 Points

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*


This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Information provided by customer includes customer sample ID and sample description.

ANALYST: _____


 Greg Ruff

APPROVED BY: _____


 Tianbao Bai, Ph.D., CIH
 Laboratory Director



70



CEI

CHAIN OF CUSTODY

730 SE Maynard Road, Cary, NC 27511
Tel: 866-481-1412; Fax: 919-481-1442

| | |
|---------------------|---------|
| LAB USE ONLY: | |
| CEI Lab Code: | BZ45348 |
| CEI Lab I.D. Range: | |

| COMPANY INFORMATION | | PROJECT INFORMATION | |
|--|------|--|--|
| CEI CLIENT #: | | Job Contact: Sam Irwin | |
| Company: ECS Mid Atlantic | | Email / Tel: sirwin@ecslimited.com 240-440-4891 | |
| Address: 5112 Pegasus Court Frederick MD 21704 | | Project Name: Lincoln Park Community Park Center | |
| | | Project ID#: 47:18603 | |
| Email: | | PO #: | |
| Tel: | Fax: | STATE SAMPLES COLLECTED IN: MD | |

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

| ASBESTOS | METHOD | TURN AROUND TIME | | | | | |
|------------------------|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|
| | | 4 HR | 8 HR | 1 DAY | 2 DAY | 3 DAY | 5 DAY |
| PLM BULK | EPA 600 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| PLM POINT COUNT (400) | EPA 600 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PLM POINT COUNT (1000) | EPA 600 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PLM GRAV w POINT COUNT | EPA 600 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PLM BULK | CARB 435 | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PCM AIR | NIOSH 7400 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM AIR | EPA AHERA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM AIR | NIOSH 7402 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM AIR (PCME) | ISO 10312 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM AIR | ASTM 6281-15 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM BULK | CHATFIELD | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM DUST WIPE | ASTM D6480-05 (2010) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM DUST MICROVAC | ASTM D5755-09 (2014) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM SOIL | ASTM D7521-16 | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM VERMICULITE | CINCINNATI METHOD | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| TEM QUALITATIVE | IN-HOUSE METHOD | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| OTHER: | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| REMARKS / SPECIAL INSTRUCTIONS: | | <input checked="" type="checkbox"/> Accept Samples <input type="checkbox"/> Reject Samples | |
|---|-----------|---|---------------|
| Analyze All Layers. Stop Positive except Joint Compound | | | |
| Relinquished By: | Date/Time | Received By: | Date/Time |
| | 3/14/24 | | 03/18/24 9:50 |

Samples will be disposed of 30 days after analysis

81622758 1651

Project Name: Lincoln Park Community Park Center
 Project Number: 47:18603
 TAT: 3 Day
 Stop Positive, Analyze All Layers
 Sampled in MD

| No. | Homogenous Area | Sample Location A | Sample Location B | Sample Location C | Sample Location D | Sample Location E | Sample Location F | Sample Location G |
|-----|---|-----------------------------------|----------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 1 | 12x12 Tan Mottle VFT with Yellow Mastic | Multi-Purpose Room | Multi-Purpose Room | | | | | |
| 2 | Yellow Covebase Mastic | Multi-Purpose Room | Library | | | | | |
| 3 | DW | Multi-Purpose Room | Game Room Closet | | | | | |
| 4 | JC | Multi-Purpose Room | Game Room Closet | | | | | |
| 5 | White Window Caulk | Multi-Purpose Room | Multi-Purpose Room | | | | | |
| 6 | 2x4 White P&G DCT | Multi-Purpose Room | Office behind Front Counter | | | | | |
| 7 | Endcap Mastic on Paper Over Foil TSI | Multi-Purpose Room Bathroom Right | End of Hall Janitor Closet | | | | | |
| 8 | White Bathroom Fixture Caul | Multi-Purpose Room Bathroom Right | Multi-Purpose Room Bathroom Left | | | | | |
| 9 | 12x12 Different Tan Mottle VFT with Yellow Mastic Second Layer with Black Mastic | Multi-Purpose Room Kitchen | Hallway Mechanical Room | | | | | |
| 10 | White Sink Undercoat | Multi-Purpose Room Kitchen | Multi-Purpose Room Kitchen | | | | | |
| 11 | Yellow Carpet Mastic with Grey Leveling Compound over Brown Mottled VFT with Black Mastic | Library | Library | | | | | |
| 12 | Residual Wall Caulk | Library | Learning Center Closet | | | | | |
| 13 | 2x2 White P&G DCT | Computer Room | Library | | | | | |
| 14 | Door Caulk | Computer Room Storage Door | Game Room Closet | | | | | |
| 15 | Old DW above DCT in Lobby | Lobby | Lobby | | | | | |
| 16 | 2x2 P&W DCT | Lobby | Lobby | | | | | |

| No. | Homogenous Area | Sample Location A | Sample Location B | Sample Location C | Sample Location D | Sample Location E | Sample Location F | Sample Location G |
|-----|--|--------------------------------|--------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 17 | 12"x12" Black with Red Fleck VFT with Black Mastic | Sports Storage Room | Sports Storage Room | | | | | |
| 18 | White Interior Window Caulk | Sports Storage Room | Sports Storage Room | | | | | |
| 19 | 2'x2' Pin Hole DCT | Hallway Janitor Closet | Hallway Janitor Closet | | | | | |
| 20 | Tan Epoxy Floor | End of Hall Janitor Closet | End of Hall Janitor Closet | | | | | |
| 21 | 12"x12" Green VFT 2- Layer with Black Mastic | Learning Center Closet | Learning Center Closet | | | | | |
| 22 | Red Fire Stop | Learning Center Closet | Learning Center Closet | | | | | |
| 23 | Tan Firestop | Basement Closet Locker | Basement Closet Locker | | | | | |
| 24 | Remnant Green and Yellow Floor Mastic | Basement Floor under Black Mat | Basement Floor under Black Mat | | | | | |
| 25 | 12"x12" Grey with Dark Grey Fleck 2- Layer VFT with Black Mastic | Office behind Front Counter | Office behind Front Counter | | | | | |
| 26 | Tan Door Frame Caulk | Mens Locker Room | Mens Locker Room | | | | | |
| 27 | Brown Door Caulk | Exterior West Door | Exterior West Door | | | | | |
| 28 | Brown Wall Expansion Joint | Exterior West Wall | Exterior North Wall | | | | | |
| 29 | White Wall Expansion Joint | Exterior West Wall | Exterior West Wall | | | | | |
| 30 | White Window Caulk | Exterior West Wall | Exterior North Wall | | | | | |
| 31 | Grey Window Case Caulk | Exterior North Wall | Exterior North Wall | | | | | |
| 32 | White Remnant Vent Caulk | Exterior North Wall | Exterior North Wall | | | | | |
| 33 | White Door Caulk | Exterior East Wall | Exterior East Wall | | | | | |
| 34 | Black Waterproofing | Exterior South Wall | Exterior South Wall | | | | | |
| 35 | Grey Duct Mastic | Exterior South Wall | Exterior South Wall | | | | | |

Appendix IV: XRF Lead-Based Paint Readings

NON-HUD SCOPE LBP XRF READINGS SHEET

| | | | | |
|-------------------------------------|-------------------|-----------------|-------------------|-----------------|
| BUILDING: | JOB: Lincoln Park | JOB #: 47:18603 | SAMPLER NAME: SEI | DATE: 3/14/2024 |
| CALIBRATION CHECK: NIST SRIM: 1.045 | | | | |
| | 1st Reading | 2nd Reading | 3rd Reading | Average |
| AM | 0.96 | 0.93 | 0.88 | 0.923 |
| End of Day | 0.91 | 0.92 | 0.93 | 0.920 |

| Sample | Color | Substrate | Component | Location | Reading |
|--------|------------|-----------|--------------|------------------------|---------|
| 1 | Light Blue | CMU | Wall | Learning Center Wall C | 0 |
| | | | | Learning Center Wall A | 0 |
| | | | | Learning Center Wall C | 0 |
| 2 | Light Blue | Drywall | Wall | Learning Center Wall D | 0 |
| | | | | Learning Center Wall D | 0 |
| | | | | Learning Center Wall D | 0 |
| 3 | Light Blue | Metal | Door/Frame | Learning Center | 0 |
| | | | | Learning Center | 0 |
| | | | | Learning Center | 0 |
| 4 | Light Blue | Metal | Window Frame | Learning Center | 0.1 |
| | | | | Learning Center | 0.1 |
| | | | | Learning Center | 0.08 |
| 5 | Light Blue | Wood | Door/Frame | Learning Center | 0 |
| | | | | Learning Center | 0 |
| | | | | Learning Center | 0 |
| 6 | White | CMU | Wall | Learning Center Wall A | 0 |
| | | | | Stairwell Wall D | 3.2 |
| | | | | Learning Center Wall A | 0 |
| 7 | White | Drywall | Wall | Learning Center Wall D | 0 |
| | | | | Lobby | 0 |
| | | | | Learning Center Wall D | 0 |
| 8 | White | Metal | Duct | Learning Center | 0 |
| | | | | Learning Center | 0.13 |
| | | | | Weight Room | 0.54 |
| 9 | White | Wood | Truss | Learning Center | 0.02 |
| | | | | Learning Center | 0.01 |
| | | | | Learning Center | 0.03 |

| BUILDING: | | JOB: Lincoln Park | | JOB #: 47:18603 | SAMPLER NAME: SEI | DATE: 3/14/2024 |
|-----------|-------------|-------------------|--------------|---------------------|-------------------|-----------------|
| 10 | White | Metal | Door/Frame | Lobby Bathroom | 0 | |
| | | | | Hallway Closet | 0 | |
| | | | | Hallway Closet | 0 | |
| 11 | Light Green | CMU | Wall | Hallway Closet | 0.07 | |
| | | | | Hallway Closet | 0.44 | |
| | | | | Lobby Mens Bathroom | 0 | |
| 12 | Light Green | Drywall | Wall | Hallway Closet | 0 | |
| | | | | Hallway Closet | 0 | |
| | | | | Hallway Closet | 0 | |
| 13 | Light Green | Metal | Door/Frame | Hallway Closet | 0.14 | |
| | | | | Hallway Closet | 0 | |
| | | | | Hallway Closet | 0.09 | |
| 14 | Light Green | Drywall | Wall | Lobby Mens Bathroom | 0 | |
| | | | | Lobby Mens Bathroom | 0 | |
| | | | | Lobby Mens Bathroom | 0 | |
| 15 | Yellow | CMU | Wall | Game Room | 0 | |
| | | | | Game Room | 0 | |
| | | | | Game Room | 0 | |
| 16 | Yellow | Drywall | Wall | Game Room | 0 | |
| | | | | Game Room | 0 | |
| | | | | Game Room | 0 | |
| 17 | White | Metal | Window Frame | Game Room | 0 | |
| | | | | Game Room | 0 | |
| | | | | Game Room | 0 | |
| 18 | White | Concrete | Bulkhead | Entry to Gym | 0.15 | |
| | | | | Entry to Gym | 0 | |
| | | | | Entry to Gym | 0.14 | |
| 19 | Purple | CMU | Wall | Gym lower wall | 0 | |
| | | | | Gym lower wall | 0 | |
| | | | | Gym lower wall | 0 | |
| 20 | White | CMU | Wall | Gym Upper Wall | 0 | |
| | | | | Gym Upper Wall | 0 | |
| | | | | Gym Upper Wall | 0 | |

| BUILDING: | | JOB: Lincoln Park | JOB #: 47:18603 | SAMPLER NAME: SEI | DATE: 3/14/2024 |
|-----------|--------|-------------------|-----------------|--------------------|-----------------|
| 21 | Purple | Wood | Wall Panel | Gym Lower Wall | 0 |
| | | | | Gym Lower Wall | 0 |
| | | | | Gym Lower Wall | 0 |
| 22 | Tan | Metal | Door/Frame | Gym | 0 |
| | | | | Gym | 0 |
| | | | | Gym | 0 |
| 23 | White | Metal | Support Beam | Gym Closet | 0 |
| | | | | Gym Closet | 0 |
| | | | | Gym Closet | 0 |
| 24 | Blue | Concrete | Floor | Mens Locker Room | 0 |
| | | | | Mens Locker Room | 0 |
| | | | | Mens Locker Room | 0 |
| 25 | White | Metal | Handrail | Stairwell | 0 |
| | | | | Stairwell | 0.05 |
| | | | | Stairwell | 0.03 |
| 26 | White | Metal | Ballustrade | Stairwell | 0.21 |
| | | | | Stairwell | 0.03 |
| | | | | Stairwell | 0.07 |
| 27 | White | Metal | Stringer | Stairwell | 0 |
| | | | | Stairwell | 0 |
| | | | | Stairwell | 0 |
| 28 | White | Metal | Riser | Stairwell | 0 |
| | | | | Stairwell | 0 |
| | | | | Stairwell | 0 |
| 29 | Blue | Metal | Door/Frame | Weight Room | 0 |
| | | | | Weight Room | 0.016 |
| | | | | Weight Room | 0.02 |
| 30 | White | Metal | Lolly Column | Weight Room | 0 |
| | | | | Weight Room | 0 |
| | | | | Weight Room | 0.06 |
| 31 | Green | Concrete | Floor | Weight Room Closet | 0.4 |
| | | | | Weight Room Closet | 0.31 |
| | | | | Weight Room Closet | 0.32 |

NON-HUD SCOPE LBP XRF READINGS SHEET
 Appendix D
 Lincoln Park Community Center
 47:18603

IFB 18-24
 Section VI

| BUILDING: | | JOB: Lincoln Park | JOB #: 47:18603 | SAMPLER NAME: SEI | DATE: 3/14/2024 |
|-----------|-------|-------------------|-----------------|---------------------------------|-----------------|
| 32 | Red | Metal | I-Beam | Weight Room Closet Under Stairs | 0 |
| | | | | Weight Room Closet Under Stairs | 0 |
| | | | | Weight Room Closet Under Stairs | 0 |
| 33 | White | Metal | Stairs | Underside Stairs | 0 |
| | | | | Underside Stairs | 0 |
| | | | | Underside Stairs | 0 |

Appendix V: Certifications/ Licenses

Results

Maryland Asbestos Accreditation Exam

Certificate Number: VAIR11102023-3

First Name: Nathan

Last Name: Edwards

Address: 10616 Steamboat Landing

City: Columbia

State: MD

Zip: 21044



According to our records this test was completed on: **11/21/2023**

We administered the following asbestos certification exam: **Inspector**

Your Results

Score: **96%**

Congratulations you have passed your Maryland asbestos accreditation exam. This document and your training certificate will serve as a temporary license until you receive your official license in the mail. Prior to issuing a license, MDE will verify all necessary information and submitted documents.
necessary information and submitted documents.

Thank you for taking the Maryland asbestos accreditation exam. If you have any concerns or questions about the exam, including how to collect your photo ID, please direct them to the Maryland Department of the environment at (410) 537-3200.

Issued By _____

Date **11/21/2023**

THIS IS TO CERTIFY THAT

Samuel Irwin

***HAS MET THE LEAD PAINT SERVICES
ACCREDITATION REQUIREMENTS FOR***

Inspector Technician

START DATE: 09/19/2023

EXPIRY DATE: 09/19/2025

TRAINING PROVIDER: Aerosol Monitoring & Analysis, Inc.

COURSE DATE: 01/09/2023

ACCREDITATION # 102064 IT



A handwritten signature in black ink, appearing to be "S. Irwin".

**ADMINISTRATOR, LEAD PAINT ACCREDITATION
MARYLAND DEPARTMENT OF THE ENVIRONMENT**

**09/19/2023
APPROVED DATE**

STATE OF MARYLAND

Appendix VI: Previous Reports

CIMAC LIMITED

Post Office Box 383, Linthicum, Maryland 21090-0383 (301) 859-8345

August 26, 1988

Ron Griffin
Human Resources
Rockville City Hall
Maryland Avenue at Vinson
Rockville, Maryland 20850-2364

Reference: Comprehensive Asbestos Building Survey
Lincoln Park Community Center and Gym
(Bldg. 7)

Dear Mr. Griffin:

CIMAC Limited conducted a comprehensive survey for asbestos-containing materials (ACM) of the Lincoln Park Community Center and Gym on August 11, 1988. The building is a one floor building with a partial basement. The building is used as a recreation center for neighborhood residents and is occupied by adults and children.

Methodology:

CIMAC accessed all rooms and mechanical areas of the building except where noted. CIMAC inspected all accessible mechanical equipment for external insulation and inspected inside all air handling units and shafts where access doors were present. CIMAC did not access enclosed chases and walls and did not identify gaskets inside mechanical equipment.

CIMAC identified homogeneous areas of materials suspected to contain asbestos. Data was collected for all suspected asbestos-containing materials including the material type and location, quantity, friability, percent damage and cause of damage. CIMAC collected representative bulk samples of all suspected asbestos-containing materials. The samples were collected with cork borers or knives and wet methods were used to limit fiber release during the sampling.

The sampling sites were selected randomly. The samples of the surfacing materials (i.e. plaster) were collected in a statistically random manner that is representative of the homogeneous area. The sample locations were selected by dividing each homogeneous area into nine sections. Each section was assigned a number and the numbers were randomly selected to determine which areas would be sampled. Thermal system insulation (i.e. pipe and

The Environmental Group

Asbestos Management Services • Fire and Safety Audits • Indoor Air Quality

CIMAC

Page 2

fitting) was collected in a randomly distributed manner of each homogeneous material. Miscellaneous materials (i.e. ceiling and floor tile) were sampled in a manner sufficient to determine whether the material contains asbestos.

The samples were analyzed by Enviro Dynamics, Inc. of Arlington, Virginia using polarized light microscopy with dispersion staining. This laboratory satisfactorily participates in the Environmental Protection Agency Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Summary of Findings:

The building survey identified six homogeneous areas of suspected ACMs. They included two types of ceiling tile and four types of floor tile. Representative samples were collected from the suspected ACMs.

The samples collected from floor tile type B contains asbestos. The samples of the remaining materials do not contain asbestos. Floor tile B is 1'x1' black with brown and is located in the game room, entrance and hall, art room and rooms 1 and 2 (see building drawings for room number assignments).

Recommendations:

Recommendations for abatement actions were developed by evaluating each materials asbestos content, location, accessibility, friability, percent and cause of damage and potential for future disturbance. The least burdensome abatement method which will protect human health has been provided. Alternative abatement options have been provided where applicable. All recommended removal, repair or encapsulation should be conducted by properly trained personnel who are licensed in the State of Maryland.

The floor tiles are in good condition and are not friable. An operations and maintenance program should be established to maintain the ACMs in good condition and minimize fiber release.

CIMAC recommends that the City notify the building occupants that the inspection has been conducted and that asbestos-containing building materials were found. This can be done by issuing a newsletter and/or posting notices. The building occupants should be notified prior to any planned abatement actions and should be notified of any ongoing surveillance and re-inspection activities.

CIMAC

Page 3

Attachments:

The survey data sheets, building drawings and sample analysis reports are attached. The survey data sheets list all suspected ACMs identified by the survey and records the floor and room/area location, material location and type, quantity, accessibility, friability and damage for each. All confirmed ACMs are marked with a '+' in the +/- column. The sample locations and comments are provided on the lower half of each sheet. The sample locations and ACMs are marked on the building drawings.

The building survey was conducted by Dale R. McGuire and myself. Please contact us if you have any questions.

Sincerely,



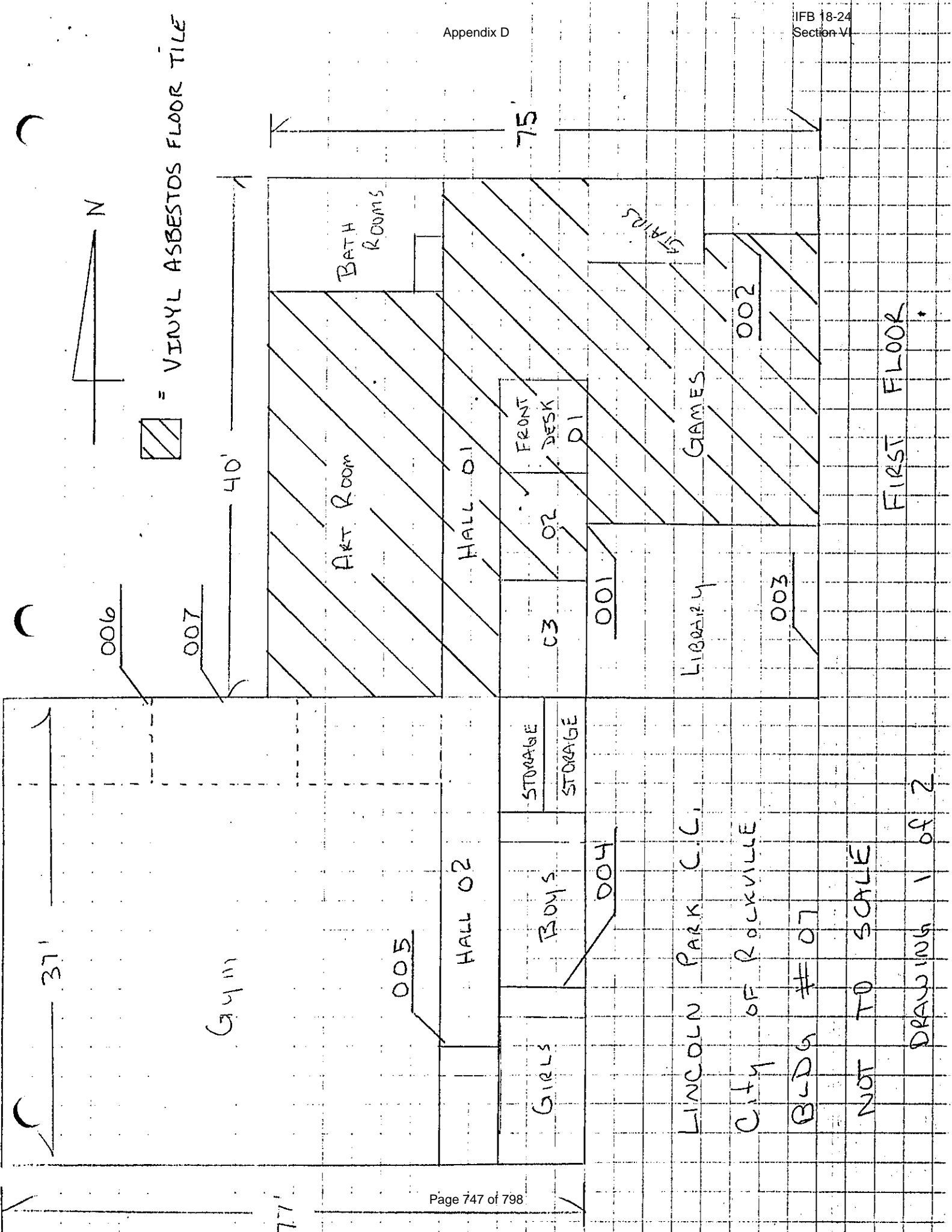
Cynthia Schoonmaker
Associate

| ITEM # | ROOM/AREA | MATERIAL LOCATION | | QUANTITY | ACCESS | FRIABILITY | DAMAGE % | SOURCE | AHERA ASSESS | SAMPLE # | +/- |
|--------|--------------------|-------------------|----------|----------|-------------|------------|----------|--------|--------------|----------|-----|
| | | TYPE | LOCATION | | | | | | | | |
| 01 | Games | Ceiling Tile A | ceiling | 800 SF | medium High | Yes | 0 | — | N/A | | — |
| 02 | Games | Floor Tile B | Floor | 264 SF | High | No | 0 | — | N/A | 002 | + |
| 03 | Library | Ceiling Tile A | ceiling | 580 SF | medium High | Yes | 0 | — | N/A | 003 | — |
| 04 | Library | Floor Tile A | Floor | 540 SF | High | No | 0 | — | N/A | 001 | — |
| 05 | Entrance + Hall 01 | Floor Tile B | Floor | 415 SF | High | No | 0 | — | N/A | | + |
| 06 | Baths | Ceiling Tile A | ceiling | 270 SF | High | Yes | 0 | — | N/A | | — |
| 07 | Art Room | Ceiling Tile A | ceiling | 1200 SF | Medium | Yes | 0 | — | N/A | | — |
| 08 | Art Room | Floor Tile B | Floor | 1080 SF | High | No | 0 | — | N/A | | + |
| 09 | Rooms 1+2 | Floor Tile B | Floor | 220 SF | High | No | 0 | — | N/A | | + |
| 10 | Room 3 | Floor Tiled | Floor | 110 SF | High | No | 0 | — | N/A | | — |

Appendix D

ITEM/SAMPLE # COMMENTS/SAMPLE LOCATION

| | |
|--------|--|
| 01 | Ceiling Tile A is 2'x4' with grooves |
| 02/002 | Floor Tile B is 1'x1' Black with brown. Sample location: NORTH EAST AREA BY WATER FOUNTAIN AND STAIR WALKWAY |
| 03/003 | Ceiling Tile A is 2'x4' with grooves. Sample location: SOUTHWEST CORNER AREA |
| 04/001 | Floor Tile A is 1'x1' Brown. Sample location: NORTHWEST CORNER AREA |
| 05 | Floor Tile B is 1'x1' Black with brown |
| 06 | Ceiling Tile A is 2'x4' with grooves |
| 07 | Ceiling Tile A is 2'x4' with grooves |
| 08 | Floor Tile B is 1'x1' Black with brown |
| 09 | Floor Tile B is 1'x1' Black with brown |
| 10 | Floor Tile D is 1'x1' light brown |





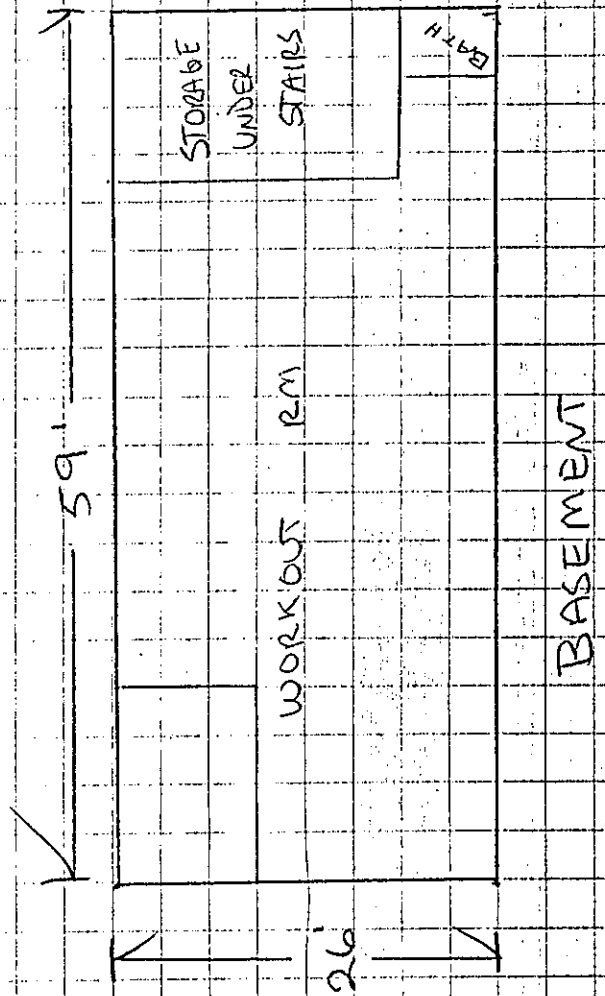
LINCOLN PARK C.C.

CITY OF ROCKVILLE

BLDG # 07

NOT TO SCALE

DRAWING 2 of 2



Enviro Dynamics, Inc.
 3800 N. Fairfax Drive
 Arlington, Virginia 22203 (703) 522-2622

Project Number: 4688
 Page 1 of 1

Building Code: 07

Appendix D

IFB 18-24
 Section VI

| SAMPLE # | LOG # | DESCRIPTION | PHYSICAL APPEARANCE | RESULTS +/- | CHRY * | ASBESTOS TYPE % | | | NON- % ASBESTOS |
|----------|-------|-------------|---|----------------|-----------|-----------------|--------------|-------|--------------------|
| | | | | | | AMOS ** | CROCI *** | OTHER | |
| 07-001 | 1500 | NONE GIVEN | TAN, COMPACT, GRANULAR, FLOOR TILE | - | | | | | 100 |
| 07-002 | 1501 | NONE GIVEN | DK GREY, COMPACT, FLOOR TILE | + | 1-5 | | | | 95-99 |
| 07-003 | 1502 | NONE GIVEN | LT GREY, FIBROUS, COMPACT, CEILING-TILE, SOFT | - | | | | | 100 |
| 07-004 | 1503 | NONE GIVEN | GREY, FIBROUS, SOFT, COMPACT | - | | | | | 100 |
| 07-005 | 1504 | NONE GIVEN | LT GREY, COMPACT, FLOOR TILE | - | | | | | 100 |
| 07-006 | 1505 | NONE GIVEN | LT GREY, COMPACT, FLOOR TILE | - | | | | | 100 |
| 07-007 | 1506 | NONE GIVEN | TAN, COMPACT, FLOOR TILE | - | | | | | 100 |

ANALYST : L. THOMAS *MLC of LT* Date: 8-16-88

METHOD : EPA Interim Method for the Determination of Asbestos in Bulk
 Insulation Samples. December 1982 EPA-600/M4-82-020
 Polarized Light Microscopy with Dispersion Staining.

QC NUMBER: 3418 / EPA Interim Laboratory Accreditation for Laboratories
 Which Offer Analysis of Bulk Samples for Asbestos.

LATEST QC ROUND :#18

* Chrysotile Asbestos ** Amosite Asbestos *** Crocidolite Asbestos

SCORE : 100%

9791R001

Ellwood Smith Park Recreation Center

The contractor removed asbestos containing floor tiles and mastic from rooms 01, 03 and 05. Background samples were taken in the building prior to construction of a full containment. Negative air units were used and final air samples were collected using non-aggressive methods. Final air samples taken in the abatement area were 0.01 fibers/cubic centimeter (f/cc) of air or less. Approximately 125 ACM bags were generated during this project. The contractor replaced all floor tiles removed.

Start date: February 3, 1992

Completion date: February 10, 1992

Red Gate Golf Course Maintenance Shop

The contractor removed asbestos containing floor tiles and mastic from the bathroom, employee break room and office. Background samples were taken in building prior to construction of a full containment. Negative air units were used and final air samples were collected using non-aggressive methods. Final air samples taken in abatement area were 0.01 fibers/cubic centimeter (f/cc) of air or less. Approximately 40 ACM bags were generated during this project. The contractor replaced all floor tiles removed.

Start date: February 18, 1992

Completion date: February 20, 1992

Lincoln Park Community Center

The contractor removed asbestos containing floor tiles and mastic from game room, foyer, hallway, room 01, room 02, art room and kitchen. Background samples were taken in the building prior to construction of a full containment. Negative air units were used and final air samples were collected using non-aggressive methods. Final air samples taken in the abatement area were 0.01 fibers per cubic centimeter (f/cc) of air or less. Approximately 200 ACM bags were generated during this project. The contractor replaced all floor tiles removed.

Start date: March 23, 1992

Completion date: March 30, 1992



Professional Service Industries, Inc.

REPORT OF BULK SAMPLE ANALYSIS FOR ASBESTOS

Tested For: PSI Fairfax RF

Project: 443-37125
Various Municipal
Bldg. Lincoln Park

Report For: City of Rockville

Method: PLM with Dispersion Staining

Date: April 7, 1994

Our Report No.: 815-49924-17

Page 1 of 7

| | | | |
|---|--|---|---|
| Laboratory No. | 940400098 | 940400099 | 940400100 |
| Sample ID No. | C-8 | C-9 | C-11 |
| Type of Material | Lincoln Pk. Community Ct. Rockville, MD., North End Field Cut | Lincoln Pk. Community Ct. Rockville, MD., East Field Cut | Lincoln Pk. Community Ct. Rockville, MD., South Wall Flashing |
| <u>Gross Appearance/Texture</u> | | | |
| Is it homogeneous? | Yes | Yes | Yes |
| Are there obvious layers? | Yes | No | Yes |
| Is it fibrous? | Yes | Yes | Yes |
| What color is it? | Black/Tan | Black | Black/Beige |
| Is Asbestos Present? | No | No | No |
| Asbestos (Type & Percent) | None Detected | None Detected | None Detected |
| Total Percent Asbestos | None Detected | None Detected | None Detected |
| Other Fibrous Materials (Type & Percent) | Cellulose 45-50% | Cellulose 30-35% | Cellulose 25-30% |
| Nonfibrous Materials % | Not Analyzed | Not Analyzed | Not Analyzed |

APPENDIX E

IFB DRAWINGS – BID SET

| Discipline | Drawing No. | Drawing Title | Revision | Drawing Date | Set Name |
|--------------------|-------------|--|----------|--------------|----------|
| General | CS-001 | Cover Sheet | | 3/20/2024 | Bid Set |
| General | G-001 | Civil Cover Sheet | | 3/20/2024 | Bid Set |
| General | G-002 | Stormwater Management Cover Sheet | | 3/20/2024 | Bid Set |
| General | G-003 | Sediment Control Cover Sheet | | 3/20/2024 | Bid Set |
| General | G-101 | Site Plan Amendment Cover Sheet | | 3/20/2024 | Bid Set |
| Architecture, Demo | AD-101 | First Floor Plan - Demo | | 3/20/2024 | Bid Set |
| Architecture, Demo | AD-151 | First Floor RCP - Demo | | 3/20/2024 | Bid Set |
| Architecture, Demo | AD-601 | Demo Details | | 3/20/2024 | Bid Set |
| Architecture | A-011 | Partition Types | | 3/20/2024 | Bid Set |
| Architecture | A-101 | New Work Floor Plan | | 3/20/2024 | Bid Set |
| Architecture | A-151 | New Work RCP and Details | | 3/20/2024 | Bid Set |
| Architecture | A-401 | Enlarged Plans and Interior Elevations | | 3/20/2024 | Bid Set |
| Architecture | A-402 | Enlarged Plans and Interior Elevations | | 3/20/2024 | Bid Set |
| Architecture | A-601 | Finish Plan and Schedule | | 3/20/2024 | Bid Set |
| Architecture | A-602 | Details | | 3/20/2024 | Bid Set |
| Architecture | A-621 | Door Schedule and Hardware | | 3/20/2024 | Bid Set |
| Architecture | A-631 | Storefront Glazing Elevations | | 3/20/2024 | Bid Set |
| Architecture | A-632 | Storefront Glazing Details | | 3/20/2024 | Bid Set |
| Architecture | A-701 | Millwork | | 3/20/2024 | Bid Set |
| Architecture | A-702 | Millwork Details | | 3/20/2024 | Bid Set |
| Architecture | A-801 | Signage Plan | | 3/20/2024 | Bid Set |
| Structural | S-001 | General Notes | | 3/20/2024 | Bid Set |
| Structural | S-002 | Special Inspections | | 3/20/2024 | Bid Set |
| Structural | S-101 | Foundation & First Floor Plans | | | |
| Structural | S-200 | Typical Details | | 3/20/2024 | Bid Set |
| Mechanical | M-001 | Mechanical Cover Sheet | | 3/20/2024 | Bid Set |
| Mechanical | MD-111 | First Floor Mechanical Plan - Demolition | | 3/20/2024 | Bid Set |
| Mechanical | M-111 | First Floor HVAC Plan - New Work | | 3/20/2024 | Bid Set |
| Mechanical | M-112 | Roof HVAC Plan - New Work | | 3/20/2024 | Bid Set |
| Mechanical | M-501 | Mechanical Details | | 3/20/2024 | Bid Set |
| Mechanical | M-502 | Schedule | | 3/20/2024 | Bid Set |
| Plumbing | P-001 | Plumbing Cover Sheet | | 3/20/2024 | Bid Set |
| Plumbing | PD-111 | Basement and First Floor Plumbing Plan - Demolition | | 3/20/2024 | Bid Set |
| Plumbing | P-111 | Basement and First Floor Water Plan - New Work | | 3/20/2024 | Bid Set |
| Plumbing | P-121 | Basement and First Floor DWV Plan - New Work | | 3/20/2024 | Bid Set |
| Plumbing | P-301 | Plumbing Schedules | | 3/20/2024 | Bid Set |
| Plumbing | P-401 | Plumbing Risers | | 3/20/2024 | Bid Set |
| Plumbing | P-501 | Plumbing Details | | 3/20/2024 | Bid Set |
| Electrical | E-001 | Electrical Cover Sheet | | 3/20/2024 | Bid Set |
| Electrical | ED-111 | Basement and First Floor Electrical Plan - Demolition | | 3/20/2024 | Bid Set |
| Electrical | E-111 | Basement and First Floor Lighting Plan - New Work | | 3/20/2024 | Bid Set |
| Electrical | E-121 | Basement and First Floor Power Plan - New Work | | 3/20/2024 | Bid Set |
| Electrical | E-131 | First Floor Fire Alarm Plan - New Work | | 3/20/2024 | Bid Set |
| Electrical | E-301 | Panelboard Schedules | | 3/20/2024 | Bid Set |
| Electrical | E-401 | Electrical Riser Diagrams - Existing/Demolition and New Work | | 3/20/2024 | Bid Set |

LINCOLN PARK COMMUNITY CENTER RENOVATION AND ADA IMPROVEMENTS

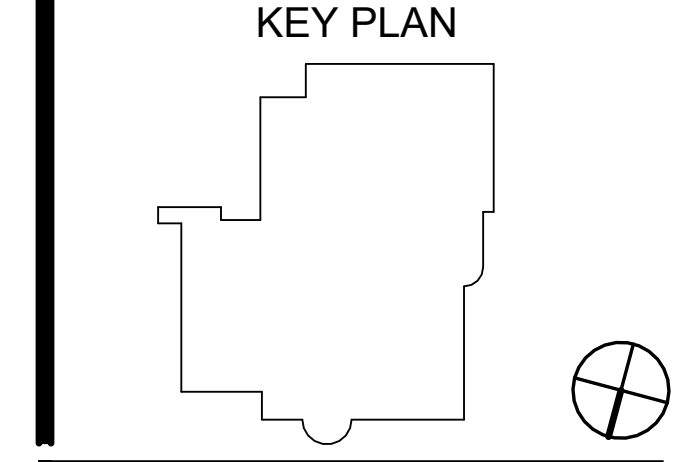
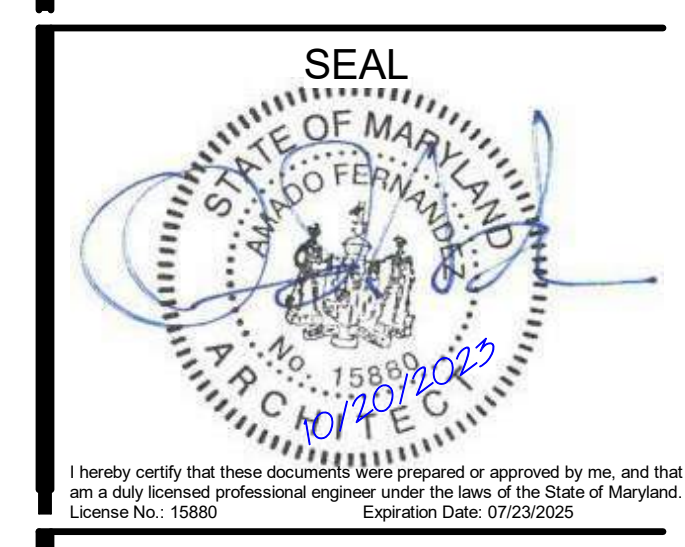
357 FREDERICK AVE, ROCKVILLE, MD 20850

BID SET 3/20/2024

**LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS**

PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850

OWNER: THE CITY OF ROCKVILLE
PROJ. NO.: 1916A



| REVISIONS | | |
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| ISSUANCES | |
|------------|----------|
| DATE | ISSUANCE |
| 10/20/2023 | PERMIT |
| 3/20/2024 | BID SET |

OWNER

CITY OF ROCKVILLE
111 MARYLAND AVENUE
ROCKVILLE, MD 20850
TEL: 240.314.5000

ARCHITECT

LITTLE
1753 PINNACLE DR, SUITE 1100
MCLEAN, VA 22102
TEL: 703.908.4501

STRUCTURAL

CAGLEY & ASSOCIATES
6141 EXECUTIVE BLVD
ROCKVILLE, MD 20852
TEL: 301.881.9050

**MECHANICAL, ELECTRICAL,
PLUMBING, & FIRE PROTECTION**

SALAS O'BRIEN
6700 ROCKLEDGE DR, SUITE 301
BEHTESDA, MD 20817
TEL: 301.216.2871

COVER SHEET

CS-001

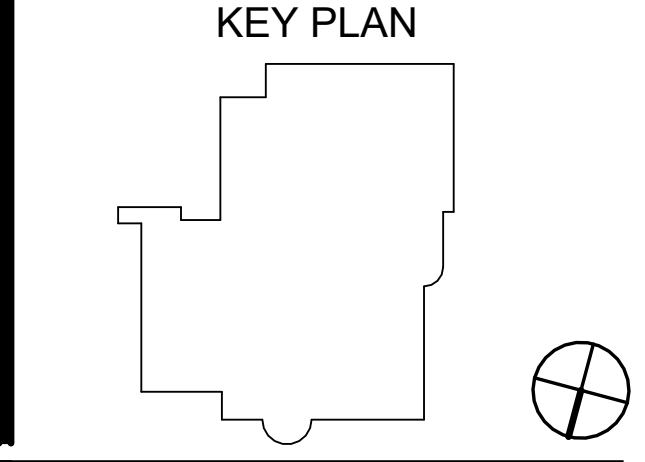


Table with 3 columns: MARK, DATE, ISSUE. It is currently empty.

Table with 2 columns: DATE, ISSUANCE. It contains two entries: 10/20/2023 PERMIT and 3/20/2024 BID SET.

ABBREVIATIONS, SYMBOLS, GENERAL NOTES, DRAWING INDEX

G-001

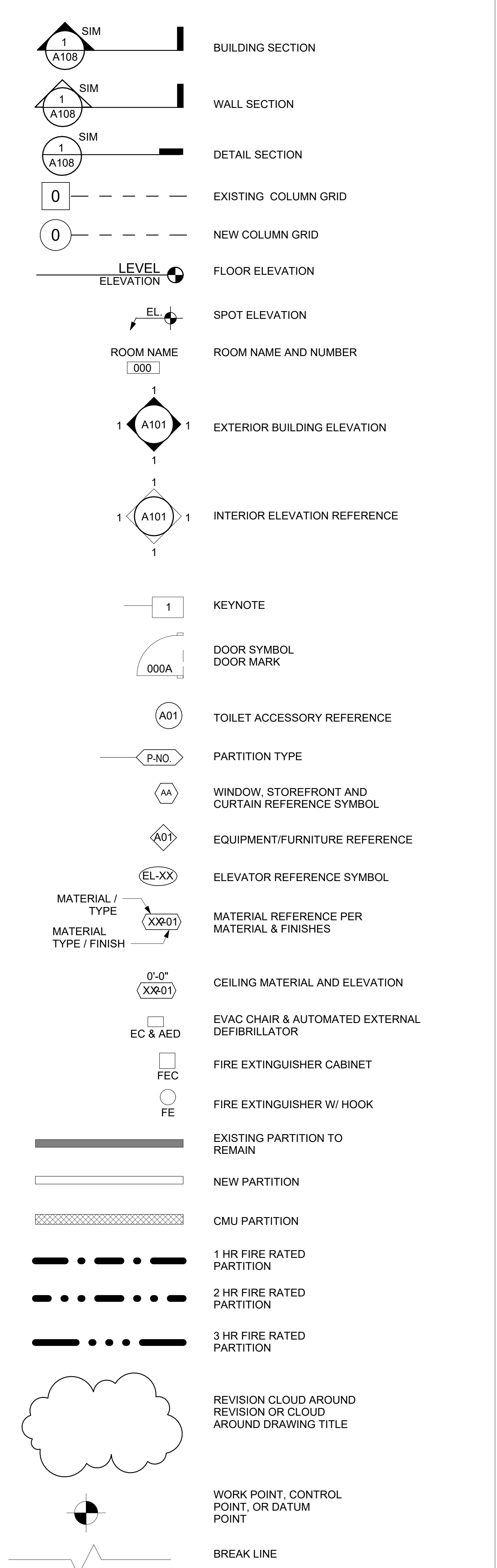
DRAWING INDEX

Table listing drawing sheets under categories: GENERAL, ARCHITECTURE - DEMO, ARCHITECTURE, STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL.

GENERAL NOTES

- A. GENERAL NOTES: 1. THE CONTRACT, ADDENDA, SUPPLEMENTAL CONDITIONS... C. DIMENSIONS: 1. DIMENSIONS ARE INDICATED TO THE CENTERLINE OF STRUCTURAL GRID... D. PROJECT SPECIFIC NOTES: 1. SPACES SHOWN BUT NOT NOTED, WHICH ARE SUBSTANTIALLY SIMILAR IN USE TO SPACES NOTED AS TYPICAL...

SYMBOLS & CONVENTIONS



ABBREVIATIONS

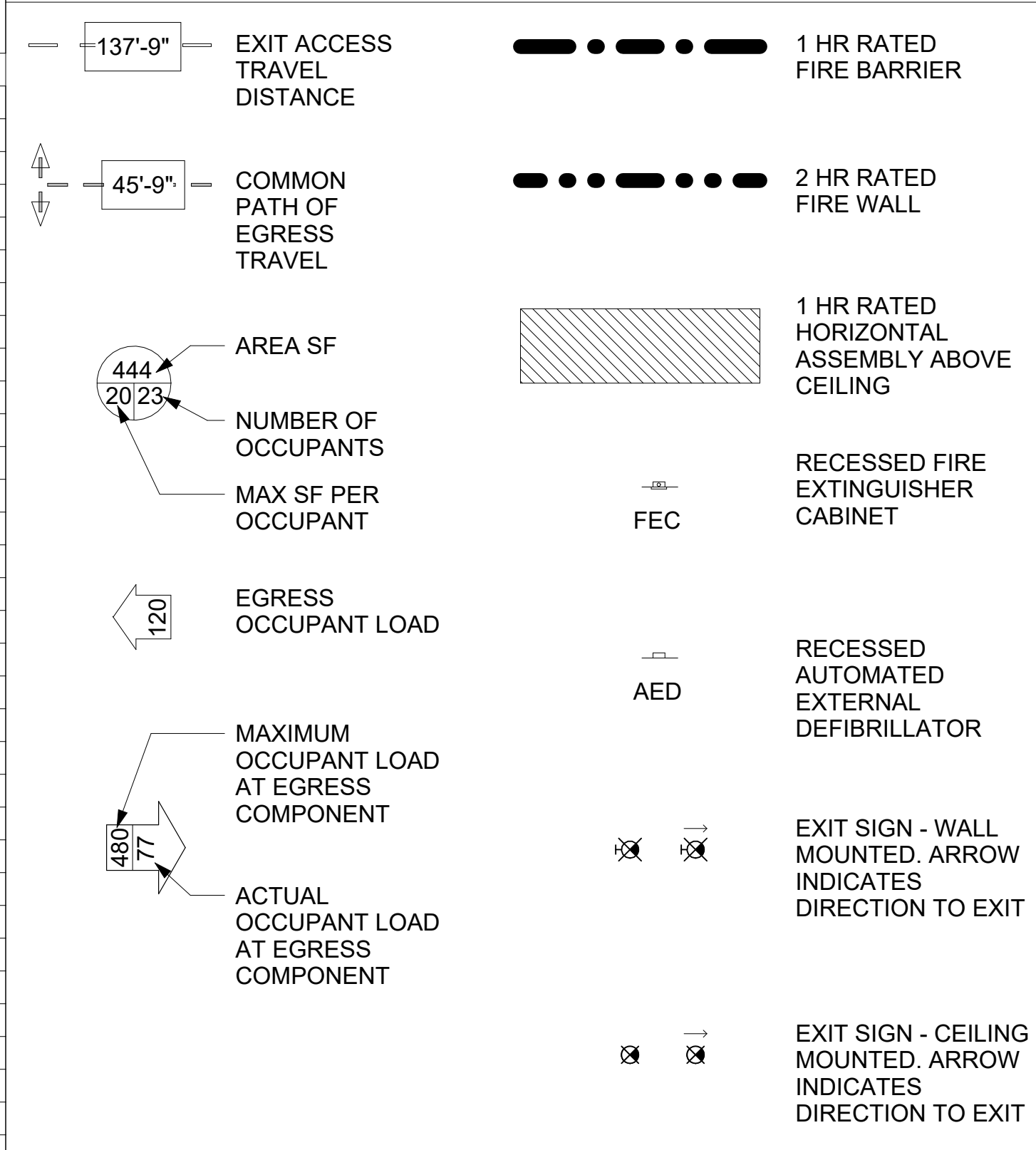
Table listing abbreviations for various building components and materials, such as ADA (AMERICANS WITH DISABILITIES ACT), CAB (CABINET), DIA (DIAMETER), and others.

NOTE: ABBREVIATION LIST IS FOR CONTRACTORS CONVENIENCE AND MAY NOT BE COMPLETE. REFER ANY QUESTIONABLE ABBREVIATIONS TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.

OCCUPANCY

| ROOM NUMBER | ROOM NAME | AREA (SF) | OCCUPANCY TYPE | OCCUPANT LOAD PER PERSON (SF) | OCCUPANCY |
|-------------------------|-----------------------------|------------|----------------------|-------------------------------|------------|
| 124 | ALL GENDER | Not Placed | NON-SIMULTANEOUS | 0 | |
| B001 | WEIGHT ROOM | 1144 SF | EXERCISE | 50 | 23 |
| B002 | TOILET | 25 SF | NON-SIMULTANEOUS | 0 | |
| B003 | WATER HEATER | 138 SF | STORAGE / MECHANICAL | 300 | 1 |
| B004 | UTILITY CLOSET | 82 SF | STORAGE / MECHANICAL | 300 | 1 |
| B005 | EXIT STAIR | 83 SF | CIRCULATION | 0 | |
| 101 | FOYER | 324 SF | CIRCULATION | 0 | |
| 102 | MULTIPURPOSE ROOM | 1092 SF | ASSEMBLY | 15 | 73 |
| 103 | CLOSET | 84 SF | STORAGE / MECHANICAL | 300 | 1 |
| 105 | ALL GENDER | 49 SF | NON-SIMULTANEOUS | 0 | |
| 106 | STOR | 55 SF | STORAGE / MECHANICAL | 300 | 1 |
| 107 | LOBBY | 339 SF | CIRCULATION | 0 | |
| 108 | ALL GENDER | 50 SF | NON-SIMULTANEOUS | 0 | |
| 109 | WOMEN'S RESTROOM | 111 SF | NON-SIMULTANEOUS | 0 | |
| 110 | MEN'S RESTROOM | 95 SF | NON-SIMULTANEOUS | 0 | |
| 111 | STEM CLASSROOM | 718 SF | CLASSROOM | 15 | 48 |
| 112 | CLOSET | 112 SF | STORAGE / MECHANICAL | 300 | 1 |
| 113 | PANTRY | 150 SF | KITCHEN | 200 | 1 |
| 114 | RECEPTION | 243 SF | BUSINESS | 150 | 2 |
| 115 | SUPERVISOR | 85 SF | BUSINESS | 150 | 1 |
| 116 | ASSISTANT SUPERVISOR | 82 SF | BUSINESS | 150 | 1 |
| 117 | OFFICE SUPPLIES AUDIO/VIDEO | 38 SF | STORAGE / MECHANICAL | 300 | 1 |
| 118 | STUDY ROOM | 192 SF | ASSEMBLY | 15 | 13 |
| 119 | GAME ROOM | 480 SF | ASSEMBLY | 15 | 31 |
| 120 | VESTIBULE | 69 SF | CIRCULATION | 0 | |
| 121 | LIBRARY | 523 SF | LIBRARY - READING | 50 | 11 |
| 122 | CORRIDOR | 190 SF | CIRCULATION | 0 | |
| 123 | FITNESS | 623 SF | EXERCISE | 50 | 13 |
| 125 | CORRIDOR | 383 SF | CIRCULATION | 0 | |
| 126 | STORAGE | 175 SF | STORAGE / MECHANICAL | 300 | 1 |
| 127 | ADULT CHANGING | 122 SF | LOCKER ROOM | 50 | 3 |
| 128 | STORAGE | 118 SF | STORAGE / MECHANICAL | 300 | 1 |
| 129 | CUSTODIAL | 61 SF | STORAGE / MECHANICAL | 300 | 1 |
| 130 | CORRIDOR | 442 SF | CIRCULATION | 0 | |
| 131 | GYMNASIUM | 3069 SF | ASSEMBLY | 15 | 205 |
| 132 | STORAGE | 194 SF | STORAGE / MECHANICAL | 300 | 1 |
| S001 | STAIRS | 64 SF | CIRCULATION | 0 | |
| S002 | EXIT STAIR | 83 SF | CIRCULATION | 0 | |
| TOTAL OCCUPANCY: | | | | | 435 |

LIFE SAFETY PLAN LEGEND



BUILDING DATA

| PLUMBING FIXTURE CALCULATION | | APPLICABLE CODES AND REGULATIONS | |
|--|----------------------|--|---|
| OCCUPANCY - ASSEMBLY (A-3) | | | |
| TOTAL OCCUPANT LOAD | 435 OCCUPANTS | 2018 INTERNATIONAL BUILDING CODE (IBC) | 2018 INTERNATIONAL EXISTING BUILDING CODE (IBC) |
| MALE OCCUPANTS | 217 MALE OCCUPANTS | - ALTERATION LEVEL 1 (SECTION 602, CHAPTER 7, CHAPTER 8) | |
| FEMALE OCCUPANTS | 217 FEMALE OCCUPANTS | - ALTERATION LEVEL 2 (SECTION 603, CHAPTER 7, CHAPTER 8) | |
| FIXTURES FOR MALES | | | |
| | WATER CLOSETS* | LAVATORIES | |
| REQUIRED FIXTURES | 1 PER 125 | 1 PER 200 | |
| PROVIDED FIXTURES | 2 | 2 | |
| *INTERNATIONAL PLUMBING CODE SECTION 424.2. URINALS SHALL NOT BE SUBSTITUTED FOR MORE THAN 50 PERCENT OF THE REQUIRED WATER CLOSETS. | | | |
| ** ALL GENDER TOILET 108 IS INCLUDED. | | | |
| FIXTURES FOR FEMALES | | | |
| | WATER CLOSETS | LAVATORIES | |
| REQUIRED FIXTURES | 1 PER 65 | 1 PER 200 | |
| PROVIDED FIXTURES | 4 | 2 | |
| * ALL GENDER TOILET 105 AND ADULT CHANGING 127 ARE INCLUDED. | | | |
| DRINKING FOUNTAINS & OTHER | | | |
| | DRINKING FOUNTAINS | OTHER | |
| REQUIRED FIXTURES | 1 PER 500 | 1 SERVICE SINK | |
| PROVIDED FIXTURES | 1 | 1 | |

| PROJECT DESCRIPTION | |
|---|--|
| THE PROJECT CONSISTS OF A LEVEL 1 AND LEVEL 2 ALTERATIONS INCLUDING: | |
| <ul style="list-style-type: none"> NO CHANGE IN USE, OCCUPANCY, BUILDING AREA OR EGRESS COMPONENTS UPGRADES TO INTERIOR FLOOR AND WALL FINISHES WITH LIMITED WORK TO THE EXISTING CEILINGS SEE G-004 FOR AREAS OF ALTERATION LEVELS. | |

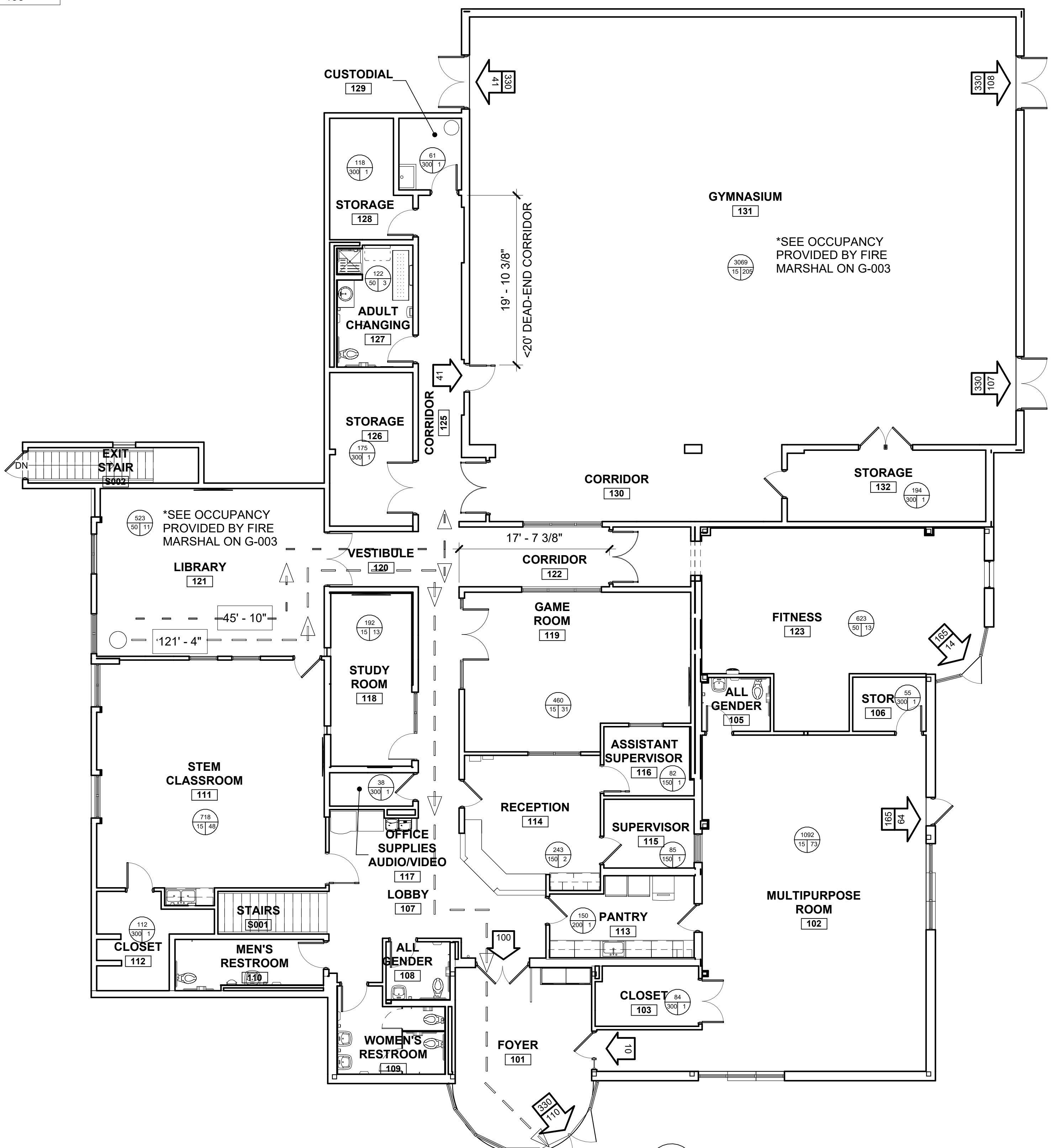
| OCCUPANCY CLASSIFICATION (IBC SECTION 303.4) | | |
|--|--------------------|----------------------------------|
| PRIMARY OCCUPANCY: ASSEMBLY GROUP A3 | | |
| CLASSIFICATION | FUNCTION | OCCUPANT LOAD FACTOR |
| IBC CHAPTER 3 | IBC TABLE 1004.1.2 | IBC TABLE 1004.1.2 (SF / PERSON) |
| ASSEMBLY | UNCONCENTRATED | 15 SF / PERSON |
| BUSINESS | | 150 SF / PERSON |
| EXERCISE ROOMS | | 50 SF / PERSON |
| KITCHENS | | 200 SF / PERSON |
| LIBRARY | READING | 50 SF / PERSON |
| LOCKER ROOMS | | 50 SF / PERSON |
| STORAGE/MECH AREA | STORAGE | 300 SF / PERSON |

| TYPE OF CONSTRUCTION (IBC TABLE 601) | |
|--|--|
| III B | |
| BUILDING IS NON-SPRINKLERED WITH A VOICE-ACTIVATED FIRE ALARM SYSTEM | |
| BUILDING HEIGHT: 20' - 8" | |

| OCCUPANT LOAD REFERENCE OCCUPANT LOAD TABLE AND LEGEND | | |
|--|----------|-----------|
| EGRESS WIDTH PER OCCUPANT PER NFPA 101, 7.3.3.1 | | |
| W/O SPRINKLER SYSTEM | | |
| A-3 | ASSEMBLY | DOORS 0.2 |

| BUSINESS OCCUPANCY REQUIREMENTS | | | |
|---------------------------------|--------------------|-----------------|------------|
| COMMON PATH OF EGRESS TRAVEL | NFPA 101, 13.2.5.1 | 75' | <75' |
| EXIT ACCESS TRAVEL DISTANCE | NFPA 101, 13.2.6.2 | 200' | <200' |
| NUMBER OF EXITS | NFPA 101, 7.4.1.2 | MIN. REQUIRED 2 | PROVIDED 6 |

| INTERIOR FINISH REQUIREMENTS | | |
|--|--------------|-------------------|
| INTERIOR WALL AND CEILING FINISHES SHALL BE CLASSIFIED AS FOLLOWS AND SHALL BE RESTRICTED FOR USE BY THE FOLLOWING TABLE AS DEFINED IN IBC SECTION 803.1 | | |
| CLASS | FLAME SPREAD | SMOKE DEVELOPMENT |
| A | 0 - 25 | 0 - 450 |
| B | 26 - 75 | 0 - 450 |
| C | 76 - 200 | 0 - 450 |



A5 BASEMENT FLOOR - LIFE SAFETY
1/8" = 1'-0"
SHOWN FOR INFORMATION ONLY. NO NEW WORK IN THE BASEMENT.

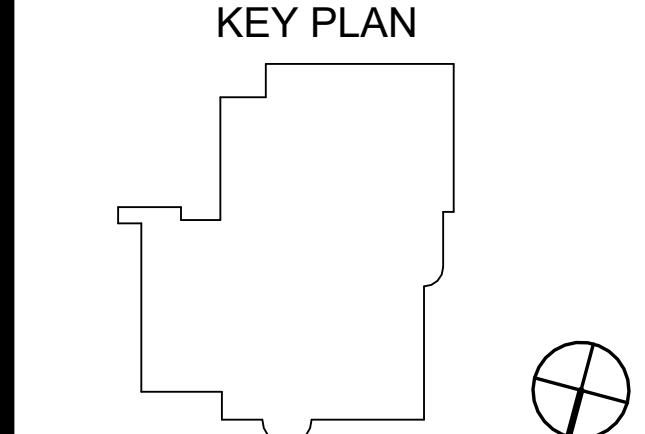
A4 FIRST FLOOR NEW WORK - LIFE SAFETY
1/8" = 1'-0"

**LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS**

PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850

OWNER: THE CITY OF ROCKVILLE

PROJ. NO.: 19/16A



| REVISIONS | | |
|-----------|------|-------|
| MARK | DATE | ISSUE |
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| ISSUANCES | |
|------------|----------|
| DATE | ISSUANCE |
| 10/20/2023 | PERMIT |
| 3/20/2024 | BID SET |

CODE INFORMATION AND LIFE SAFETY

G-002



MEETING MINUTES Fire Marshal Preliminary Meeting Project Name/Number: Lincoln Park Community Center City of Rockville Project #1916A Date of Meeting: March 10, 2023 Location of Meeting: Lincoln Park Community Center Attendees: See attached attendee list. Items Discussed: Review Comments: 1. Hughes Group presented the history of the existing building, the demolition plan, and the proposed scope of work. a. The existing building as documented is an Assembly use, Type 3B construction, nonsprinklered. 2. After a preliminary discussion with the City Fire Marshal team it is understood that, if the following is maintained, a sprinkler system is not required to be added to the project: a. The existing use is maintained. b. The existing occupancy for assembly areas is not increased. If the occupant load is increased, a sprinkler system may be required. c. If less than 50% of the building is renovated. Renovation is defined as walls being moved, work within the structural slab, or similar work. Paint and updated finishes are not considered a renovation. 3. Charles Biggus completed an occupant load verification in 2021. He will send those counts to Hughes Group Architects for reference. 4. The existing fire alarm was discussed. Salas O'Brien confirmed the existing fire alarm is a voice activated system. This meets the fire alarm requirements per NFPA Life Safety code based on the existing occupancy of the assembly spaces. a. Based on the reallocation of space within the proposed scope of work, there may be updates to the fire alarm system. b. No further action is required at this time. 5. Fire Marshal team clarified the following: a. The term "grandfathered" does not exist. b. The term typically applied is "retroactively". 6. The submission process and typical timeline for review was discussed. a. After the plans go through the intake process, there is a 2 to 4 week review period for alterations and renovations. This is for building and fire review. Planning and zoning reviews are not anticipated at this time based on the scope of work. 22630 Davis Drive, Suite 175, Sterling, Virginia 20164 703.437.6600 www.hgaarch.com

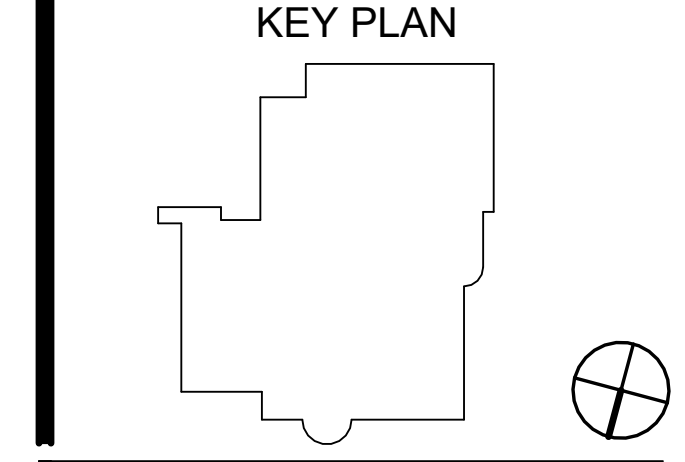
The preceding meeting minutes represent Hughes Group Architects understanding of the items discussed and the actions or decisions agreed to and shall constitute the basis upon which the project is proceeding. If any of the attendees should have any additions, clarifications, or corrections, they should be forwarded to Hughes Group Architects within five working days of receipt of this document. End of Meeting Minutes. Minutes By: Elizabeth Morgan Distribution: 3/20/2023 to attendees

Lincoln Park Community Center Meeting Minutes

CITY OF ROCKVILLE Office of the Fire Marshal NOT MORE THAN 205 Persons w/ Tables & Chairs PERMITTED IN THE BUILDING Carl Young Fire Marshal Lincoln Park Community Center (Gymnasium) 357 Frederick Ave 5/24/2021

CITY OF ROCKVILLE Office of the Fire Marshal NOT MORE THAN 15 Persons w/ Tables & Chairs PERMITTED IN THE BUILDING Carl Young Fire Marshal Lincoln Park Community Center (Library) 357 Frederick Ave 5/24/2021

LINCOLN PARK COMMUNITY CENTER RENOVATION AND ADA IMPROVEMENTS PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850 OWNER: THE CITY OF ROCKVILLE PROJ. NO.: 19/16A



REVISIONS table with columns MARK, DATE, ISSUE

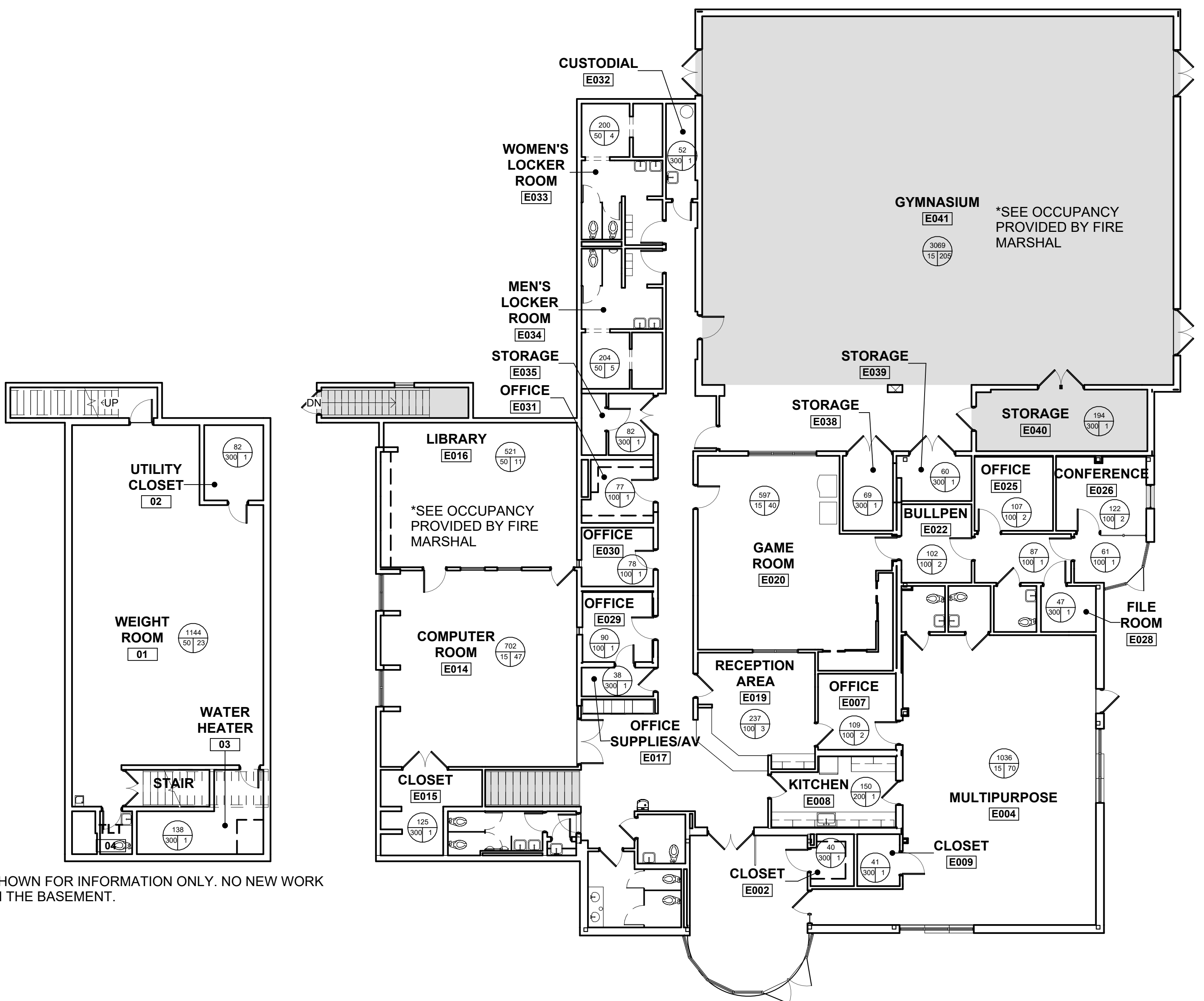
ISSUANCES table with columns DATE, ISSUANCE

CODE LETTERS

G-003

OCCUPANCY - EXISTING

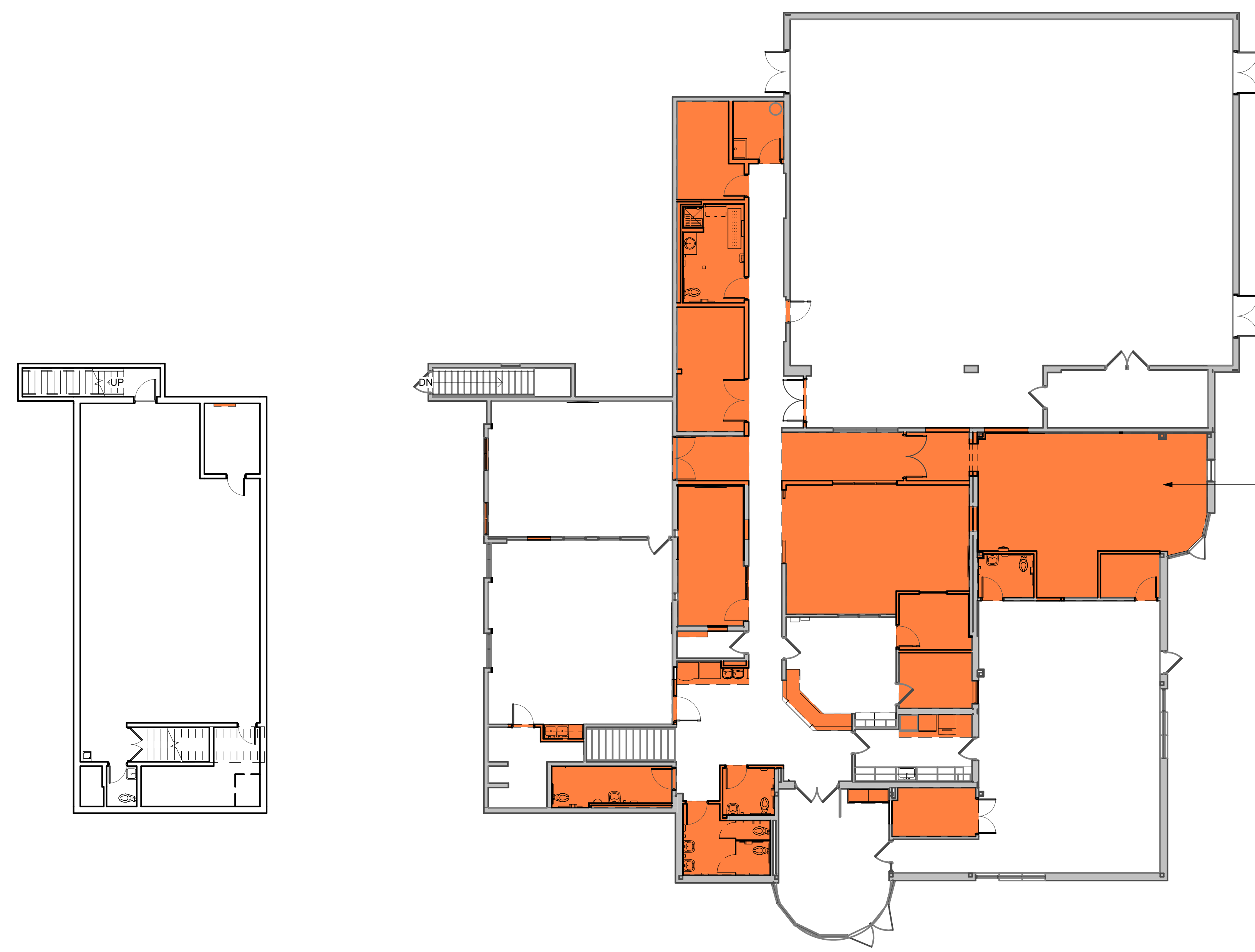
Table with columns: ROOM NUMBER, ROOM NAME, AREA (SF), OCCUPANCY TYPE, OCCUPANT LOAD PER PERSON (SF), OCCUPANCY. Lists rooms like STAIR, WEIGHT ROOM, UTILITY CLOSET, WATER HEATER, etc.



C4 FIRST FLOOR PLAN - OCCUPANCY - EXISTING 3/32" = 1'-0"

C6 BASEMENT FLOOR PLAN - OCCUPANCY - EXISTING 3/32" = 1'-0"

LEVEL 1 ALTERATION 602.1 - LEVEL 1 ALTERATIONS INCLUDE THE REMOVAL AND REPLACEMENT OR THE COVERING OF EXISTING MATERIALS, ELEMENTS, EQUIPMENT, OR FIXTURES USING NEW MATERIALS, ELEMENTS, EQUIPMENT, OR FIXTURES THAT SERVICE THE SAME PURPOSE. LEVEL 2 ALTERATION 603.1 - LEVEL 2 ALTERATIONS INCLUDE THE RECONFIGURATION OF SPACE, THE ADDITION OR ELIMINATION OF ANY DOOR OR WINDOW, THE RECONFIGURATION OR EXTENSION OF ANY SYSTEM, OR THE INSTALLATION OF ANY ADDITIONAL EQUIPMENT. AREA OF ALTERATIONS = 2,978 SF TOTAL BUILDING AREA = 10,342 SF AREA OF ALTERATION IS LESS THAN 50% OF THE BUILDING AREA.



A4 FIRST FLOOR PLAN - ALTERATION AREAS 3/32" = 1'-0"

A6 BASEMENT FLOOR PLAN - ALTERATION AREAS 3/32" = 1'-0"



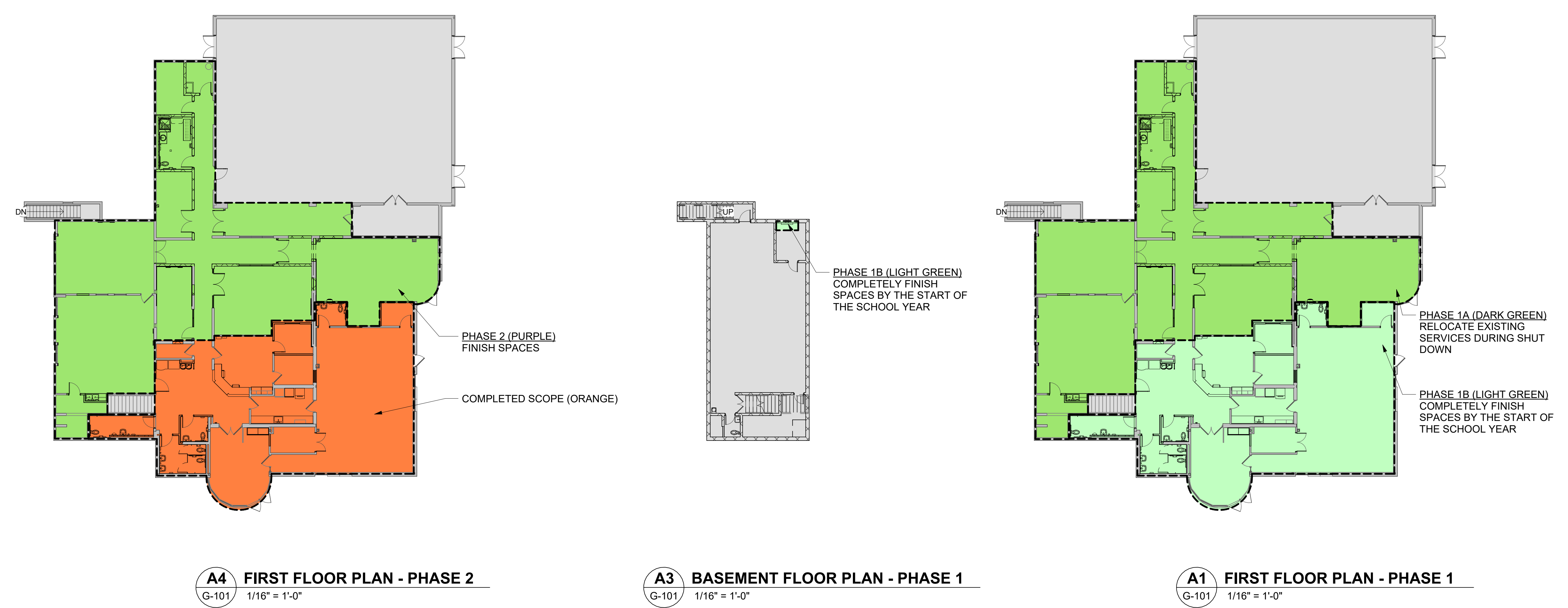
PHASE 1 - FACILITY CLOSED
COMPLETE DEMO AND MAIN CORRIDOR. RELOCATE ELECTRICAL PANELS. FINISH THE MULTIPURPOSE ROOM, STORAGE ROOMS, FOYER, PANTRY, TWO OFFICES, RECEPTION, MEN'S RESTROOM, WOMEN'S RESTROOM, AND TWO SINGLE USER RESTROOMS.
THIS PHASE TO BE PARTIALLY COMPLETE PRIOR TO THE START OF THE SCHOOL YEAR FOR THE CITY OF ROCKVILLE PUBLIC SCHOOL SYSTEM.

PHASE 2 - FACILITY OPEN
COMPLETE FINISHES AND MAKE OPERATIONAL STUDY ROOM, GAME ROOM, FITNESS ROOM, SINGLE USER RESTROOM, ADULT CHANGING ROOM, AND STORAGE ROOMS. RENOVATE LIBRARY AND STEM CLASSROOM.

B1 PHASING - AERIAL
G-101 1" = 30'-0"

**LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS**

PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850
OWNER: THE CITY OF ROCKVILLE
PROJ. NO.: 19/16A



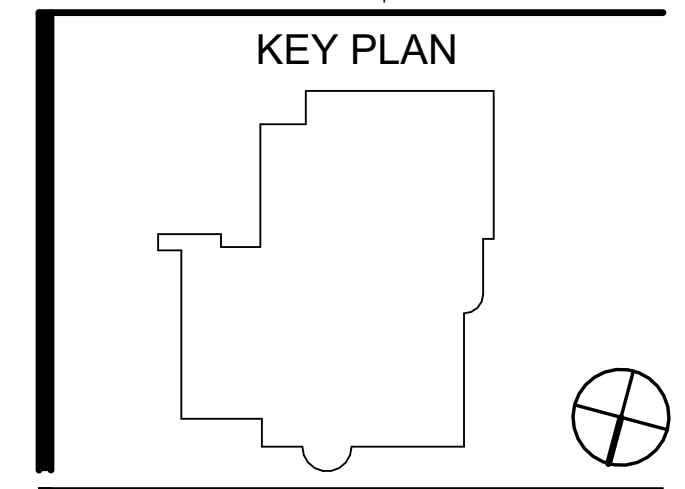
A4 FIRST FLOOR PLAN - PHASE 2
G-101 1/16" = 1'-0"

A3 BASEMENT FLOOR PLAN - PHASE 1
G-101 1/16" = 1'-0"

A1 FIRST FLOOR PLAN - PHASE 1
G-101 1/16" = 1'-0"



I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 15589. Expiration Date: 07/23/2025.



REVISIONS

| MARK | DATE | ISSUE |
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ISSUANCES

| DATE | ISSUANCE |
|------------|----------|
| 10/20/2023 | PERMIT |
| 3/20/2024 | BID SET |

PHASING

G-101

DEMO LEGEND

- CMU WALL TO BE DEMOLISHED
- CMU WALL TO BE REMAIN
- METAL STUD WALL TO BE DEMOLISHED
- METAL STUD WALL TO BE REMAIN
- AREA OF FLOOR DEMOLITION
- DOOR TO BE DEMOLISHED
- DOOR TO BE REMAIN

KEYNOTE LEGEND

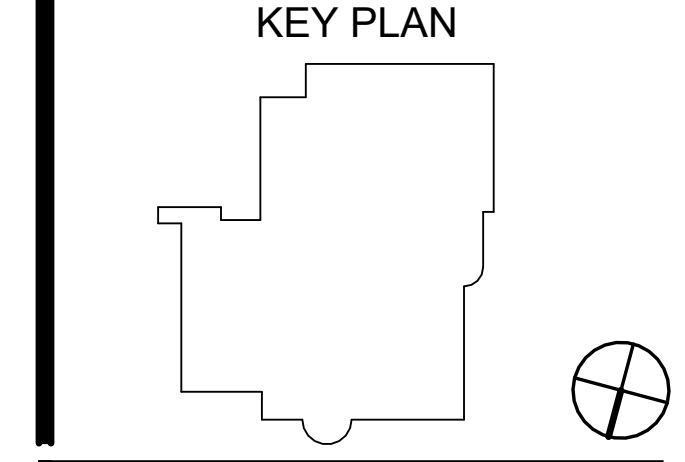
| # | KEYNOTE |
|------|--|
| D1 | DEMOLISH PORTION OF EXTERIOR WALL. COORDINATE WITH NEW WORK. |
| D2 | DEMOLISH PORTION OF EXISTING WALL, DOOR FRAME, AND DOOR. PROTECT ADJACENT WALLS OR FINISHES TO REMAIN. PREP WALLS AND FLOOR TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D3 | DEMOLISH PORTION OF EXISTING CONCRETE SLAB-ON-GRADE. COORDINATE WITH PLUMBING AND STRUCTURAL DRAWINGS. |
| D4 | PATCH AND REPAIR OPENINGS IN EXISTING WOOD DECK. COORDINATE WITH PLUMBING AND STRUCTURAL DRAWINGS. |
| D5 | DEMOLISH EXISTING FLOORING, WALLS, DOORS AND FRAMES, AND INTERIOR WINDOWS. SEE DEMOLITION RCP FOR CEILING WORK. COORDINATE WITH NEW WORK. |
| D6A | DEMOLISH EXISTING WALLS, DOORS AND FRAMES, TOILET PARTITIONS, AND SHELVING. SEE DEMOLITION RCP FOR CEILING WORK. ALL LIGHT FIXTURES TO BE CAREFULLY REMOVED AND STORED FOR REUSE. FLOOR MOUNTED WATER CLOSETS AS WELL AS WALL MOUNTED URINALS AND LAVATORIES TO BE DEMOLISHED. COORDINATE WITH PLUMBING DRAWINGS. TOILET ACCESSORIES TO BE DEMOLISHED. |
| D6B | FLOOR MOUNTED WATER CLOSET AND WALL MOUNTED LAVATORY TO BE DEMOLISHED. COORDINATE WITH PLUMBING DRAWINGS. DEMOLISH TOILET ACCESSORIES. DEMOLISH PORCELAIN WALL TILE, BASE, AND FLOOR. REPLACE PORTION OF GYP BOARD WHERE TILE IS REMOVED FROM WALL. PREP FLOOR AND WALLS TO RECEIVE NEW FINISHES. |
| D7 | DEMOLISH EXISTING DOOR PANEL. REUSE EXISTING FRAME FOR NEW DOOR. COORDINATE WITH NEW WORK. |
| D8A | DEMOLISH EXISTING BASE CABINETS, WALL CABINETS, AND COUNTERTOP. PREP WALLS TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D8B | DEMOLISH EXISTING BASE CABINET AND COUNTERTOP. EXISTING WALL MOUNTED MILLWORK TO REMAIN. PREP WALLS TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D8C | DEMOLISH EXISTING PLASTIC LAMINATE COUNTERTOP AND SINK. EXISTING BASE AND WALL CABINETS TO REMAIN. PREP WALLS TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D9 | DEMOLISH EXISTING WOOD CUBBIES. PREP WALLS TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D10 | DEMOLISH EXISTING TROPHY CASE. PREP WALLS AND FLOOR TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D11 | DEMOLISH EXISTING WALL MOUNTED SHELVING. PATCH HOLES IN WALLS TO REMAIN. PREP REMAINING WALLS TO RECEIVE NEW FINISHES. |
| D12 | DEMOLISH EXISTING METAL LOCKERS AND CONCRETE BASE. PREP FLOOR TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D13 | DEMOLISH EXISTING RECEPTION DESK, EXISTING SURFACE MOUNTED OUTLETS, DATA, AND TELEPHONE JUNCTION BOXES TO BE REMOVED AND LINES RELOCATED TO WALL OF NEW RECEPTION DESK. REMOVE PLEXIGLASS SHIELD HANGING ABOVE RECEPTION DESK AND CAREFULLY STORE FOR REUSE. COORDINATE WITH NEW WORK. |
| D13B | REMOVE EXISTING SAFE FROM FLOOR BOLTS. REMOVE FLOOR BOLTS AND PATCH CONCRETE SLAB TO RECEIVE NEW FINISHES. CAREFULLY STORE SAFE FOR REUSE. COORDINATE WITH NEW WORK. |
| D14 | DEMOLISH EXISTING SHOP SINK. COORDINATE WITH PLUMBING DRAWINGS. PREP WALLS TO RECEIVE NEW FINISHES. |
| D15 | DEMOLISH EXISTING TRENCH DRAIN. COORDINATE WITH PLUMBING AND STRUCTURAL DRAWINGS. COORDINATE WITH NEW WORK. |
| D16 | DEMOLISH EXISTING SHOWERS. COORDINATE WITH PLUMBING DRAWINGS AND NEW WORK. |
| D17 | EXISTING ELECTRICAL PANEL TO BE DEMOLISHED. COORDINATE WITH ELECTRICAL DRAWINGS. |
| D18 | EXISTING ELECTRICAL PANEL TO BE RELOCATED. COORDINATE WITH ELECTRICAL DRAWINGS. |
| D19 | DEMOLISH EXISTING DRINKING FOUNTAIN AND BOTTLE FILLER. COORDINATE WITH PLUMBING DRAWINGS. |
| D20 | DEMOLISH EXISTING FLOOR TILE. PROVIDE LEVELING CONCRETE TO BRING CONCRETE LEVEL AND RAISE FLOOR DRAIN TO FLUSH. PREP TO RECEIVE NEW FINISHES. |
| D21 | DEMOLISH EXISTING TOILET PARTITIONS. PREP WALLS TO RECEIVE NEW FINISHES. |
| D22 | DEMOLISH EXISTING FLOOR TO CEILING WALL MOUNTED MIRRORS. PATCH WALL TO RECEIVE NEW FINISHES. |
| D23 | CAREFULLY REMOVE EXISTING WALL MOUNTED AED CABINET AND FIRST AID CABINET. STORE FOR REUSE. PATCH WALLS TO RECEIVE NEW FINISHES. |
| D24 | REMOVE EXISTING UNDERCOUNTER ICE MAKER. PREP WALLS AND FLOOR TO RECEIVE NEW FINISHES. |
| D30 | EXISTING WATER CLOSET TO REMAIN. COORDINATE WITH PLUMBING DRAWINGS. |
| D31 | EXISTING WATER CLOSET TO REMAIN. COORDINATE WITH PLUMBING DRAWINGS. |
| D32 | EXISTING VENDING MACHINE TO BE RELOCATED AND STORED BY OWNER. |

GENERAL DEMOLITION NOTES

- A. COORDINATE DEMOLITION WITH NEW WORK PLAN.
- B. ALL WALLS THAT ARE MARKED AS DASHED PER DEMO LEGEND SHALL BE REMOVED. WALLS OR CEILING FINISHES THAT ARE REMOVED, DISCONNECT AND REMOVE ALL ITEMS LOCATED IN THOSE WALLS OR CEILING (I.N.O.). REMOVE ALL DOORS, WINDOWS, MECHANICAL, ELECTRICAL, AND PLUMBING FIXTURES AND EQUIPMENT WITHIN WALLS WHICH SHALL BE REMOVED. REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR FULL EXTENT OF WORK AT THESE AREAS. WHERE ITEMS ARE TO BE DEMOLISHED THAT WOULD ALLOW UNAUTHORIZED ACCESS INTO THE BUILDING THE CONTRACTOR MUST PROVIDE A TEMPORARY BARRIER TO PREVENT UNAUTHORIZED ACCESS. THE OWNER HAS FIRST RIGHT OF REFUSAL OF ALL SALVAGED ITEMS, THE CONTRACTOR SHALL PROMPTLY DISPOSE OF ALL DEMOLISHED ITEMS THAT ARE NOT RETAINED BY THE OWNER. DO NOT STOCKPILE DEMOLITION DEBRIS ON SITE.
- C. ALL EXISTING SURFACES TO REMAIN SHALL BE PROTECTED FROM DAMAGE. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF THE EXISTING BUILDING ELEMENTS TO REMAIN THROUGHOUT THE SEQUENCE OF WORK. ANY DAMAGE TO THE EXISTING BUILDING CONDITIONS SHOWN TO REMAIN SHALL BE RESTORED TO NEW WORK CONDITION AT NO ADDITIONAL COST TO THE OWNER.
- D. ALL DOOR FRAMES, BUILT-IN ACCESSORIES, ETC SCHEDULED FOR REMOVAL SHALL BE REMOVED COMPLETELY, INCLUDING: FASTENERS, BRACKETS, BRACES, TIES, ETC.
- E. WHERE FINISHES ARE INDICATED TO BE REMOVED, REMOVAL SHALL INCLUDE ANY GROUT, ADHESIVES, FASTENERS, AND ALL OTHER ITEMS USED TO ATTACH THE FINISHES TO THE SURFACE THAT THEY COVER. FLOOR SURFACES TO RECEIVE NEW FINISHES TO BE SMOOTH, LEVEL, AND FREE OF RESIDUE OF PREVIOUS FINISHES. TILE MUST BE ADHERED FIRMLY TO SUBSTRATE AND SUBSTRATE PATCHED AS REQUIRED TO ACHIEVE A SMOOTH UNINTERRUPTED SURFACE FOR NEW FINISHES.
- F. WHERE WALLS THAT ARE TO REMAIN ARE DISTURBED BY DEMOLITION, PATCH/REPAIR WALLS TO LIKE-NEW CONDITION. PATCHING AT MASONRY SHALL BE WITH HALF OR FULL SIZED MASONRY UNITS TOOTHED INTO EXISTING. ANY EXPOSED ENDS SHALL BE COMPLETED OR REPLACED WITH FINISHED END UNITS. NO WALLS OR OPENINGS SHALL TERMINATE WITH EXPOSED OPEN CELLS OR DAMAGED UNITS.
- G. ITEMS TO BE DEMOLISHED SHALL BE REMOVED COMPLETELY INCLUDING ALL ASSOCIATED COMPONENTS SUCH AS ANCHORS, HANGERS, FASTENERS, PIPES, CONDUITS, DUCTS, ETC, UNLESS NOTED OTHERWISE.
- H. INFILL ALL HOLES IN CONCRETE SLAB WHERE EXISTING UTILITIES ARE SCHEDULED TO BE REMOVED.
- I. PARTITIONS SHOWN TO BE REMOVED SHALL BE CONFIRMED BY THE CONTRACTOR AS TO TYPE OF PARTITION AND EXACT LOCATION. IF PARTITION TO BE REMOVED EXTENDS THROUGH CONCRETE SLAB, REMOVE PARTITION (1) COURSE BELOW TOP OF SLAB; REPAIR PARTITION AS NECESSARY TO ALLOW FOR A FULL 4" DEPTH OF CONCRETE PATCH (TYP.) FILL SLAB OPENING WITH CONCRETE FILL TO RECEIVE FINISH FLOOR. WHERE WALLS SCHEDULED TO BE REMOVED SIT ON SLABS, GRIND SLAB SMOOTH TO PROVIDE A CONSISTENT SUBSTRATE.
- J. WHERE PIPES, CONDUITS, AND PANELS ARE REMOVED FROM EXISTING WALLS TO REMAIN, OPENINGS SHALL BE FILLED AS FOLLOWS: A. WHERE OPENINGS ARE EXPOSED TO VIEW, PATCH TO MATCH ADJACENT SURFACES. TOOTH-IN CHASE FOR ALL OPENINGS GREATER THAN 10 SQUARE INCHES. B. WHERE CONCEALED, FILL OPENINGS LESS THAN 4 SQUARE INCHES WITH INSULATION, OR FIRE SAFING MATERIAL IN RATED WALLS. C. WHERE CONCEALED, FILL OPENINGS GREATER THAN 4 SQUARE INCHES WITH MORTAR OR MASONRY INFILL.
- K. FIELD VERIFY EXACT SIZES OF NEW DOORS OR WINDOWS THAT ARE TO BE INSTALLED IN EXISTING OPENINGS OR FRAMES. DIMENSIONS SHOWN ON PLANS ARE FOR BIDDING PURPOSES ONLY AND MUST BE FIELD VERIFIED PRIOR TO SUBMITTING SHOP DRAWINGS.
- L. CONCRETE SURFACES TO REMAIN SHALL BE SCRAPPED, LEVELED AND CLEANED TO PROVIDE A SUITABLE SURFACE FOR THE NEW FLOOR FINISH.
- M. WHERE ELECTRICAL PANELS AND OTHER WORK RECESSED INTO WALLS IS REMOVED, TOOTH IN MASONRY TO MATCH EXISTING. WHERE WALL SURFACE IS DAMAGED BY REMOVAL OF EXISTING ITEMS, REPAIR SURFACE TO MATCH EXISTING AND PREP AREA FOR NEW FINISHES AS PER FINISH SCHEDULE.
- N. ALL EXISTING STRUCTURE SHALL REMAIN EXCEPT WHERE NOTED OTHERWISE.
- O. THE EXTENT OF DEMOLITION WORK SHALL INCLUDE ALL INCIDENTAL DEMOLITION NECESSARY TO PROPERLY PROVIDE ALL NEW WORK SHOWN AND SPECIFIED, TO INCLUDE STRUCTURAL, MECHANICAL, ELECTRICAL AND PLUMBING ITEMS.
- P. DEMOLITION WORK SHOWN IS BASED ON EXISTING DRAWINGS AND ELEVATIONS. THE CONTRACTOR SHALL VISUALLY INSPECT ALL EXISTING CONDITIONS AND IS RESPONSIBLE FOR PERFORMING THE INDICATED DEMOLITION WORK EVEN IF ACTUAL CONDITIONS DIFFER FROM THOSE SHOWN ON THE DRAWINGS. CONTRACTOR SHALL ADVISE OWNER/ARCHITECT OF ANY DISCREPANCIES.
- Q. DIMENSIONS OF EXISTING CONSTRUCTION ARE APPROXIMATE; CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
- R. REMOVE, PATCH, AND REPAIR PORTIONS OF EXISTING BUILDING WHICH CONFLICT WITH NEW WORK TO BE INSTALLED, EVEN IF NOT SPECIFICALLY NOTED TO BE DEMOLISHED ON PLANS.
- S. CONTRACTOR SHALL COORDINATE WITH NEW WORK SECTIONS AND ELEVATIONS FOR ADDITIONAL INFORMATION RELATED TO THE EXTENT OF DEMOLITION.
- T. COORDINATE DEMOLITION OF ANY STRUCTURAL ITEMS (COLUMNS, BEAMS, SLABS, ETC.) WITH STRUCTURAL DRAWINGS. EXTENT OF DEMOLITION AREA SHALL BE IN ACCORDANCE WITH STRUCTURAL REQUIREMENTS AND COORDINATED WITH ALL NEW WORK.
- U. REMOVE MECHANICAL, ELECTRICAL, AND PLUMBING ITEMS AS NOTED ON MECHANICAL, ELECTRICAL, AND PLUMBING PLANS. COORDINATE WITH STRUCTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR ADDITIONAL DEMOLITION NOTES. REMOVAL WORK IS INTENDED TO INCLUDE ALL ASSOCIATED ITEMS SUCH AS ELECTRICAL OUTLETS, SWITCHES, CONDUITS, CONTROLS, PIPING, MOUNTING BLOCKS, CONC. PADS, ETC.
- V. CONCRETE SLAB PATCHES MUST BE FLUSH WITH REMAINING SURFACE TO PERMIT APPLICATION OF FINISHES. PROVIDE WELDED WIRE MESH TO PATCH AREAS LARGER THAN (4) FOUR SQUARE FEET AT SLAB ON GRADE. WHERE NEW OPENINGS ARE SHOWN IN EXISTING WALLS, CAREFULLY REMOVE MASONRY TO NEAREST JOINT LINE WITHOUT DISTURBING ADJACENT WORK SO THAT NEW WORK CAN BE PATCHED IN TO MATCH. ALL NEW MASONRY WORK SHALL BE TOOTHED IN.
- X. REFER TO ALL OTHER DRAWINGS IN THIS SET TO DETERMINE INCIDENTAL DEMOLITION WORK NOT NOTED ON THE DEMOLITION PLANS.
- Y. ALL CRACKS IN SLAB GREATER THAN 1/16" WIDE TO BE ROUTED TO 1/4" WIDE AND FILLED WITH ELASTOMERIC CRACK SEALANT.
- Z. SEE DEMO FINISH SCHEDULE ON AD-601 FOR FINISHES TO BE REMOVED.

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**LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS**
PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850
OWNER: THE CITY OF ROCKVILLE
PROJ. NO.: 1916A

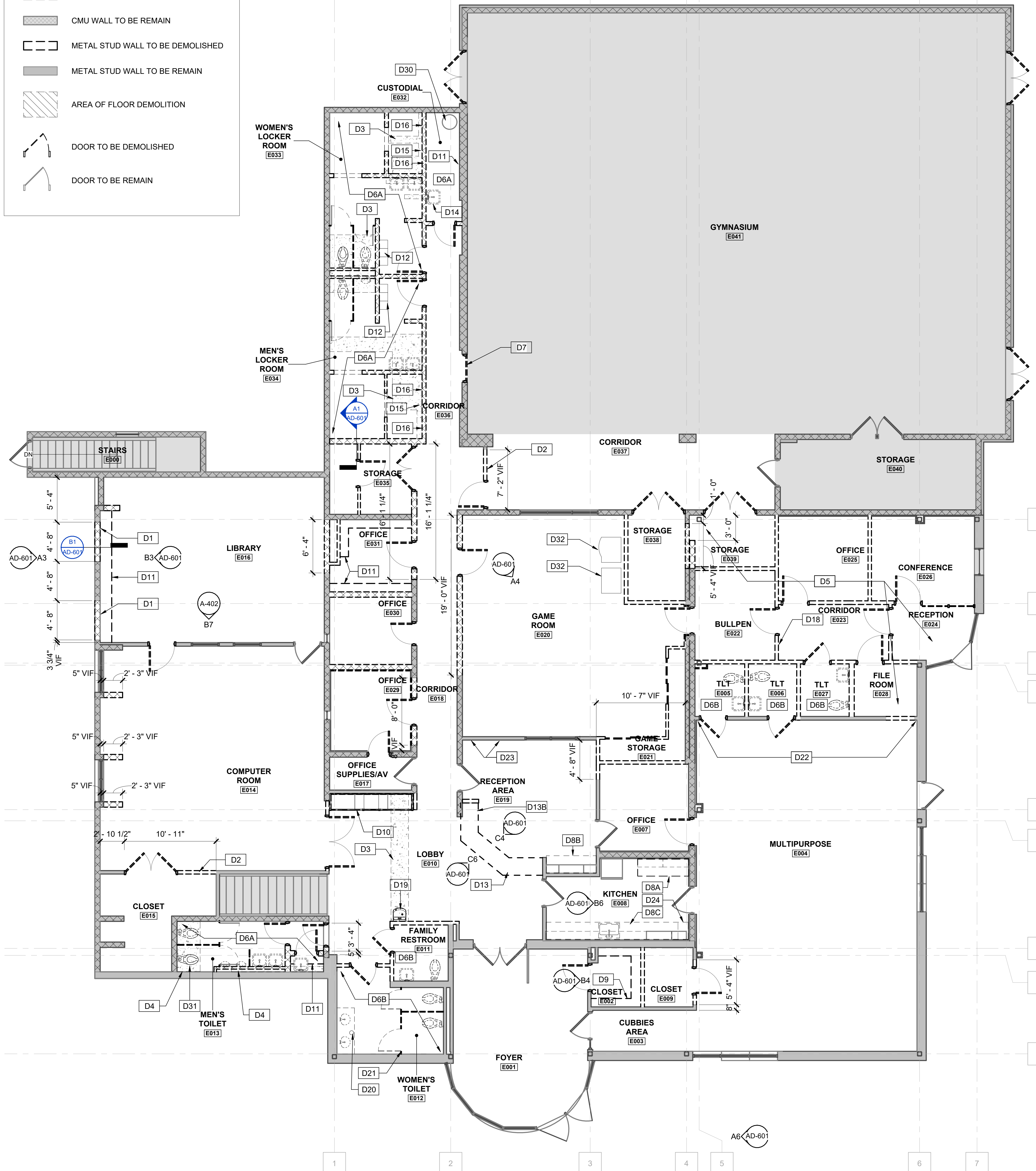


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| 3/20/2024 | BID SET |

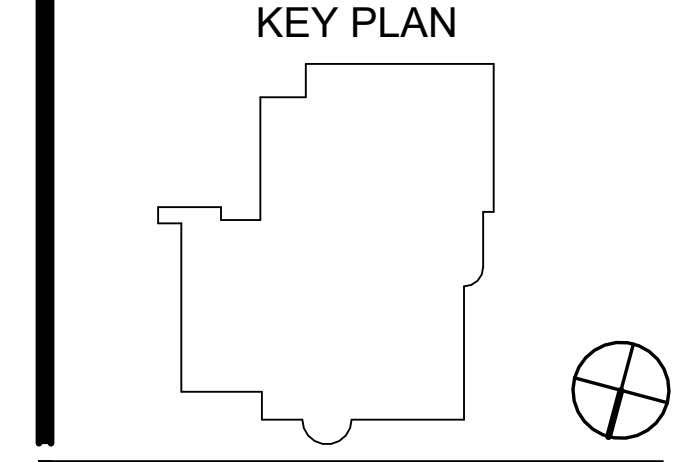
FIRST FLOOR PLAN - DEMO

AD-101



A3 FIRST FLOOR PLAN - DEMOLITION
AD-101 3/16" = 1'-0"

**LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS**
PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850
OWNER: THE CITY OF ROCKVILLE
PROJ. NO.: 19/16A



REVISIONS

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ISSUANCES

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| 10/20/2023 | PERMIT |
| 3/20/2024 | BID SET |

FIRST FLOOR RCP - DEMO

AD-151

KEYNOTE LEGEND

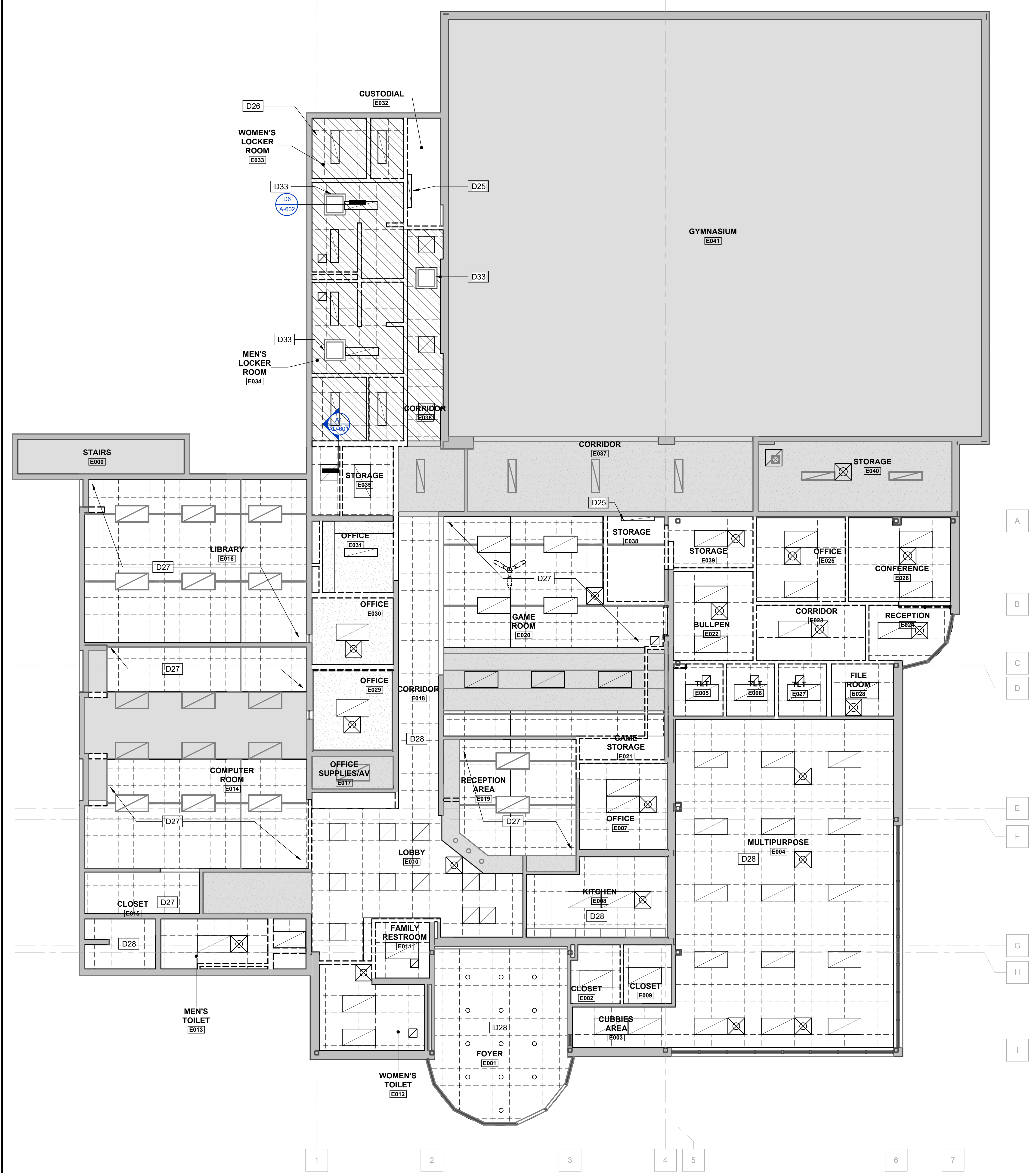
| # | KEYNOTE |
|-----|---|
| D25 | DEMOLISH WALL MOUNTED LIGHT FIXTURE. COORDINATE WITH ELECTRICAL DRAWINGS. |
| D26 | HATCHED AREA DEMONSTRATES EXTENT OF EXISTING 6" BATT INSULATION LOCATED ABOVE CEILING TO BE DEMOLISHED. COORDINATE WITH NEW WORK. |
| D27 | DEMOLISH EXISTING SLOPED ACOUSTICAL CEILING TILE AND GRID. SALVAGE ALL CEILING MOUNTED DEVICES AND CAREFULLY STORE FOR REUSE. REMOVE PAINT FROM EXISTING WOOD TRUSSES AND EXISTING MECHANICAL DUCTWORK TO REMAIN. PREP TO RECEIVE NEW FINISHES. COORDINATE WITH NEW WORK. |
| D28 | DEMOLISH EXISTING ACOUSTICAL CEILING TILE AND GRID. SALVAGE ALL CEILING MOUNTED DEVICES, LIGHT FIXTURES, AND GRILLES AND CAREFULLY STORE FOR REUSE. COORDINATE WITH NEW WORK. |
| D33 | EXISTING SKYLIGHT TO REMAIN. COORDINATE WITH NEW WORK. |

GENERAL RCP DEMO NOTES

- A. COORDINATE DEMOLITION WITH NEW WORK PLAN. SEE DEMO FINISH SCHEDULE ON AD-601 FOR FINISHES TO BE REMOVED.
- B. ALL CEILINGS THAT ARE MARKED AS DASHED PER DEMO LEGEND SHALL BE REMOVED. WALLS OR CEILINGS THAT ARE REMOVED, DISCONNECT AND REMOVE ALL ITEMS LOCATED IN THOSE WALLS OR CEILINGS (U.N.O.) REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR FULL EXTENT OF WORK AT THESE AREAS. THE OWNER HAS FIRST RIGHT OF REFUSAL OF ALL SALVAGED ITEMS. THE CONTRACTOR SHALL PROMPTLY DISPOSE OF ALL DEMOLISHED ITEMS THAT ARE NOT RETAINED BY THE OWNER. DO NOT STOCKPILE DEMOLITION DEBRIS ON SITE.
- C. ALL EXISTING SURFACES TO REMAIN SHALL BE PROTECTED FROM DAMAGE. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF THE EXISTING BUILDING ELEMENTS TO REMAIN THROUGHOUT THE SEQUENCE OF WORK. ANY DAMAGE TO THE EXISTING BUILDING CONDITIONS SHOWN TO REMAIN SHALL BE RESTORED TO NEW WORK CONDITION AT NO ADDITIONAL COST TO THE OWNER.
- D. IN AREAS WHERE THE EXISTING CEILING IS TO REMAIN, CAREFULLY REMOVE LIGHT FIXTURES AND ACOUSTICAL CEILING TILE AS NECESSARY FOR MECHANICAL, PLUMBING, AND ELECTRICAL WORK. STORE LIGHT FIXTURE AND ACOUSTICAL CEILING TILE FOR REINSTALLATION. COORDINATE WITH MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS.
- E. CAREFULLY REMOVE AND STORE ALL LIGHT FIXTURES FOR REUSE. COORDINATE WITH ELECTRICAL DRAWINGS AND NEW WORK.

REFLECTED CEILING PLAN DEMO LEGEND

- ACOUSTICAL CEILING TO BE DEMOLISHED
- GYP BOARD CEILING TO BE DEMOLISHED
- EXPOSED CEILING
- ACOUSTICAL CEILING TO REMAIN
- NOT IN CONTRACT
- BATT INSULATION ABOVE CEILING TO BE DEMOLISHED
- ELECTRICAL LIGHT FIXTURES, SEE ELEC DRAWINGS
- MECHANICAL EQUIPMENT, SEE MECH DRAWINGS



A1 FIRST FLOOR RCP - DEMO
AD-151 3/16" = 1'-0"



DEMOLISH EXISTING ACT AND GRID. COORDINATE WITH NEW WORK. SALVAGE ALL CEILING MOUNTED DEVICES, LIGHT FIXTURES, AND GRILLES FOR REINSTALLATION.

EXISTING BULKHEAD TO REMAIN

DEMOLISH EXISTING COUNTERTOP AND BASE CABINETS

C6 DEMO DETAIL - RECEPTION DESK EXTERIOR

AD-601 1/4" = 1'-0"



DEMOLISH EXISTING SLOPED ACT AND GRID. COORDINATE WITH NEW WORK. SALVAGE ALL CEILING MOUNTED DEVICES FOR REINSTALLATION.

EXISTING BULKHEAD TO REMAIN

DEMOLISH EXISTING COUNTERTOP AND BASE CABINETS

DEMOLISH GYP BOARD WALL, COORDINATE WITH NEW WORK

C4 DEMO DETAIL - RECEPTION DESK INTERIOR

AD-601 1/4" = 1'-0"

| DEMO FINISH SCHEDULE | | | | | | |
|----------------------|---------------------|-------|------|---------------------|---------|---|
| # | SPACE DESCRIPTION | FLOOR | BASE | SPACE FINISHES | | REMARKS |
| | | | | WALLS | CEILING | |
| FIRST FLOOR | | | | | | |
| E000 | STAIRS | -- | -- | -- | -- | EXISTING FINISHES TO REMAIN |
| E001 | FOYER | VCT | VB | -- | ACT | |
| E002 | CLOSET | VCT | VB | -- | ACT | EXPOSED BRICK TO REMAIN AND BE PAINTED |
| E003 | CUBBIES AREA | VCT | VB | -- | ACT | |
| E004 | MULTIPURPOSE | VCT | VB | -- | ACT | DEMO FULL HEIGHT MIRRORS ON SOUTH WALL |
| E005 | TLT | CT | CT | CT WAINSCOT/ PT GYP | ACT | |
| E006 | TLT | CT | CT | CT WAINSCOT/ PT GYP | ACT | |
| E007 | OFFICE | CPT | VB | -- | ACT | |
| E008 | KITCHEN | VCT | VB | -- | ACT | EXISTING MILLWORK TO BE DEMOLISHED ARE PLASTIC LAMINATE CABINETS AND PLASTIC LAMINATE COUNTERTOP |
| E009 | CLOSET | VCT | VB | -- | ACT | EXPOSED BRICK TO REMAIN AND BE PAINTED |
| E010 | LOBBY | VCT | VB | -- | ACT | EXISTING FINISHES TO REMAIN |
| E011 | FAMILY RESTROOM | CT | CT | CT WAINSCOT/ PT GYP | ACT | |
| E012 | WOMEN'S TOILET | CT | CT | CT WAINSCOT/ PT GYP | ACT | |
| E013 | MEN'S TOILET | CT | CT | CT WAINSCOT/ PT GYP | ACT | |
| E014 | COMPUTER ROOM | CPT | VB | -- | ACT | ACT CEILING IS SLOPED. SEE DEMO DETAILS ON AD-601. |
| E015 | CLOSET | VCT | VB | -- | ACT | PARTIAL DEMOLITION OF FLOOR AND VINYL BASE, COORDINATE WITH NEW WORK. ACT CEILING IS SLOPED. SEE DEMO DETAILS ON AD-601. |
| E016 | LIBRARY | CPT | VB | -- | ACT | ACT CEILING IS SLOPED. SEE DEMO DETAILS ON AD-601. |
| E017 | OFFICE SUPPLIES/AV | VCT | VB | -- | -- | |
| E018 | CORRIDOR | VCT | VB | -- | ACT | |
| E019 | RECEPTION AREA | VCT | VB | -- | ACT | EXISTING MILLWORK TO BE DEMOLISHED IS BASE CABINETS AND PLASTIC LAMINATE COUNTERTOP. ACT CEILING IS SLOPED. SEE DEMO DETAILS ON AD-601. |
| E020 | GAME ROOM | VCT | VB | -- | ACT | ACT CEILING IS SLOPED. SEE DEMO DETAILS ON AD-601. |
| E021 | GAME STORAGE | VCT | VB | -- | -- | |
| E022 | BULLPEN | VCT | VB | -- | ACT | |
| E023 | CORRIDOR | VCT | VB | -- | ACT | |
| E024 | RECEPTION | VCT | VB | -- | ACT | |
| E025 | OFFICE | CPT | VB | -- | ACT | |
| E026 | CONFERENCE | CPT | VB | -- | ACT | |
| E027 | TLT | CT | CT | CT WAINSCOT/ PT GYP | ACT | EXISTING FINISHES TO REMAIN |
| E028 | FILE ROOM | VCT | VB | -- | ACT | |
| E029 | OFFICE | VCT | VB | -- | GYP | |
| E030 | OFFICE | VCT | VB | -- | GYP | |
| E031 | OFFICE | VCT | VB | -- | GYP | |
| E032 | CUSTODIAL | CT | CT | -- | -- | |
| E033 | WOMEN'S LOCKER ROOM | CT | CT | -- | ACT | |
| E034 | MEN'S LOCKER ROOM | CT | CT | -- | ACT | |
| E035 | STORAGE | -- | VB | -- | ACT | |
| E036 | CORRIDOR | VCT | VB | -- | ACT | |
| E037 | CORRIDOR | VCT | VB | -- | -- | |
| E038 | STORAGE | -- | VB | -- | -- | |
| E039 | STORAGE | VCT | VB | -- | ACT | |
| E040 | STORAGE | -- | -- | -- | -- | EXISTING FINISHES TO REMAIN |
| E041 | GYMNASIUM | -- | -- | -- | -- | EXISTING FINISHES TO REMAIN |



DEMOLISH EXISTING ACT AND GRID. COORDINATE WITH NEW WORK. SALVAGE ALL CEILING MOUNTED DEVICES, LIGHT FIXTURES, AND GRILLES FOR REINSTALLATION.

DEMOLISH EXISTING MILLWORK, PREP GYP BOARD WALL TO RECEIVE NEW FINISHES

DEMOLISH EXISTING COUNTERTOP AND SINK, COORDINATE WITH NEW WORK

B6 DEMO DETAIL - KITCHEN

AD-601 1/4" = 1'-0"



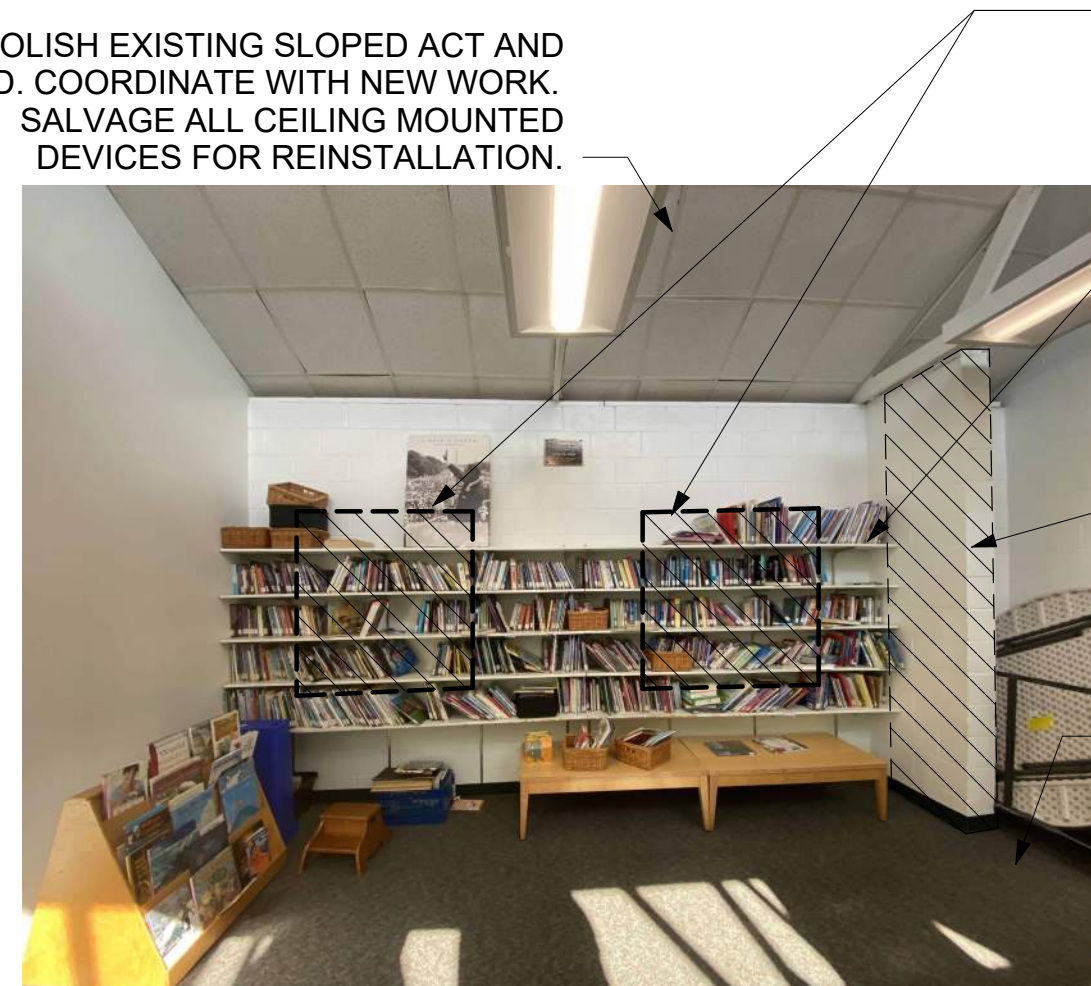
DEMOLISH EXISTING ACOUSTICAL CEILING TILE. SALVAGE LIGHT FIXTURE FOR REUSE. COORDINATE WITH NEW WORK

DEMOLISH GYP BOARD WALL, COORDINATE WITH NEW WORK

DEMOLISH EXISTING CUBBIES

B4 DEMO DETAIL - CUBBIES

AD-601 1/4" = 1'-0"



DEMOLISH EXISTING SLOPED ACT AND GRID. COORDINATE WITH NEW WORK. SALVAGE ALL CEILING MOUNTED DEVICES FOR REINSTALLATION.

APPROXIMATE LOCATION OF DEMOLITION FOR NEW EXTERIOR WINDOWS

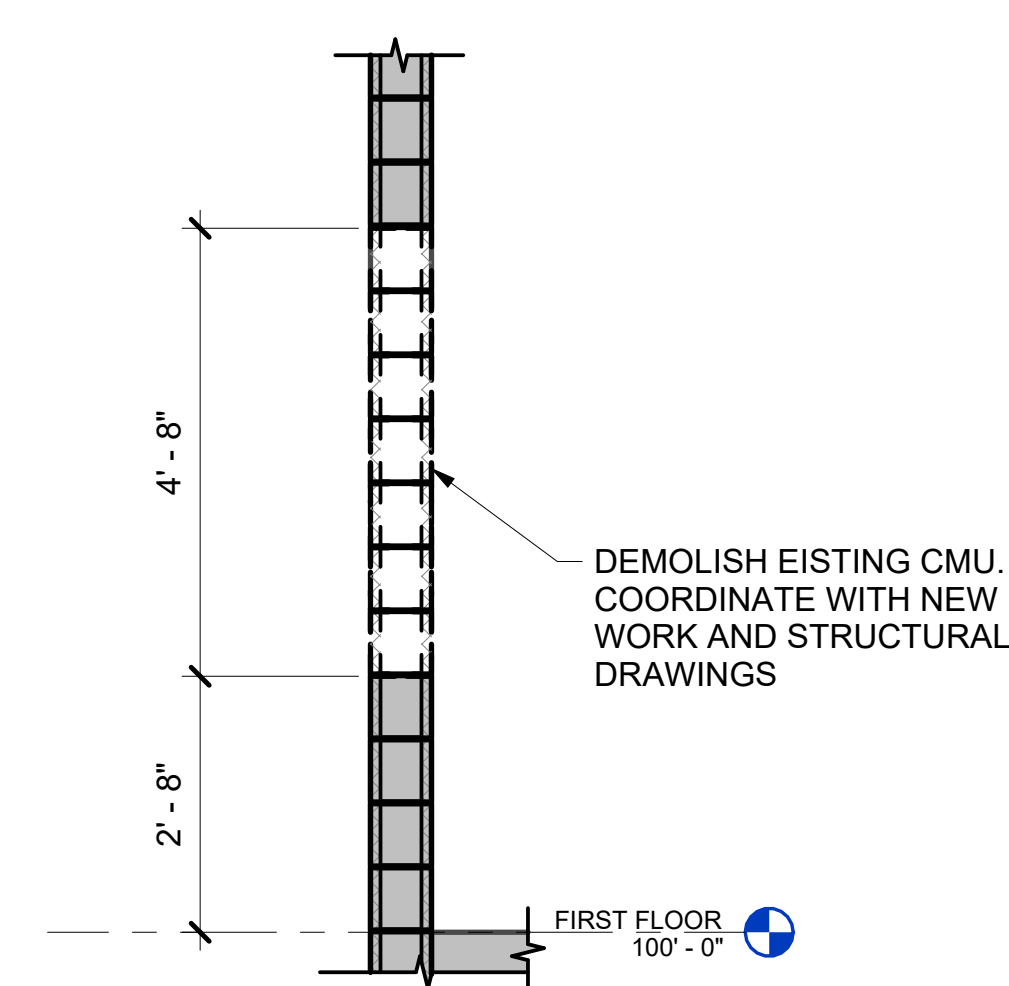
DEMO WALL MOUNTED SHELVES, PATCH EXISTING WALLS TO REMAIN

PARTIALLY DEMO CMU WALL, COORDINATE WITH NEW WORK

DEMO CARPET AND VINYL BASE, PREP PLYWOOD SUBFLOOR TO RECEIVE NEW FINISHES

B3 DEMO DETAIL - LIBRARY

AD-601 1/4" = 1'-0"



B1 SECTION DETAIL

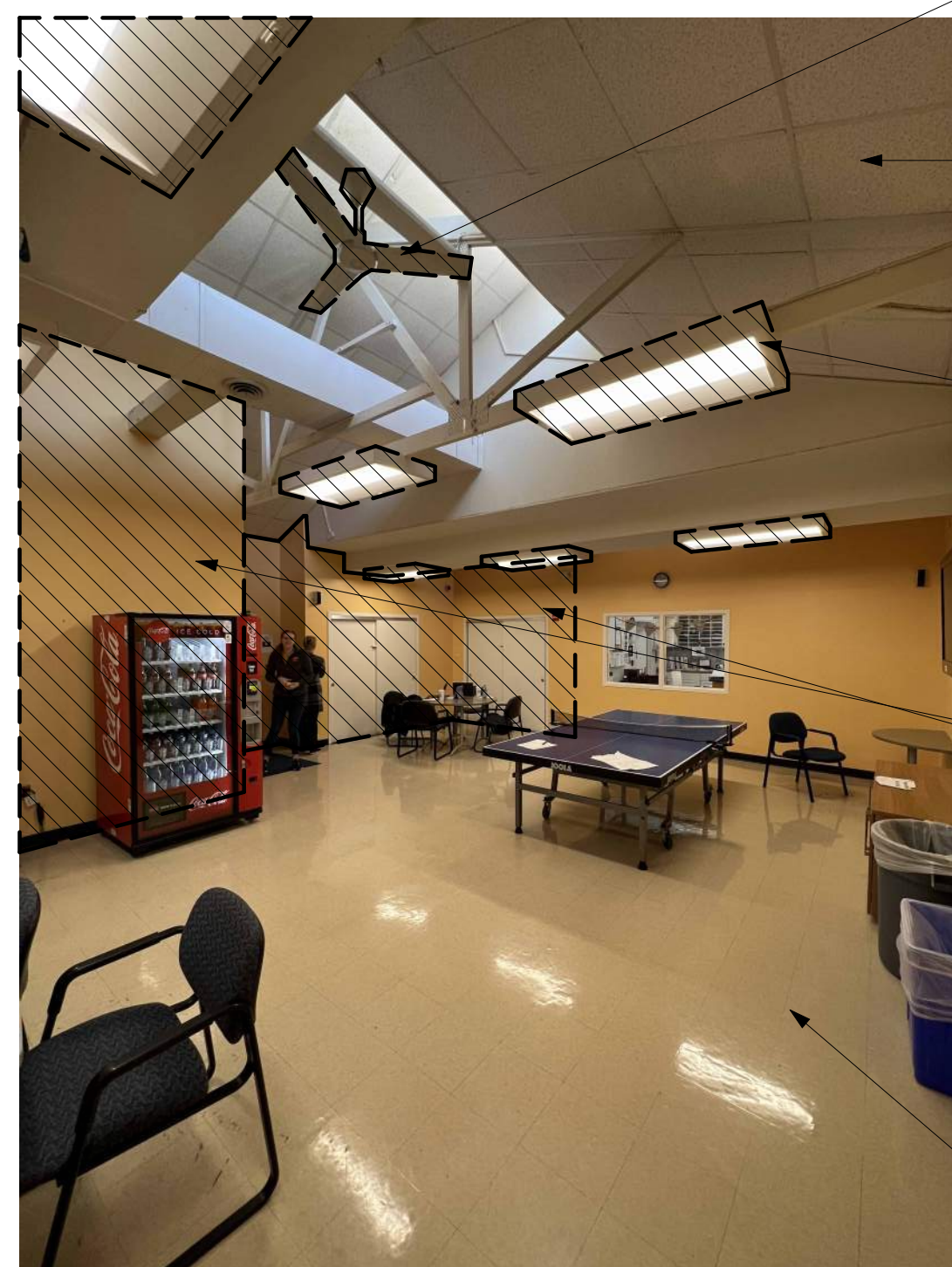
AD-601 1/2" = 1'-0"



PROVIDE NEW ADA COMPLIANT, HEAVY DUTY TOWER PEDESTAL FOR EXISTING ADA PADDLE. TOWER TO BE STAINLESS STEEL

A6 DEMO DETAIL - EXTERIOR ADA PEDESTAL

AD-601 1/4" = 1'-0"



SALVAGE EXISTING CEILING FAN, COORDINATE WITH NEW WORK AND ELECTRICAL DRAWINGS

DEMOLISH EXISTING SLOPED ACT AND GRID. COORDINATE WITH NEW WORK. SALVAGE ALL CEILING MOUNTED DEVICES FOR REINSTALLATION.

EXISTING LIGHT FIXTURES TO BE SALVAGED FOR REUSE. COORDINATE WITH NEW WORK AND ELECTRICAL DRAWINGS, TYP. PATCH AND PREP GYP BOARD BULKHEADS TO RECEIVE NEW FINISHES

DEMOLISH EXISTING GYP BOARD WALLS AND DOORS, COORDINATE WITH NEW WORK.

DEMOLISH EXISTING VCT AND VINYL BASE

A4 DEMO DETAIL - GAME ROOM

AD-601 1/4" = 1'-0"



GC TO RELOCATE GAS LINE

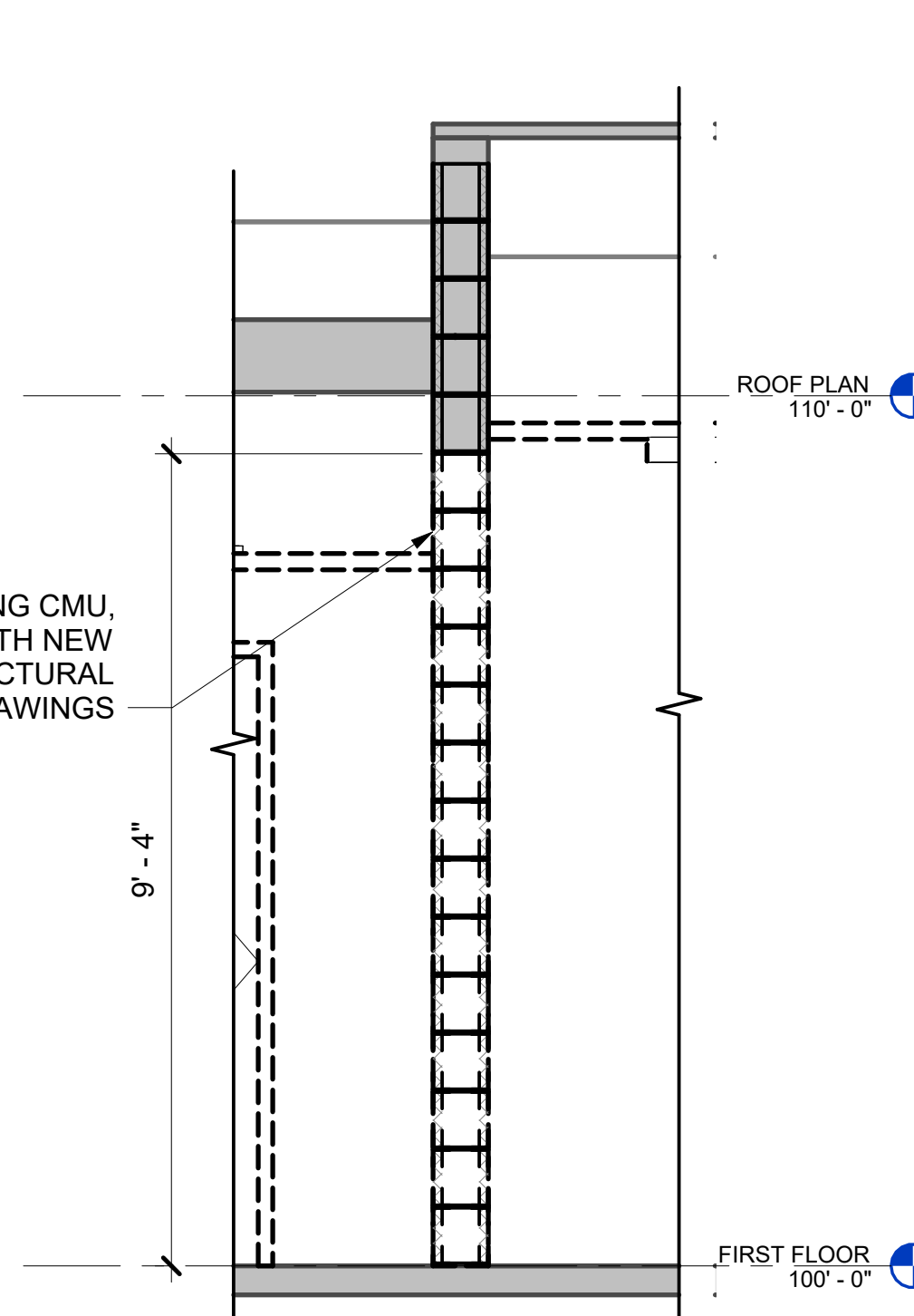
APPROXIMATE LOCATION OF DEMOLITION FOR NEW EXTERIOR WINDOWS

GC TO SECURE WIRE ABOVE NEW EXTERIOR WINDOWS. COORDINATE LOCATION WITH OWNER

DEMOLISH EXISTING CMU, COORDINATE WITH NEW WORK AND STRUCTURAL DRAWINGS

A3 DEMO DETAIL - EXTERIOR WINDOW DEMO

AD-601 1/4" = 1'-0"



A1 SECTION - DEMO

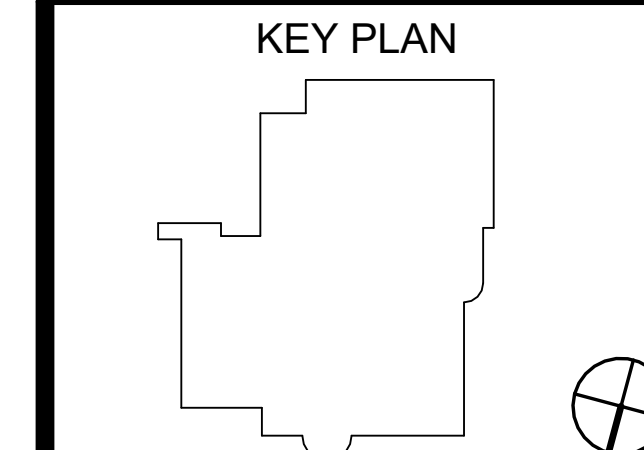
AD-601 1/2" = 1'-0"

**LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS**

PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850

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PROJ. NO.: 19/16A



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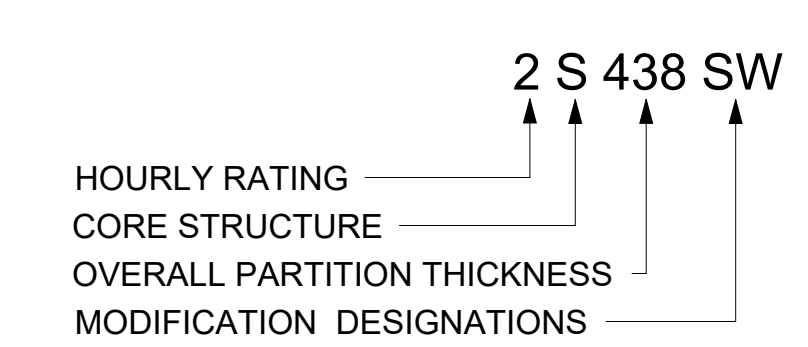
DEMO DETAILS

AD-601

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PARTITION LABELING LEGEND

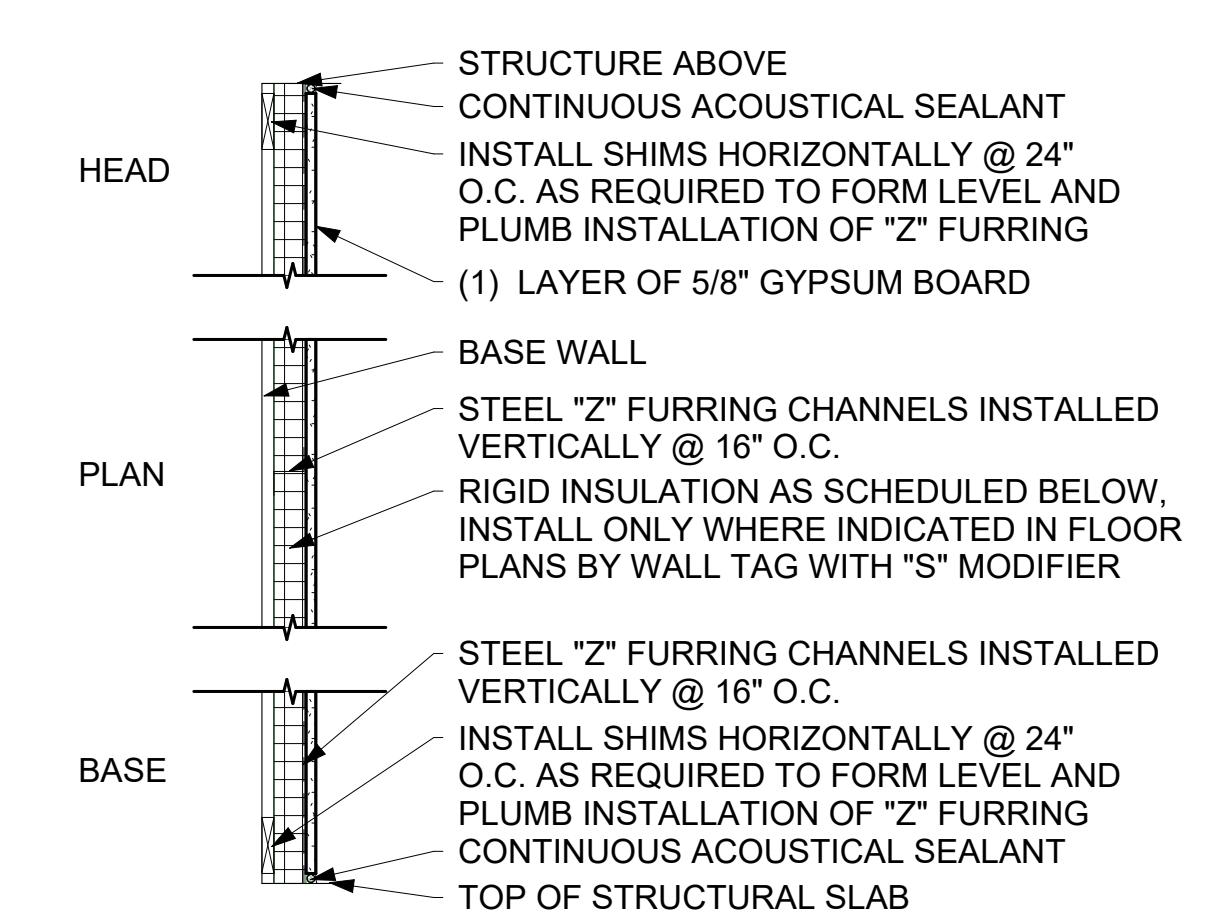
PARTITION TYPE DESIGNATION



| HOURLY RATING | | CORE STRUCTURE | |
|---------------|---------|----------------|-------------------------|
| 0 | 0 HOURS | S | STEEL STUD |
| 1 | 1 HOUR | W | WOOD STUD |
| 2 | 2 HOURS | M | CONCRETE MASONRY UNIT |
| 3 | 3 HOURS | F | FURRING |
| 4 | 4 HOURS | X | SHAFT WALL - STEEL STUD |
| S | SMOKE | C | CHASE WALL |

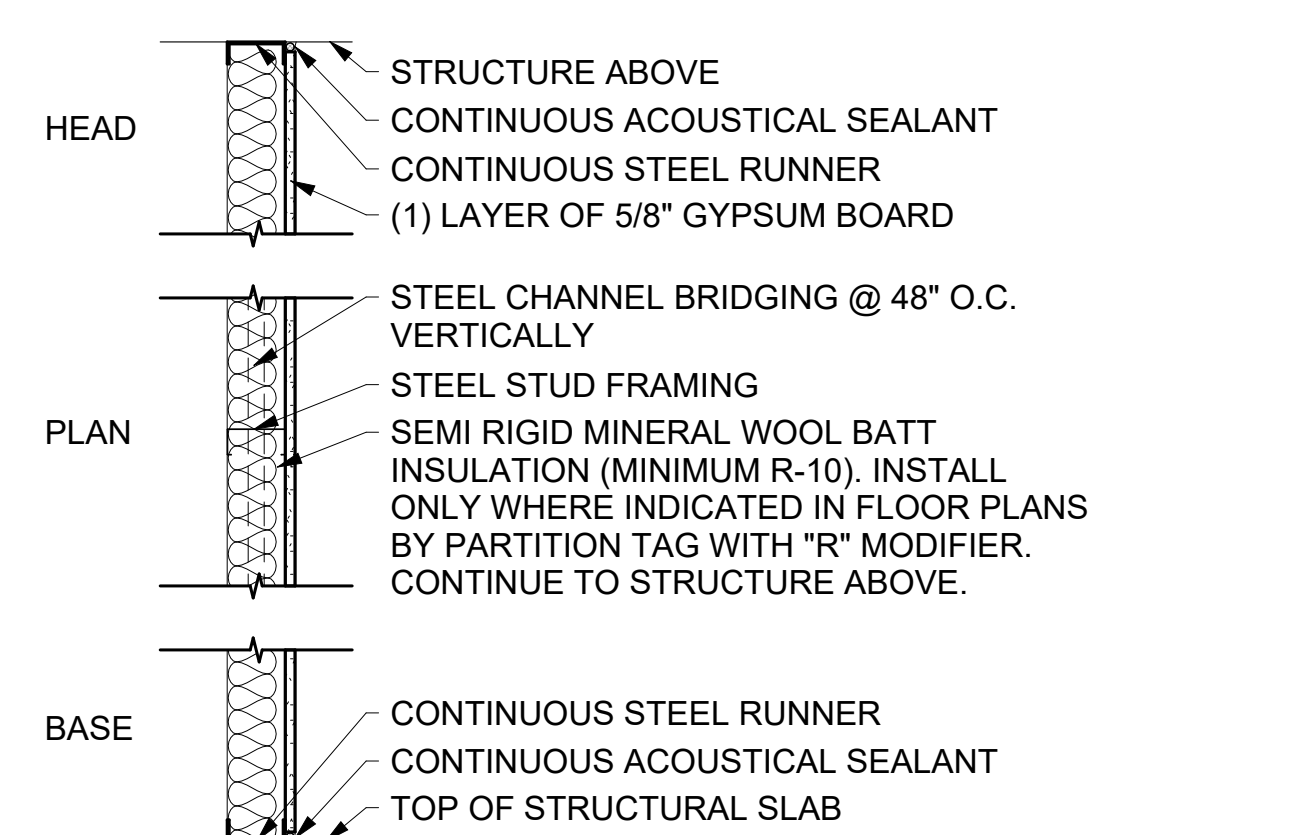
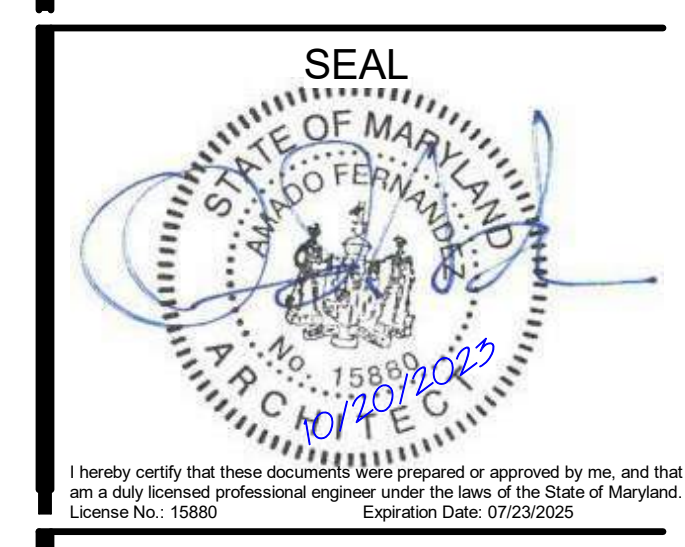
MODIFICATION DESIGNATIONS

| | |
|---|--|
| C | REPLACE GYP BD WITH 1/2" CEMENT BOARD LAYER AS SURFACE OF SCHEDULED PARTITION IN AREAS TO RECEIVE TILE |
| S | SOUND ATTENUATION REQUIRED - COMPLY WITH SCHEDULED STC RATING AND TESTING ASSEMBLY REQUIREMENTS |
| X | EXTEND PARTITION ABOVE FINISH CEILING TO DECK ABOVE |
| T | EXTEND WALL TO 8" ABOVE THE FINISH CEILING |



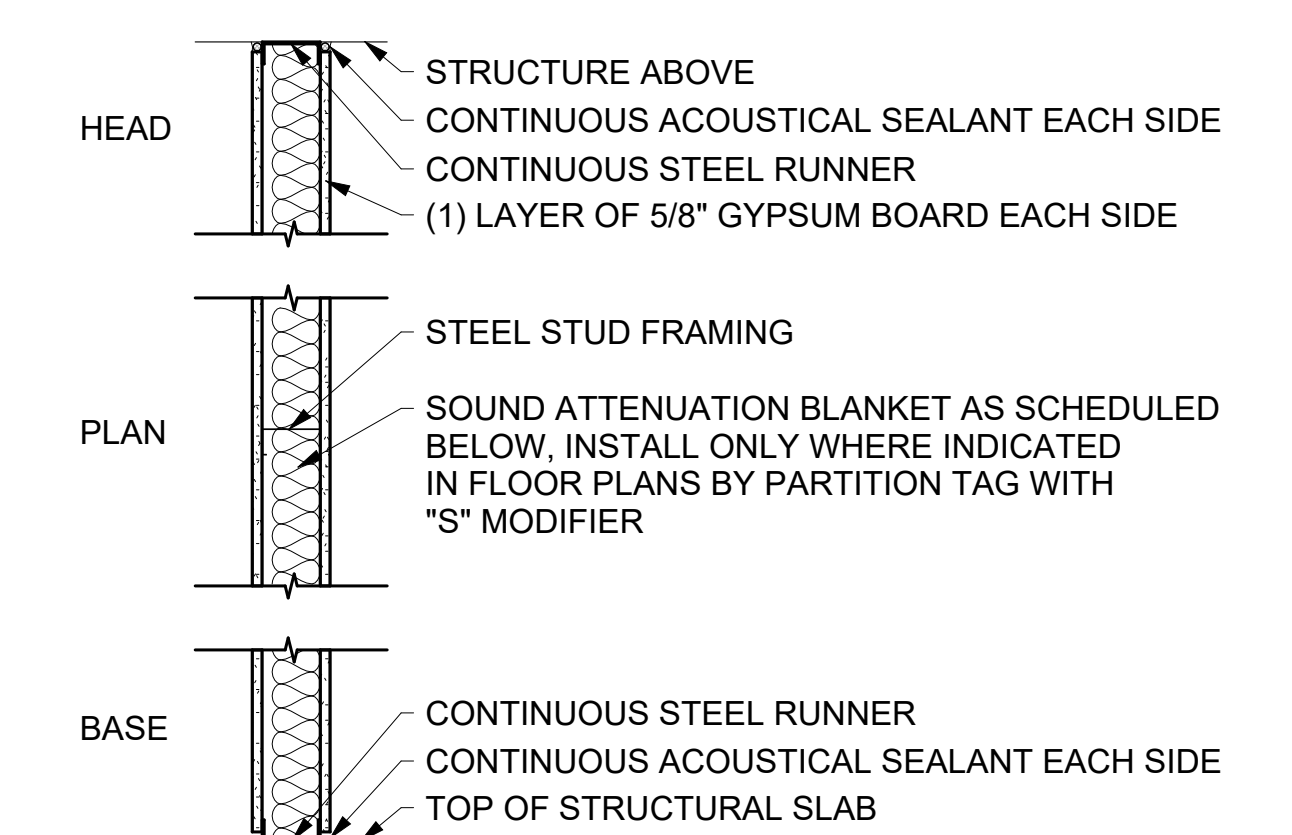
| DESIGNATION | | | | | | | "S" MODIFIER | | |
|-------------|--------------|----------|--------------|-----------|-------------------------|---------------|--------------------|------------|-----|
| NO. | FURRING SIZE | "A" DIM. | GA. O.C. MAX | FIRE TEST | LIMITING HEIGHT (5 psf) | DEFL. (5 psf) | STC CLASS (NOTE -) | SOUND TEST | SAB |
| 0F112 | 7/8" | 1 1/2" | 25 20 | 16" 16" | - | L/240 | - | - | - |

0F NON-RATED STEEL FRAMED ONE SIDED PARTITION
NON-LOAD BEARING - (1) LAYER 5/8" GYPSUM BOARD, ONE SIDE ONLY W/ "Z" FURRING



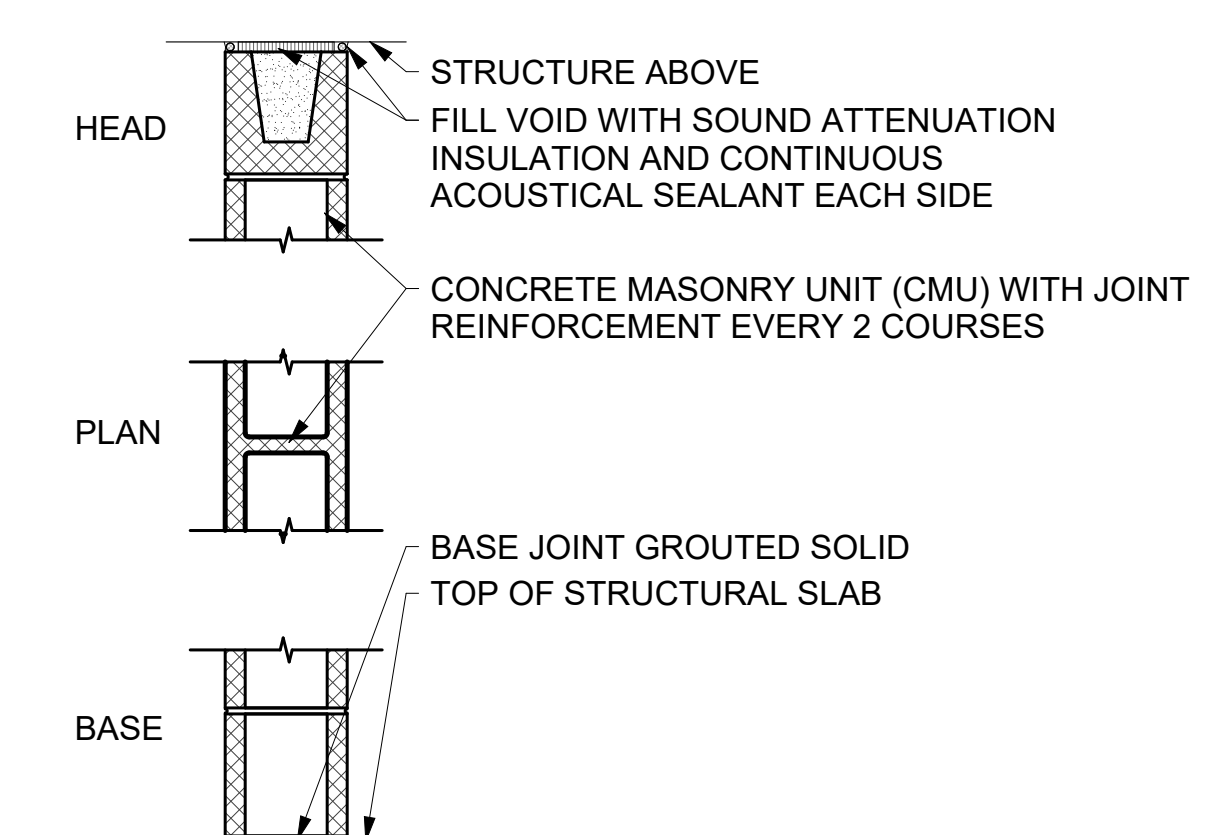
| DESIGNATION | | | | | | | "S" MODIFIER | | |
|-------------|-----------|----------|---------------|-----------|-------------------------|---------------|--------------------|------------|-----|
| NO. | STUD SIZE | "A" DIM. | GA. O.C. MAX | FIRE TEST | LIMITING HEIGHT (5 psf) | DEFL. (5 psf) | STC CLASS (NOTE -) | SOUND TEST | SAB |
| 0F414 | 3-5/8" | 4 1/4" | 25 24" 20 16" | - | 9'-11 1/2" 15'-6" | L/240 L/240 | - | - | 3" |

0F NON-RATED STEEL FRAMED ONE SIDED PARTITION
NON-LOAD BEARING - (1) LAYER 5/8" GYPSUM BOARD, ONE SIDE ONLY



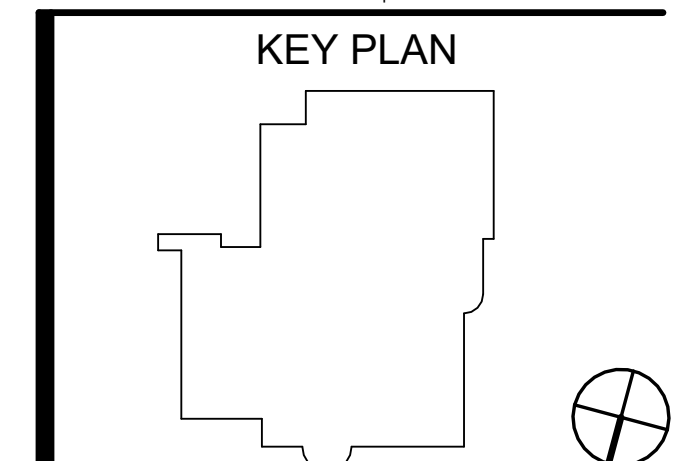
| DESIGNATION | | | | | | | "S" MODIFIER | | |
|-------------|-----------|----------|---------------|-----------|-------------------------|---------------|--------------------|---------------|-----|
| NO. | STUD SIZE | "A" DIM. | GA. O.C. MAX | FIRE TEST | LIMITING HEIGHT (5 psf) | DEFL. (5 psf) | STC CLASS (NOTE -) | SOUND TEST | SAB |
| 0S478 | 3-5/8" | 4 7/8" | 25 24" 20 16" | - | 9'-11 1/2" 15'-6" | L/240 L/240 | 51 | RAL-TL-90-166 | 3" |
| 0S514 | 4" | 5 1/4" | 25 24" 20 16" | - | 10'-5 1/2" 16'-4" | L/240 L/240 | 51 | RAL-TL-90-166 | 3" |
| 0S714 | 6" | 7 1/4" | 20 24" 20 16" | - | 18'-11" 22'-11" | L/240 L/240 | 51 | RAL-TL-90-166 | 3" |

0S NON-RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - (1) LAYER 5/8" GYPSUM BOARD, EACH SIDE



| DESIGNATION | | | | "S" MODIFIER | |
|-------------|----------|-----------|-----------|--------------|-----|
| NO. | "A" DIM. | FIRE TEST | STC CLASS | SOUND TEST | SAB |
| 0M040 | 3 5/8" | N/A | 45 | - | - |
| 0M060 | 5 5/8" | N/A | 47 | - | - |
| 0M080 | 7 5/8" | N/A | 50 | - | - |

0M NON-RATED CONCRETE MASONRY PARTITION
NON-LOAD BEARING



REVISIONS

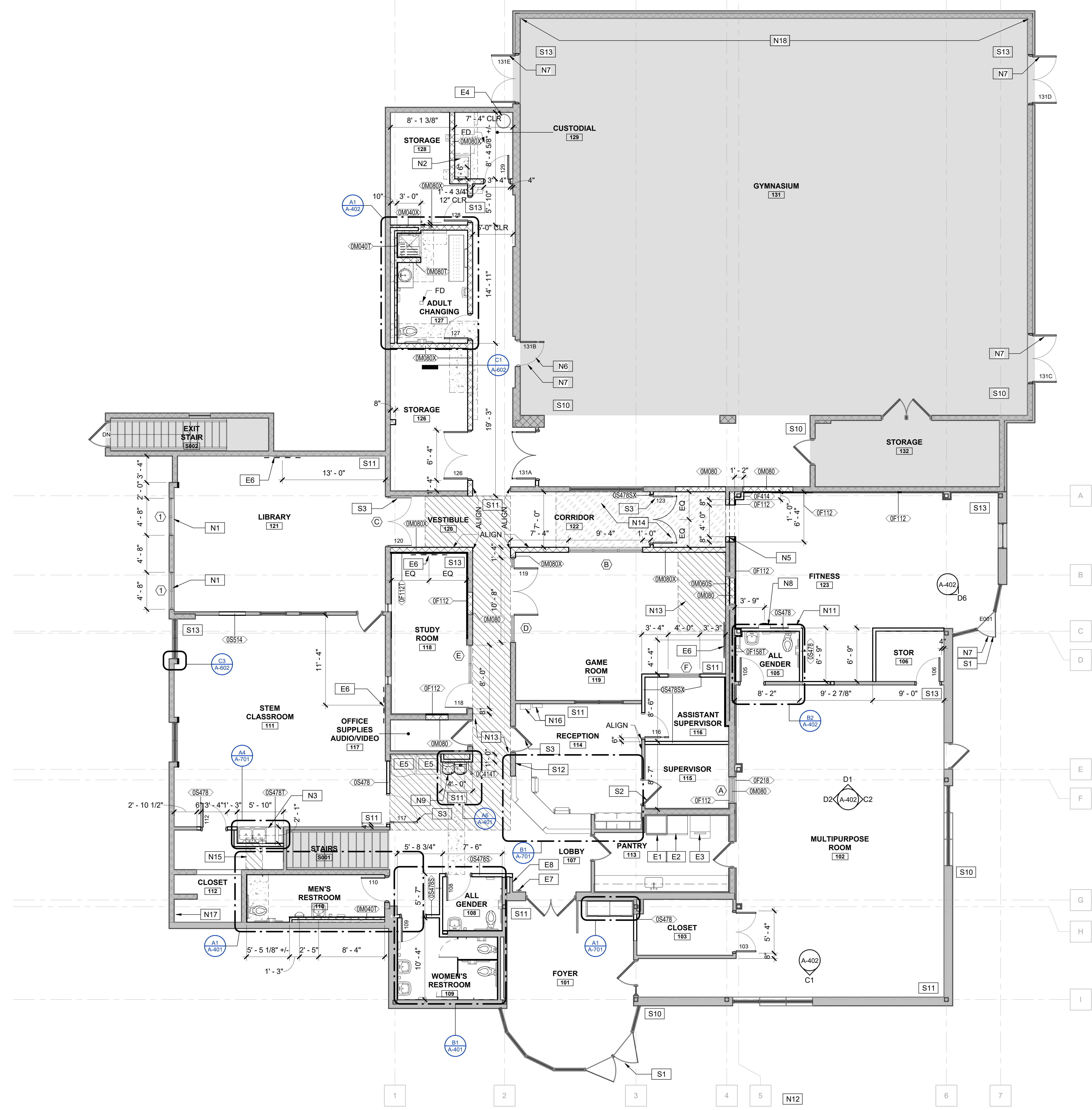
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PARTITION TYPES

A-011



KEYNOTE LEGEND

| # | KEYNOTE |
|-----|---|
| E1 | EXISTING REFRIGERATOR TO REMAIN. |
| E2 | EXISTING REFRIGERATOR TO BE RELOCATED. GC TO PROVIDE POWER. COORDINATE WITH ELECTRICAL DRAWINGS. |
| E3 | NEW ICE MAKER TO BE PROVIDED BY OWNER AND INSTALLED BY GC. GC TO PROVIDE POWER AND WATER. COORDINATE WITH ELECTRICAL AND PLUMBING DRAWINGS. |
| E4 | EXISTING WATER HEATER TO REMAIN. |
| E5 | VENDING MACHINE TO BE RELOCATED. GC TO PROVIDE POWER. COORDINATE WITH ELECTRICAL DRAWINGS. |
| E6 | NEW TV MONITOR TO BE PROVIDED BY OWNER. GC TO PROVIDE POWER. COORDINATE WITH ELECTRICAL DRAWINGS. |
| E7 | EXISTING FIRE EXTINGUISHER CABINET TO REMAIN. |
| E8 | EXISTING FIRE ALARM PANEL. COORDINATE WITH ELECTRICAL DRAWINGS. |
| N1 | NEW EXTERIOR STOREFRONT. COORDINATE LINTEL WITH STRUCTURAL DRAWINGS. |
| N2 | NEW MOP SINK. COORDINATE WITH PLUMBING DRAWINGS. |
| N3 | PROVIDE NEW MILLWORK AND SINK. |
| N5 | NEW MASONRY OPENING. PROVIDE BULLNOSED CMU ON BOTH SIDES OF OPENING. COORDINATE OPENING WITH STRUCTURAL DRAWINGS. |
| N6 | NEW DOOR PANEL AND HARDWARE IN EXISTING FRAME. DOOR TO BE TIED TO FIRE ALARM SYSTEM. PROVIDE SIGN STATING "EMERGENCY EXIT ONLY, ALARM WILL SOUND" ON PUSH SIDE OF DOOR. |
| N8 | NEW BOTTLE FILLING STATION. COORDINATE WITH PLUMBING DRAWINGS. |
| N9 | NEW HIGH LOW DRINKING FOUNTAIN WITH BOTTLE FILLER. COORDINATE WITH PLUMBING DRAWINGS. PROVIDE DRINKING FOUNTAIN GRAB BAR ON ONE SIDE. SEE TOILET ACCESSORIES SCHEDULE ON A-401. |
| N10 | NEW ELECTRICAL PANEL. COORDINATE WITH ELECTRICAL DRAWINGS AND NEW WORK. |
| N11 | RELOCATED ELECTRICAL PANEL. COORDINATE WITH ELECTRICAL DRAWINGS AND NEW WORK. |
| N12 | PROVIDE NEW STEEL PEDESTAL ENCLOSURE FOR EXISTING ADA PEDESTAL. |
| N13 | EXISTING FLOORS ARE UNEVEN AND SLOPING. GC TO PROVIDE MATERIALS TO MAKE FLOOR LEVEL. |
| N14 | FLOOR IS UNEVEN AND SLOPING. GC TO PROVIDE A COMBINATION OF GRINDING CONCRETE AND LEVELING MATERIALS TO MAKE FLOOR SLOPE LESS THAN 2%. |
| N15 | PARTIALLY DEMO GYP BOARD CEILING IN BASEMENT TO RUN NEW SANITARY AND WATER LINES. COORDINATE WITH PLUMBING DRAWINGS. PATCH CEILING AND PAINT TO MATCH ADJACENT SURFACES. |
| N16 | REINSTALL EXISTING AED CABINET AND FIRST AID CABINET. TOP OF CABINETS TO 48" AFF. COORDINATE FINAL INSTALL LOCATION WITH OWNER AND ARCHITECT. |
| N17 | SEAL ALL OPENINGS IN WALL. CLEAN AND PREP WALLS TO RECEIVE NEW FINISHES. |
| N18 | REPLACE EXISTING MECHANICAL GRILLES IN GYMNASIUM AND PAINT TO MATCH EXISTING WALLS. |
| S1 | EXISTING CARD READER TO REMAIN. |
| S2 | EXISTING CARD READER TO BE DEMOLISHED. |
| S3 | NEW CARD READER. GC TO COORDINATE WITH DOOR HARDWARE AND PROVIDE CONDUIT, PULL STRING, AND BLOCKING FOR MOUNTING OF DEVICES. COORDINATE INSTALLATION WITH OWNER'S VENDOR. FINAL LOCATION OF CARD READER TO BE COORDINATED WITH OWNER AND ARCHITECT. |
| S10 | EXISTING SECURITY CAMERA TO REMAIN. |
| S11 | EXISTING SECURITY CAMERA TO REMAIN. COORDINATE WITH NEW WORK AND CEILING REPLACEMENT. |
| S12 | OWNER TO PROVIDE WALL MOUNTED MONITOR FOR SECURITY CAMERAS. GC TO PROVIDE POWER, CONDUIT, PULL STRING, JUNCTION BOX, AND BLOCKING FOR MOUNTING OF DEVICES. COORDINATE INSTALLATION WITH OWNER'S VENDOR. FINAL LOCATION OF SECURITY CAMERA TO BE COORDINATED WITH OWNER AND ARCHITECT. |
| S13 | NEW SECURITY CAMERA LOCATION. GC TO PROVIDE CONDUIT, PULL STRING, JUNCTION BOX, AND BLOCKING FOR MOUNTING OF DEVICES. COORDINATE INSTALLATION WITH OWNER'S VENDOR. FINAL LOCATION OF SECURITY CAMERA TO BE COORDINATED WITH OWNER AND ARCHITECT. |

NEW WORK LEGEND

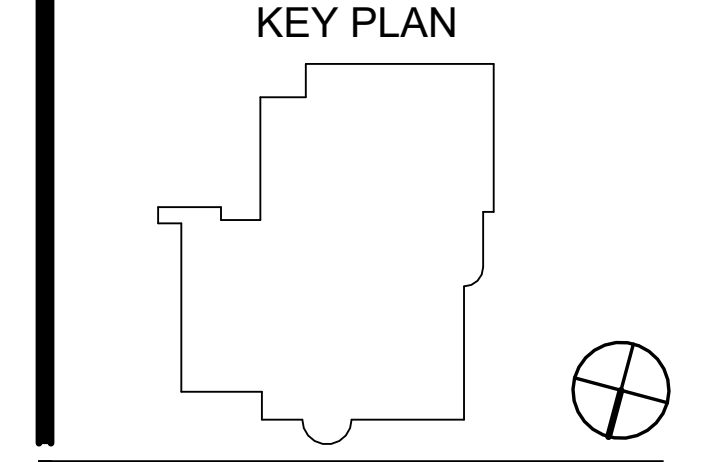
- NEW WALL
- EXISTING WALL TO BE REMAIN
- AREA OF FLOOR SLAB PATCHING, COORDINATE WITH PLUMBING AND STRUCTURAL
- AREA OF FLOOR LEVELING
- EXISTING DOOR TO REMAIN
- NEW DOOR

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NEW WORK FLOOR PLAN

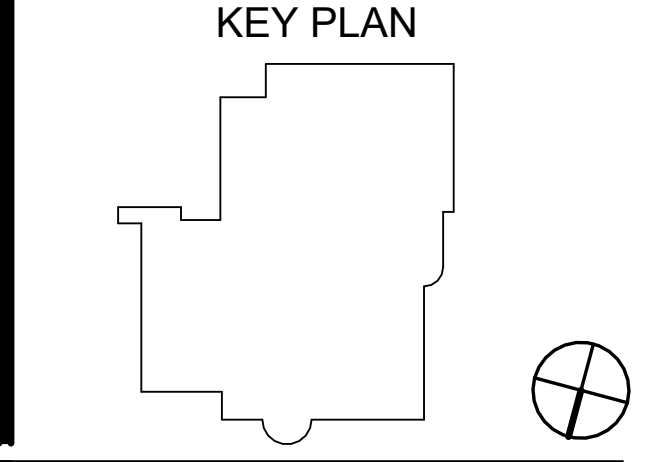
A-101

A1 FIRST FLOOR PLAN - NEW WORK
A-101 3/16" = 1'-0"

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NEW WORK RCP AND DETAILS

A-151

KEYNOTE LEGEND

| # | KEYNOTE |
|-----|--|
| N20 | PROVIDE THROUGH WALL VENT CAP, COORDINATE SIZE AND LOCATION WITH MECHANICAL DRAWINGS. |
| N21 | EXISTING SKYLIGHT TO REMAIN. CUT METAL STUD AND GYP BOARD WALLS OF SKYLIGHT BACK TO ALIGN WITH STEEL CHANNELS. |
| N22 | EXISTING GYP BOARD CEILING AND BULKHEAD TO REMAIN. PAINT VISIBLE HORIZONTAL AND VERTICAL SURFACES TO MATCH PT-1. |
| N24 | NEW ACOUSTICAL CEILING TILE AND GRID. REINSTALL CEILING MOUNTED DEVICES, LIGHT FIXTURES, AND MECHANICAL GRILLES. |

**REFLECTED CEILING PLAN
NEW WORK LEGEND**

- NEW ACOUSTICAL CEILING
- NEW GYP BOARD CEILING
- EXPOSED CEILING
- ACOUSTICAL CEILING TO REMAIN
- NOT IN CONTRACT
- GC TO PROVIDE 6" BATT INSULATION ABOVE CEILING
- ELECTRICAL LIGHT FIXTURES, SEE ELEC DRAWINGS
- MECHANICAL EQUIPMENT, SEE MECH DRAWINGS

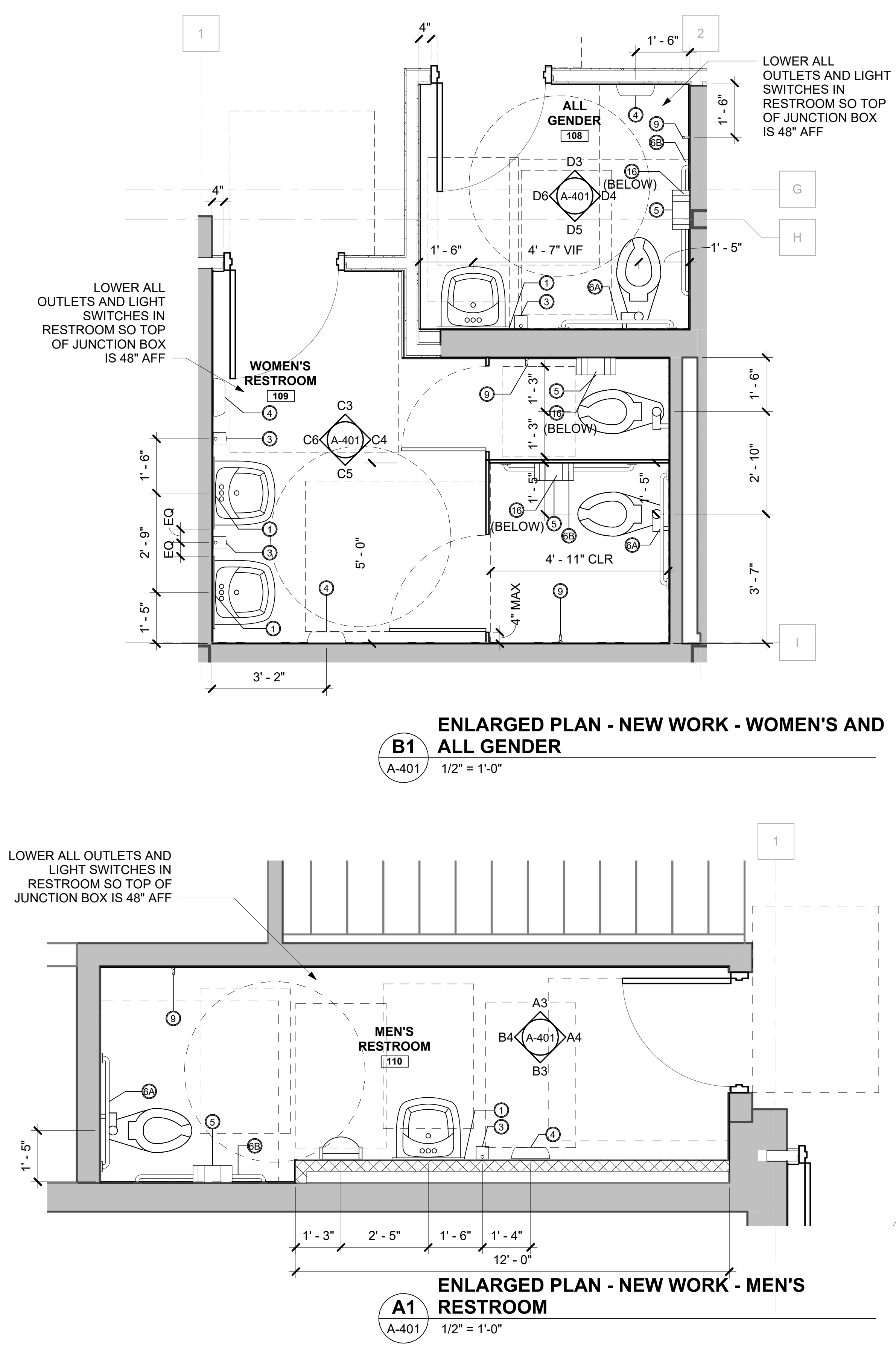
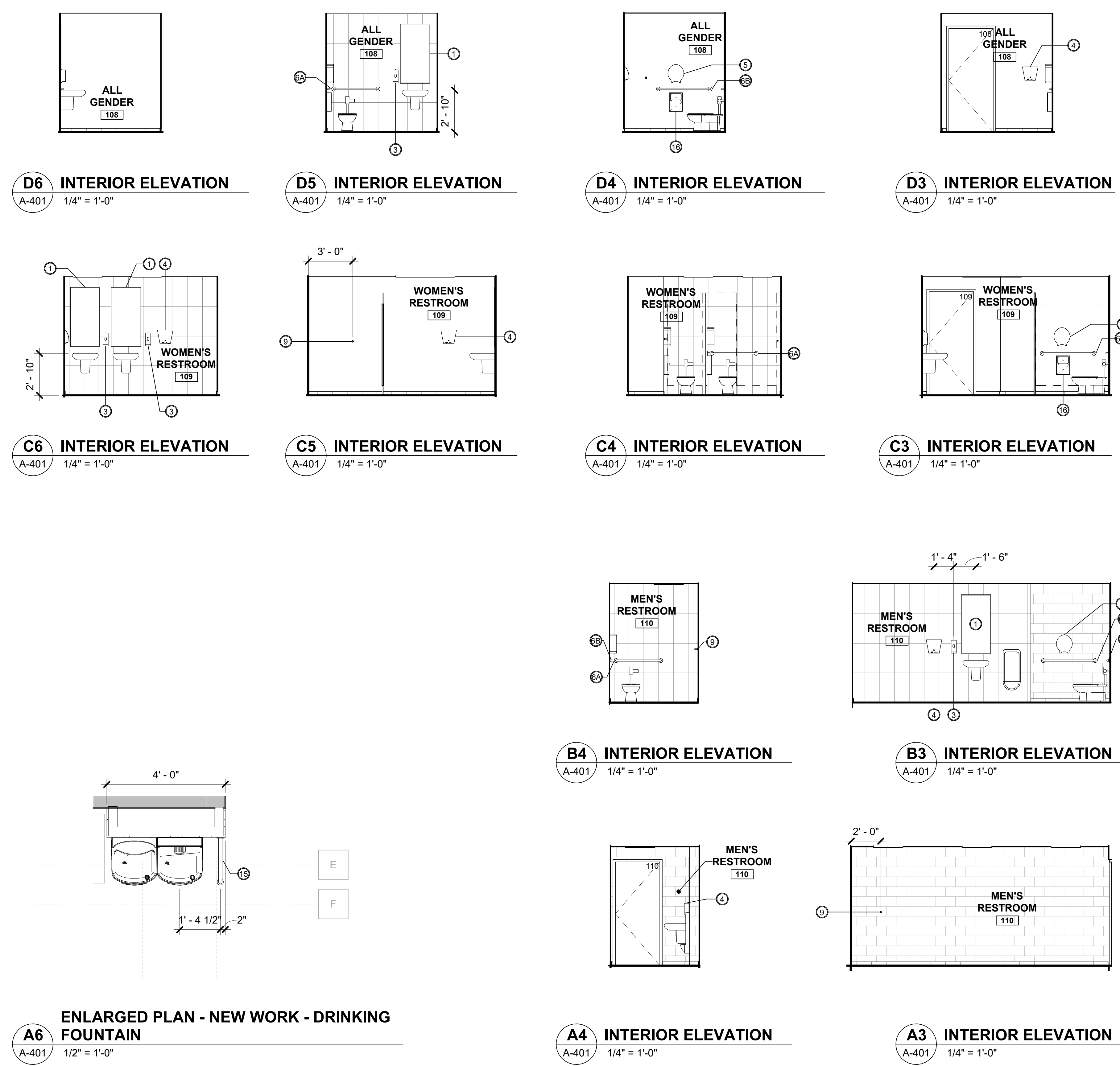
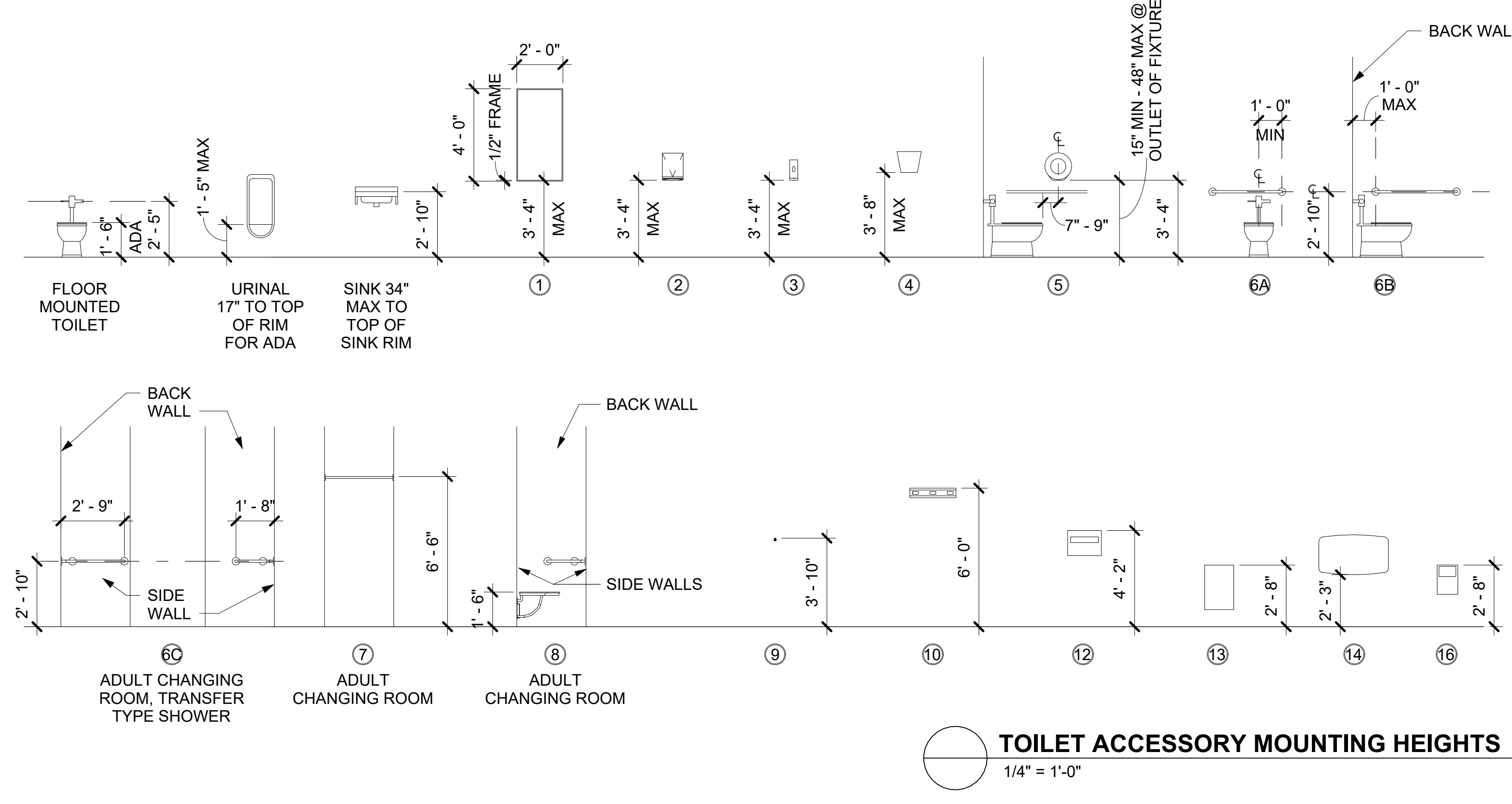
GENERAL NOTES:
 1. CEILING HEIGHT DIMENSIONS ARE FROM FINISH FLOOR
 2. ALL CEILING ELEMENTS (LIGHT FIXTURES, DIFFUSERS, EXIT SIGNS AND OTHER DEVICES) ARE TO BE INSTALLED IN THE CENTER OF CEILING PANELS UNLESS OTHERWISE NOTED; REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR TYPE, QUANTITY AND CONNECTION INFORMATION.
 3. CEILING PANELS ARE TO BE CENTERED WITHIN THE SPACE AND SYMMETRICALLY CUT AT WALLS UNLESS INDICATED GRAPHICALLY OR NOTED OTHERWISE.
 4. FOR WALL MOUNTED DEVICES, REFER TO ARCHITECTURAL ELEVATIONS AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.



A1 FIRST FLOOR RCP - NEW WORK
A-151 3/16" = 1'-0"

TOILET ACCESSORY SCHEDULE

| # | DESCRIPTION | MANUFACTURER | MODEL | COMMENTS |
|----|---|----------------------------|--|-------------------------------------|
| 1 | CHANNEL FRAME MIRROR | BOBRICK | B-165 2448 | |
| 2 | SURFACE MOUNTED PAPER TOWEL DISPENSER | BOBRICK | B-262 | ADULT CHANGING ROOM, STEM CLASSROOM |
| 3 | AUTOMATIC SOAP DISPENSER | BOBRICK | B-2012 | |
| 4 | AUTOMATIC HAND DRYER | BOBRICK | B-7125 | |
| 5 | SURFACE MOUNTED JUMBO TOILET PAPER DISPENSER | AMERICAN SPECIALTIES (ASI) | 0046 | SERVES 12" TOILET PAPER ROLLS |
| 6A | GRAB BAR | BOBRICK | B-5806x36 | |
| 6B | GRAB BAR | BOBRICK | B-5806x42 | |
| 6C | TWO-WALL SHOWER GRAB BAR | BOBRICK | B-6861 | ADULT CHANGING ROOM |
| 7 | HEAVY DUTY SHOWER CURTAIN ROD | BOBRICK | B-6047x36 | ADULT CHANGING ROOM |
| 8 | FOLDING SHOWER SEAT | BOBRICK | B-5181 | ADULT CHANGING ROOM |
| 9 | SURFACE MOUNTED COAT HOOK | BOBRICK | B-9542 | |
| 10 | MOP AND BROOM HOLDER | BOBRICK | B-223 x 24 | |
| 11 | ADULT CHANGING TABLE | ASTOR BANNERMAN | ASTOR INVINCIBLE WALL MOUNTED CHANGING AND SHOWERING TABLE | ADULT CHANGING ROOM |
| 12 | TOILET SEAT COVER DISPENSER | BOBRICK | B-3013 | ADULT CHANGING ROOM |
| 13 | SURFACE MOUNTED WASTE RECEPTACLE WITH CLOSEABLE TOP | AMERICAN SPECIALTIES (ASI) | 20826-T | ADULT CHANGING ROOM |
| 14 | BABY CHANGING STATION | KOALA KARE | KB300-SS | ADULT CHANGING ROOM |
| 15 | DRINKING FOUNTAIN GRAB BAR | BOBRICK | 819298 | |
| 16 | SANITARY NAPKIN DISPOSAL | BOBRICK | B-254 | |

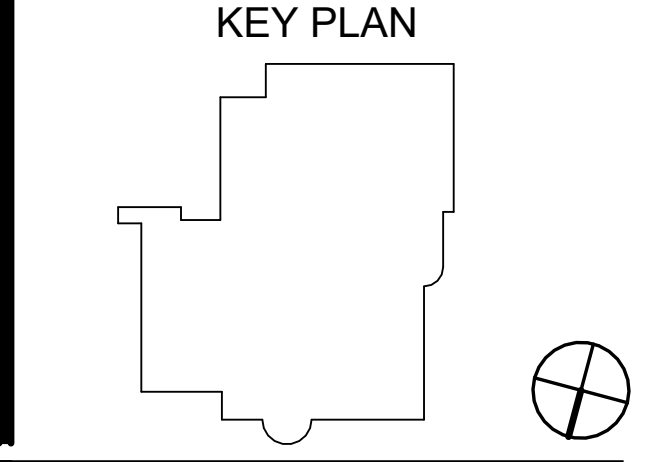


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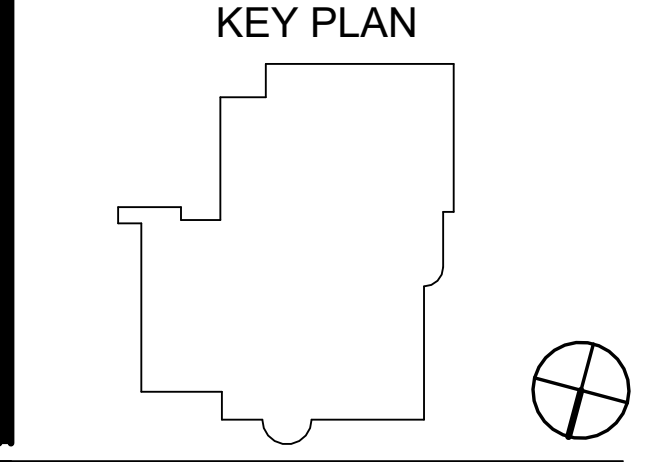
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ENLARGED PLANS AND INTERIOR ELEVATIONS

A-401

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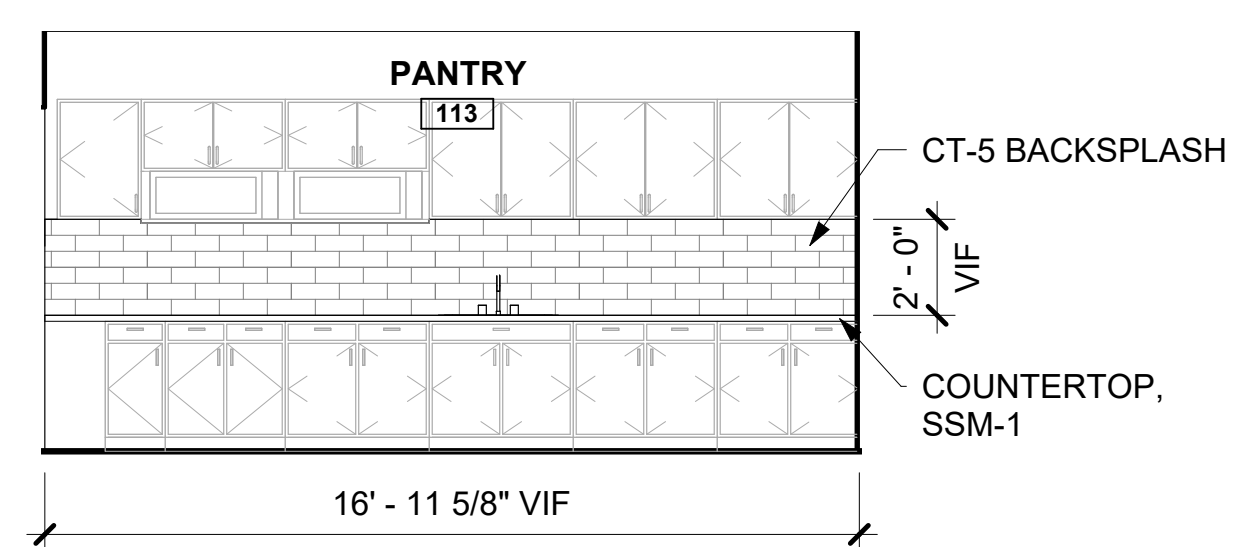


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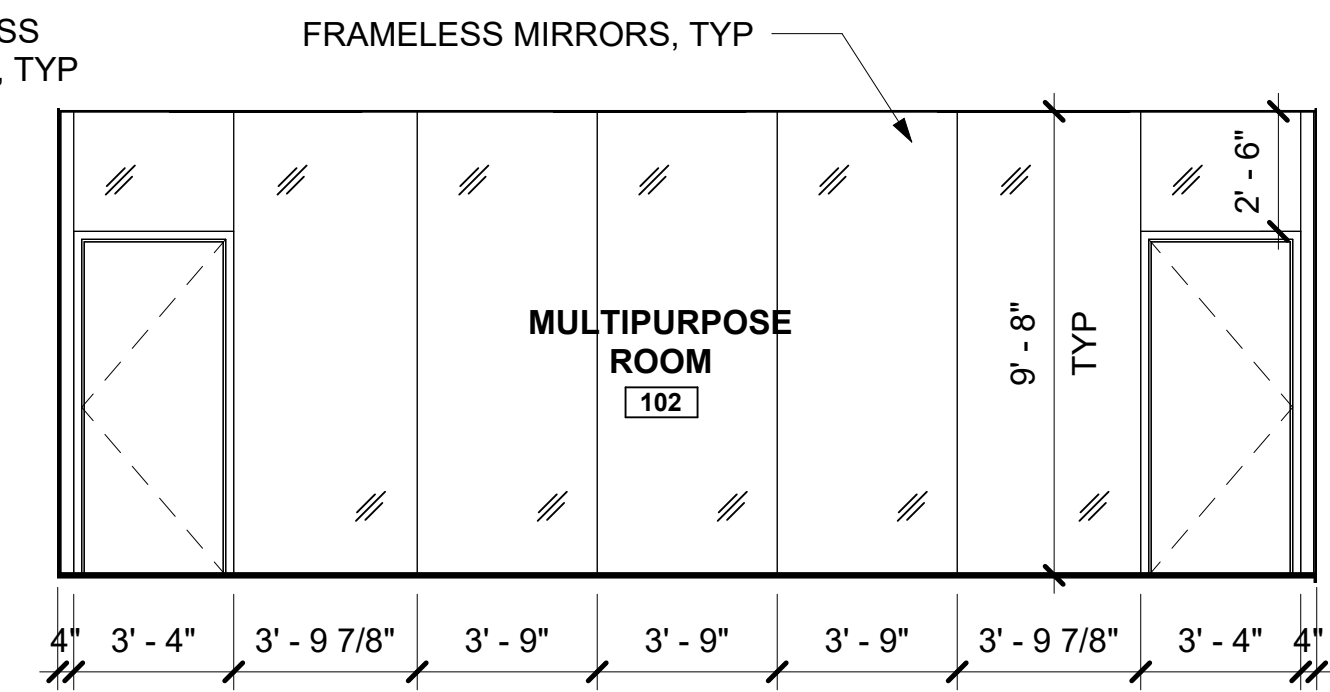
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**ENLARGED PLANS
AND INTERIOR
ELEVATIONS**

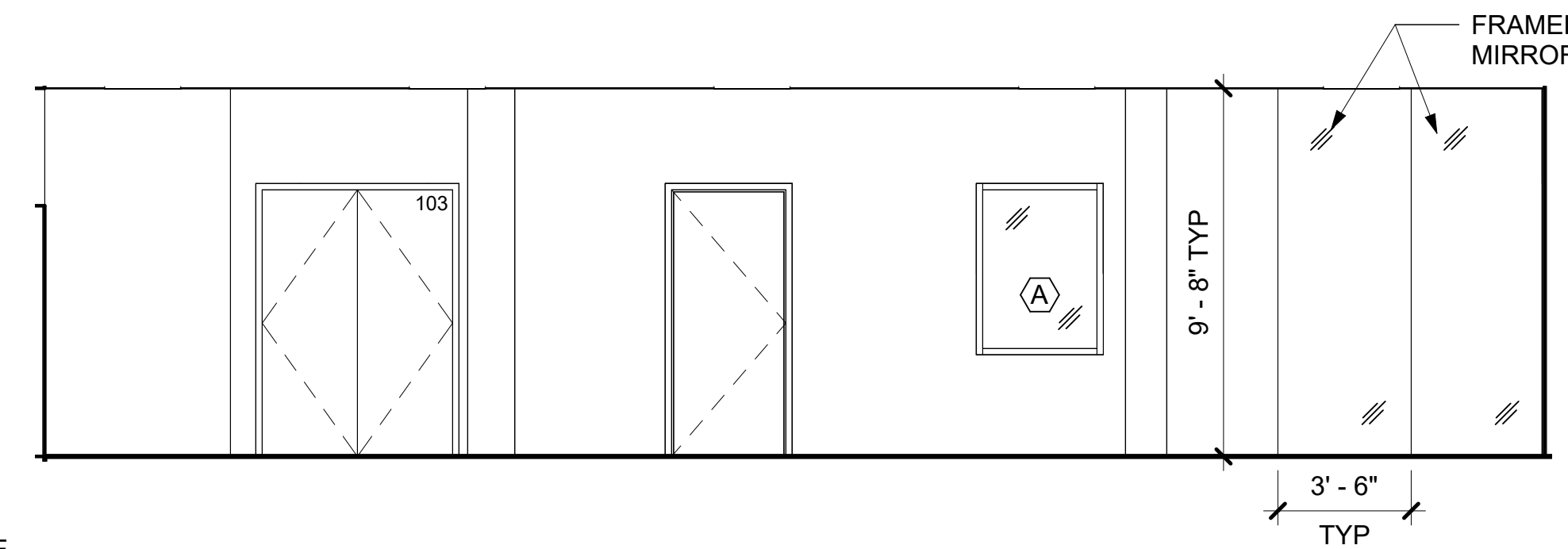
A-402



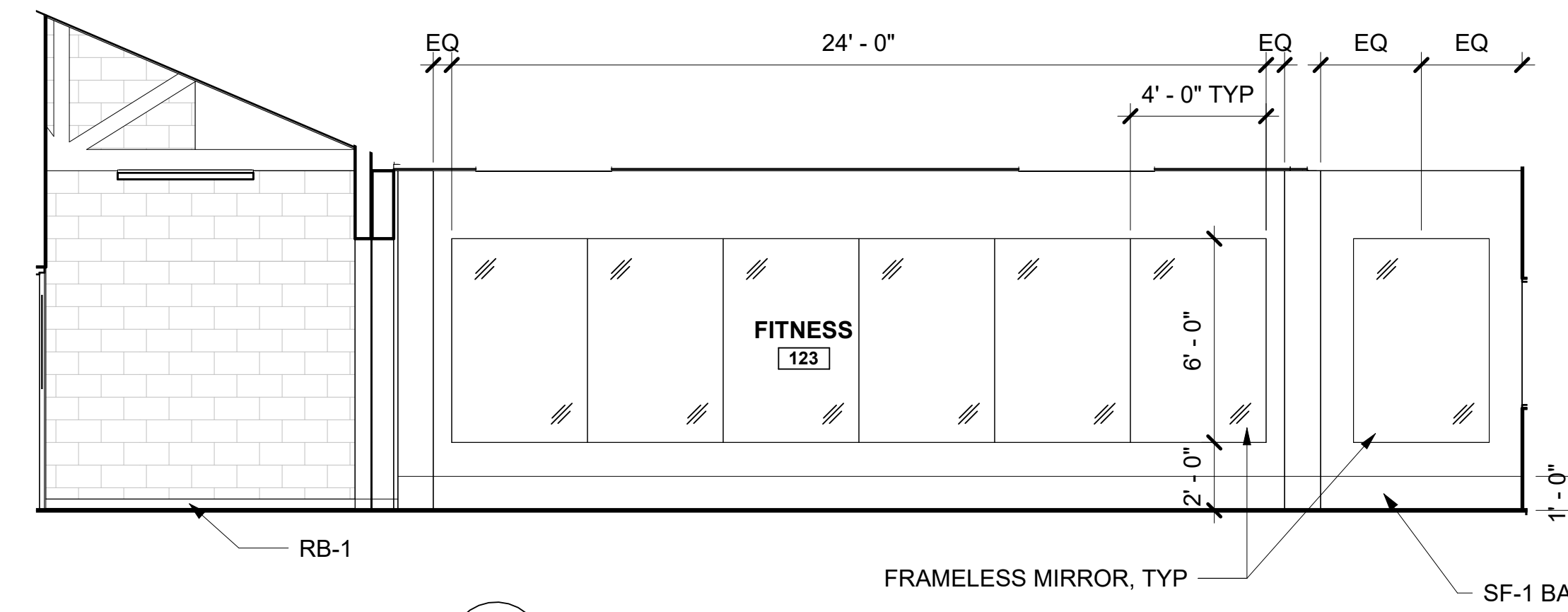
E1 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



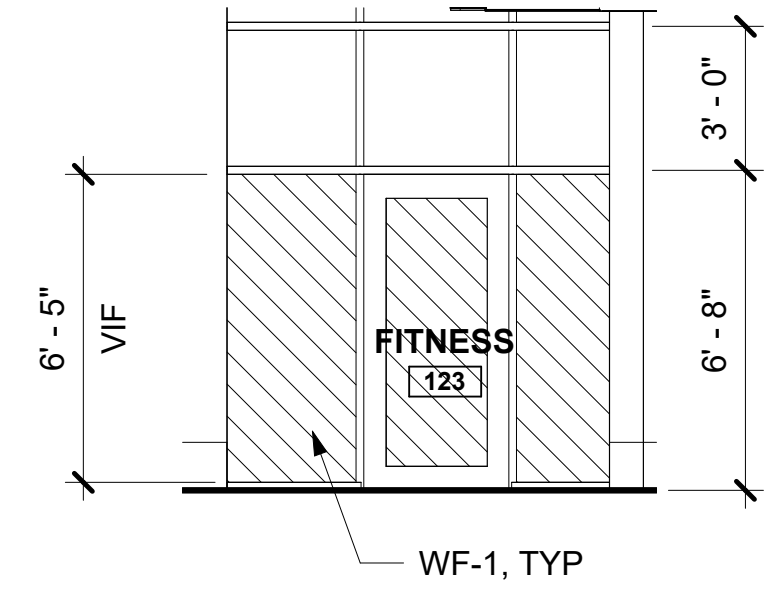
D1 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



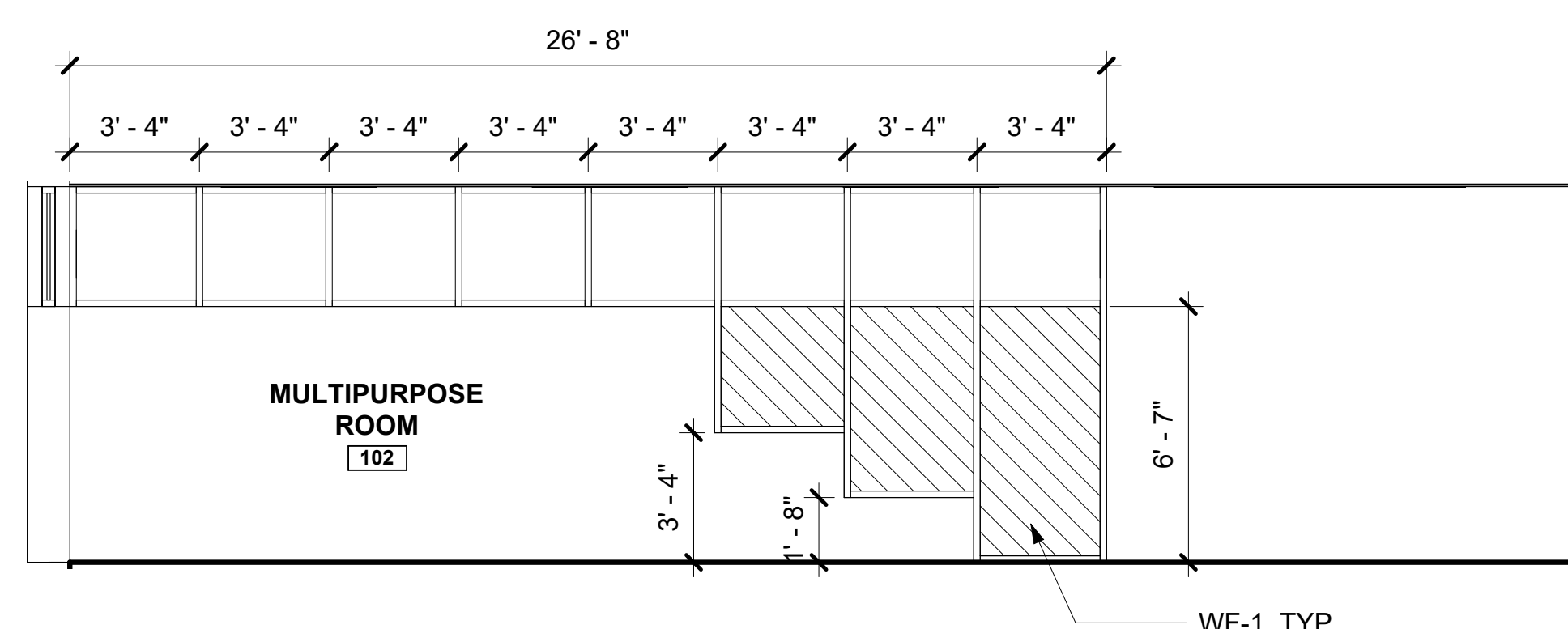
D2 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



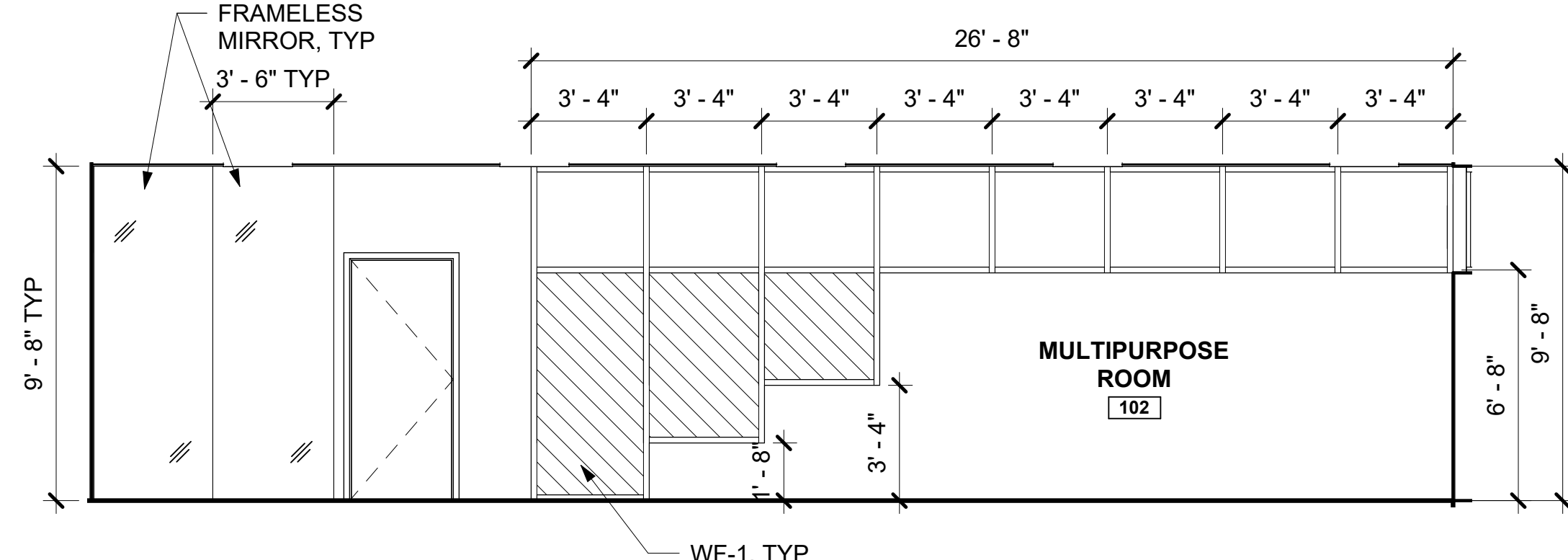
D5 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



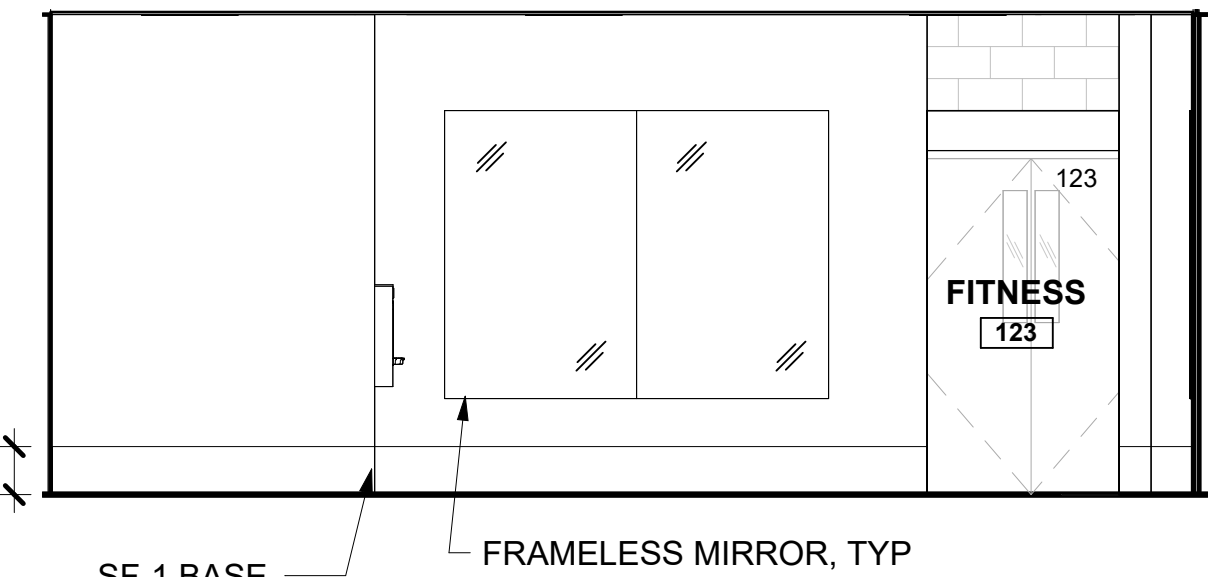
D6 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



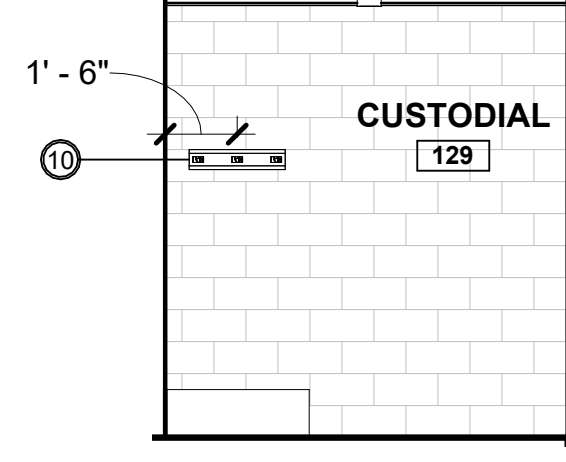
C1 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



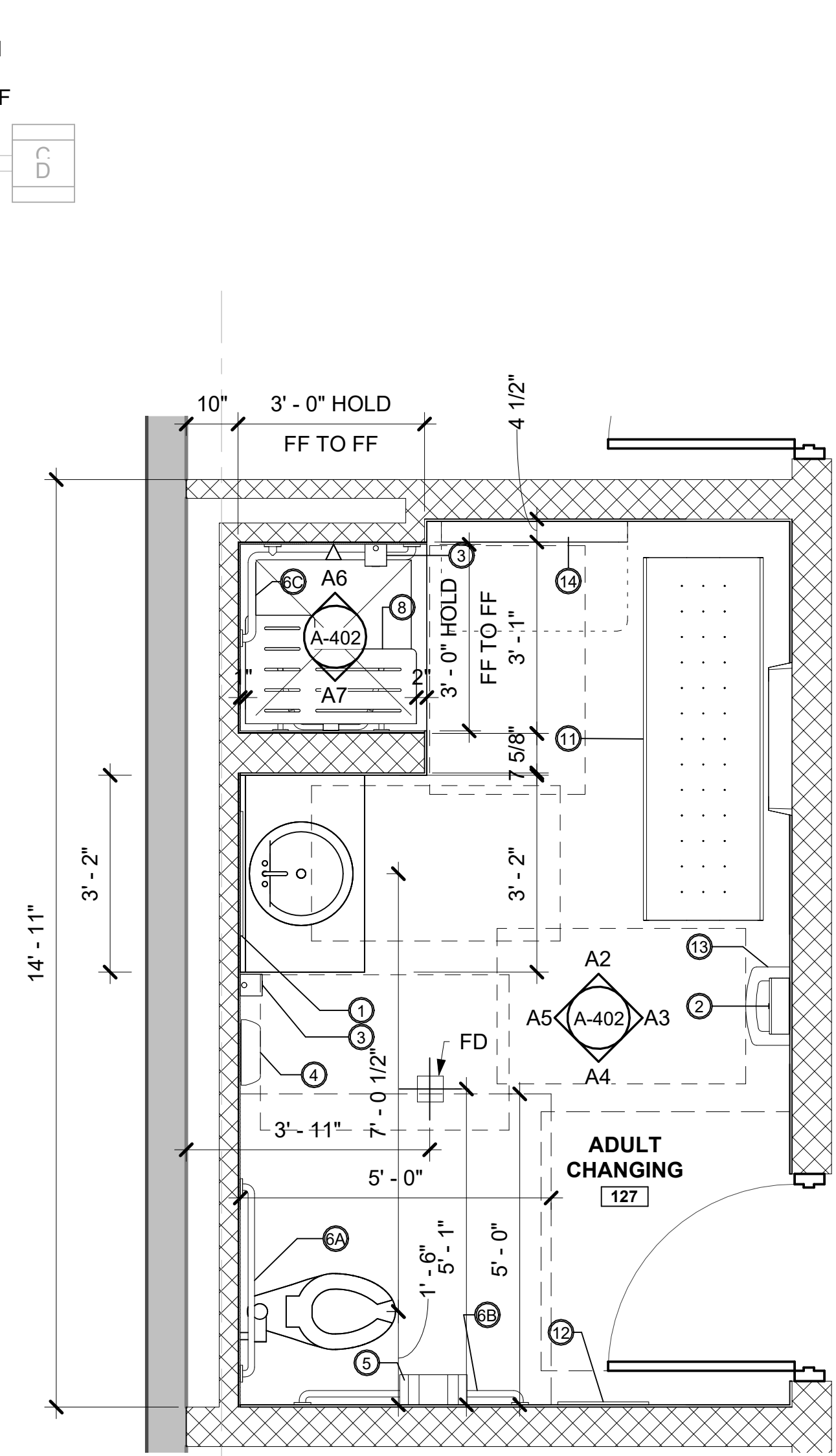
C2 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



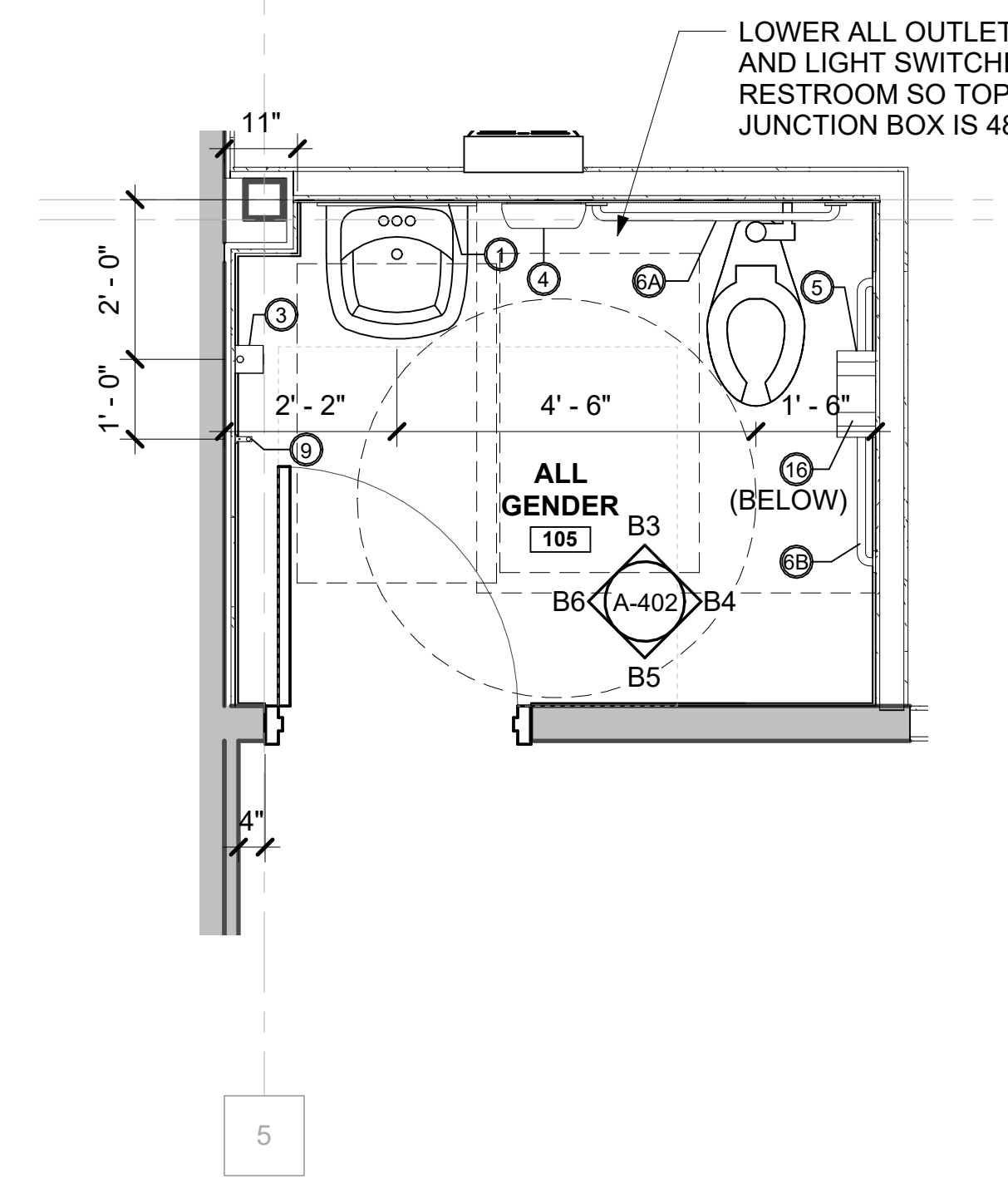
C5 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



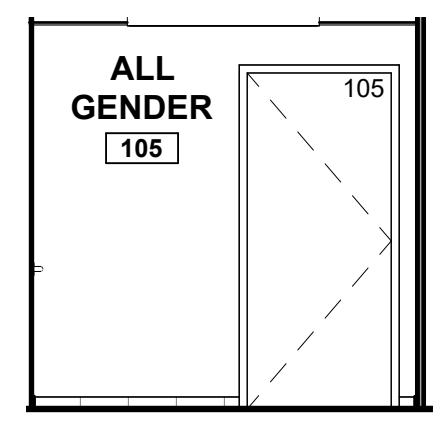
C6 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



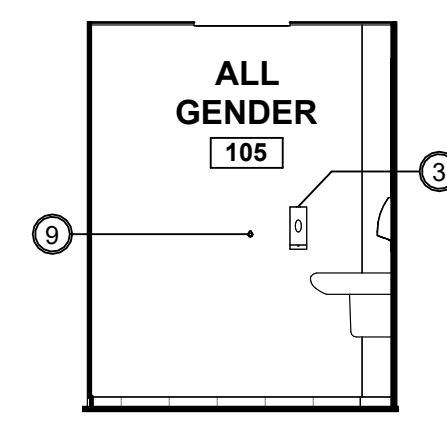
A1 ENLARGED PLAN - ADULT CHANGING ROOM
A-402 1/2" = 1'-0"



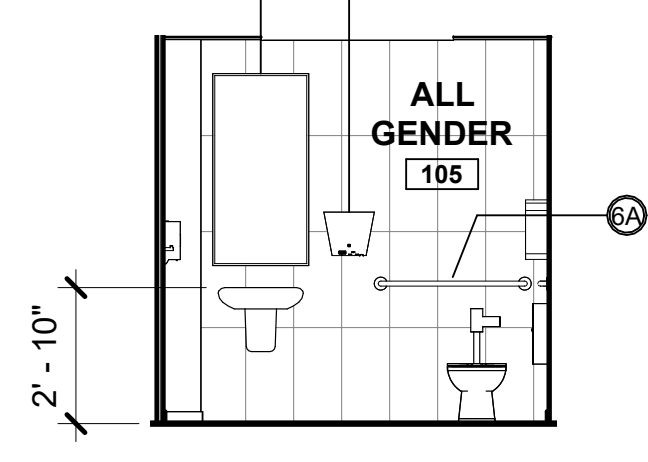
B2 ENLARGED PLAN - NEW WORK - ALL GENDER
A-402 1/2" = 1'-0"



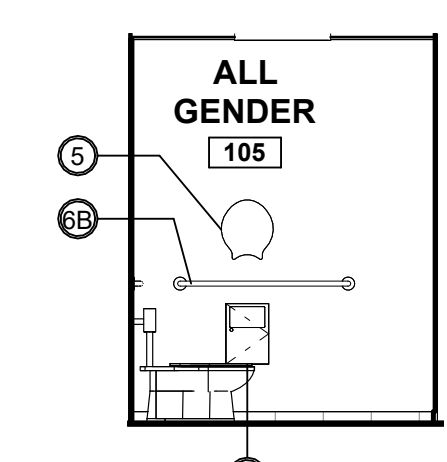
B5 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



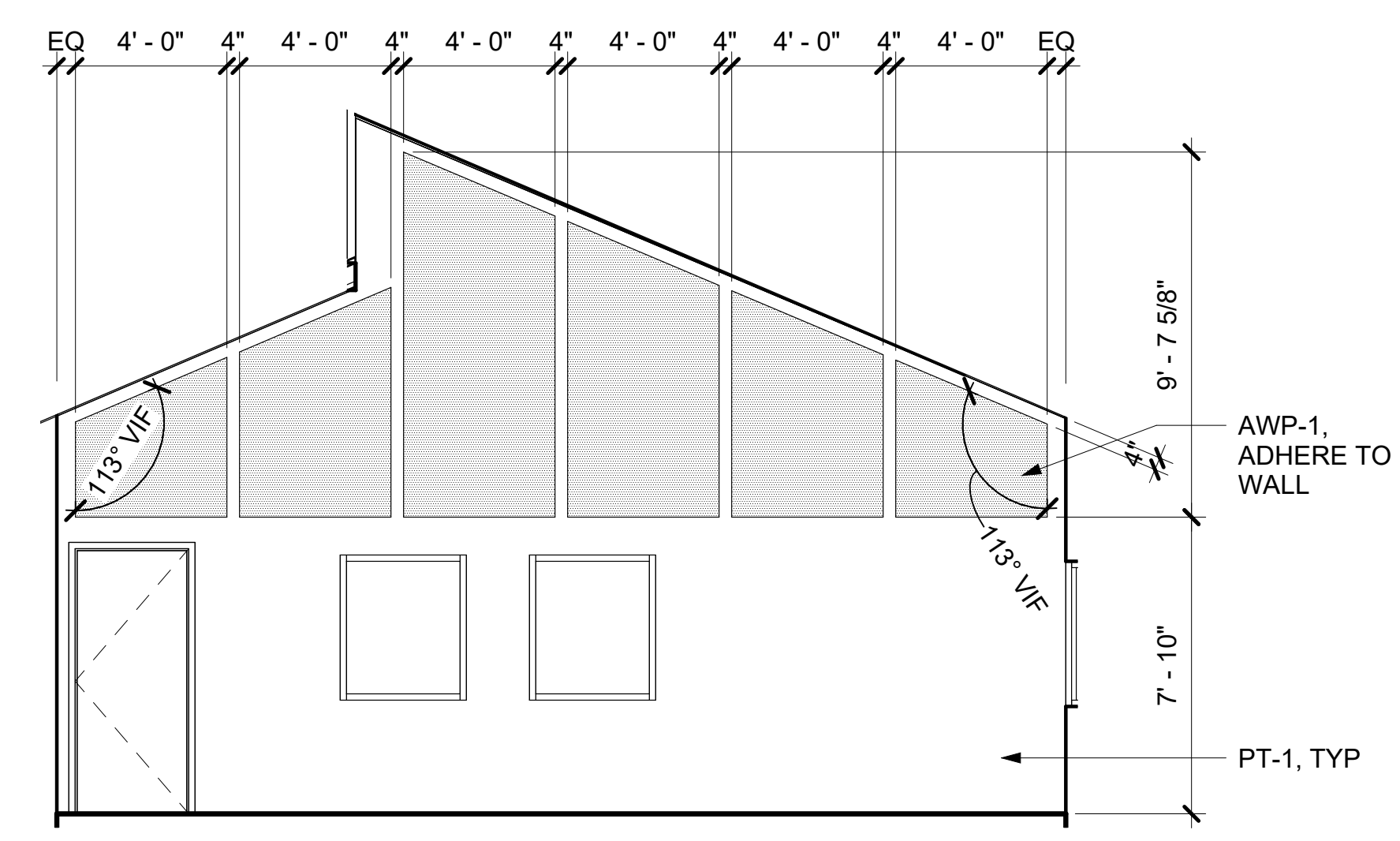
B6 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



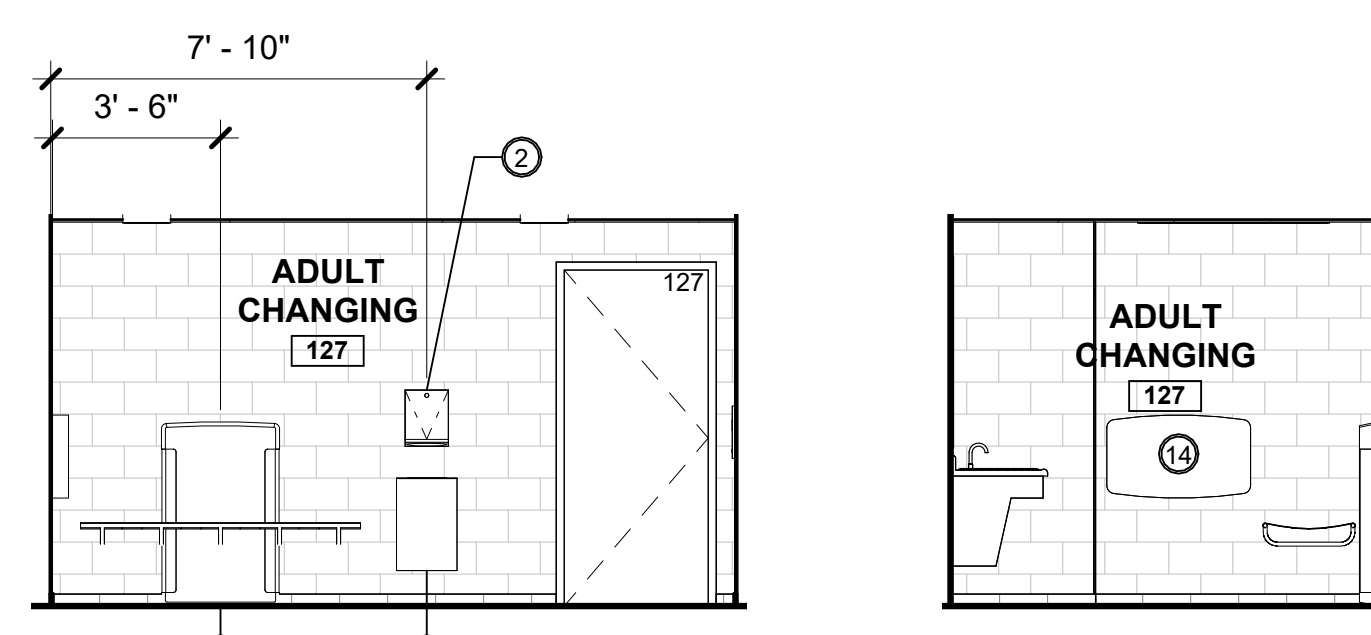
B3 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



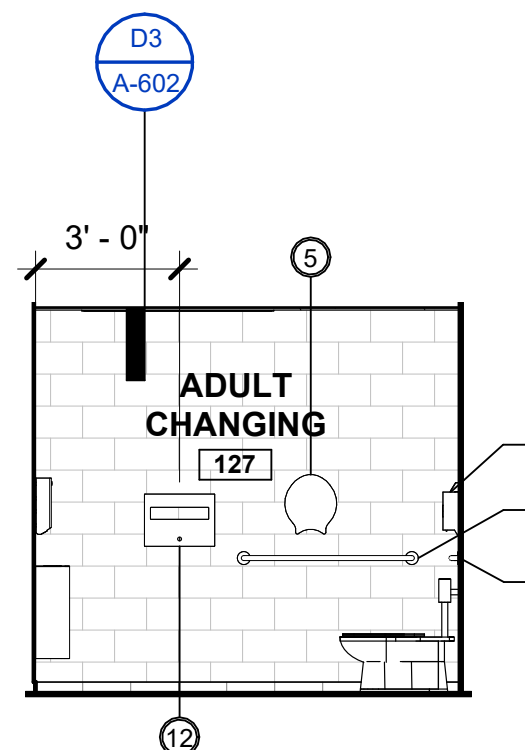
B4 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



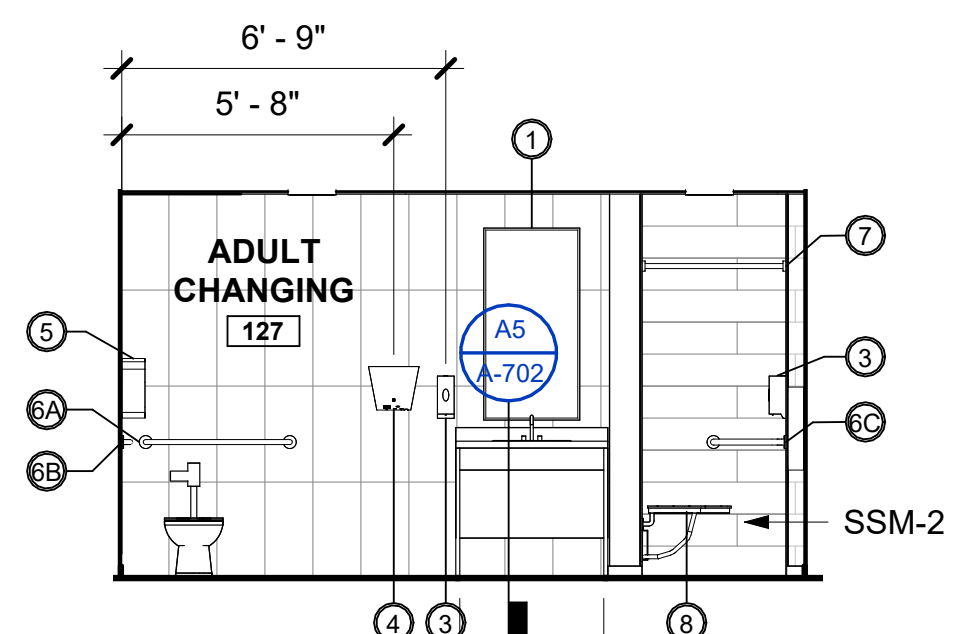
B7 INTERIOR ELEVATION - AWP, TYP
A-402 1/4" = 1'-0"



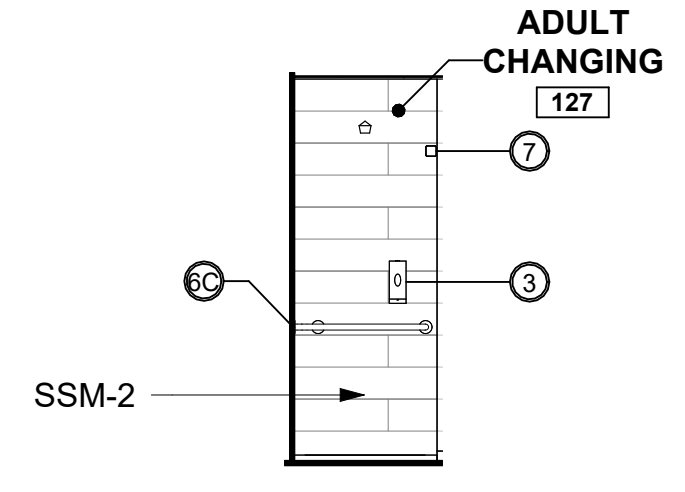
A3 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



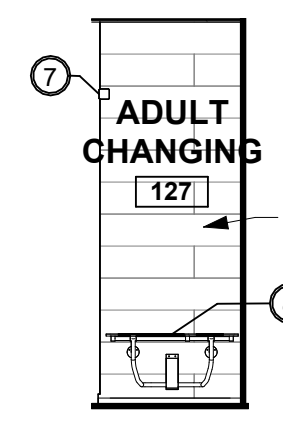
A4 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



A5 INTERIOR ELEVATION
A-402 1/4" = 1'-0" CLR



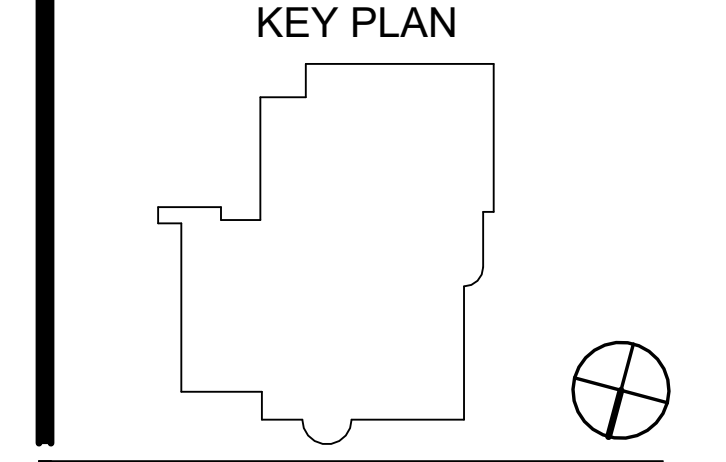
A6 INTERIOR ELEVATION
A-402 1/4" = 1'-0"



A7 INTERIOR ELEVATION
A-402 1/4" = 1'-0"

**LINCOLN PARK COMMUNITY CENTER
RENOVATION AND ADA IMPROVEMENTS**

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| 3/20/2024 | BID SET |

FINISH PLAN AND SCHEDULE

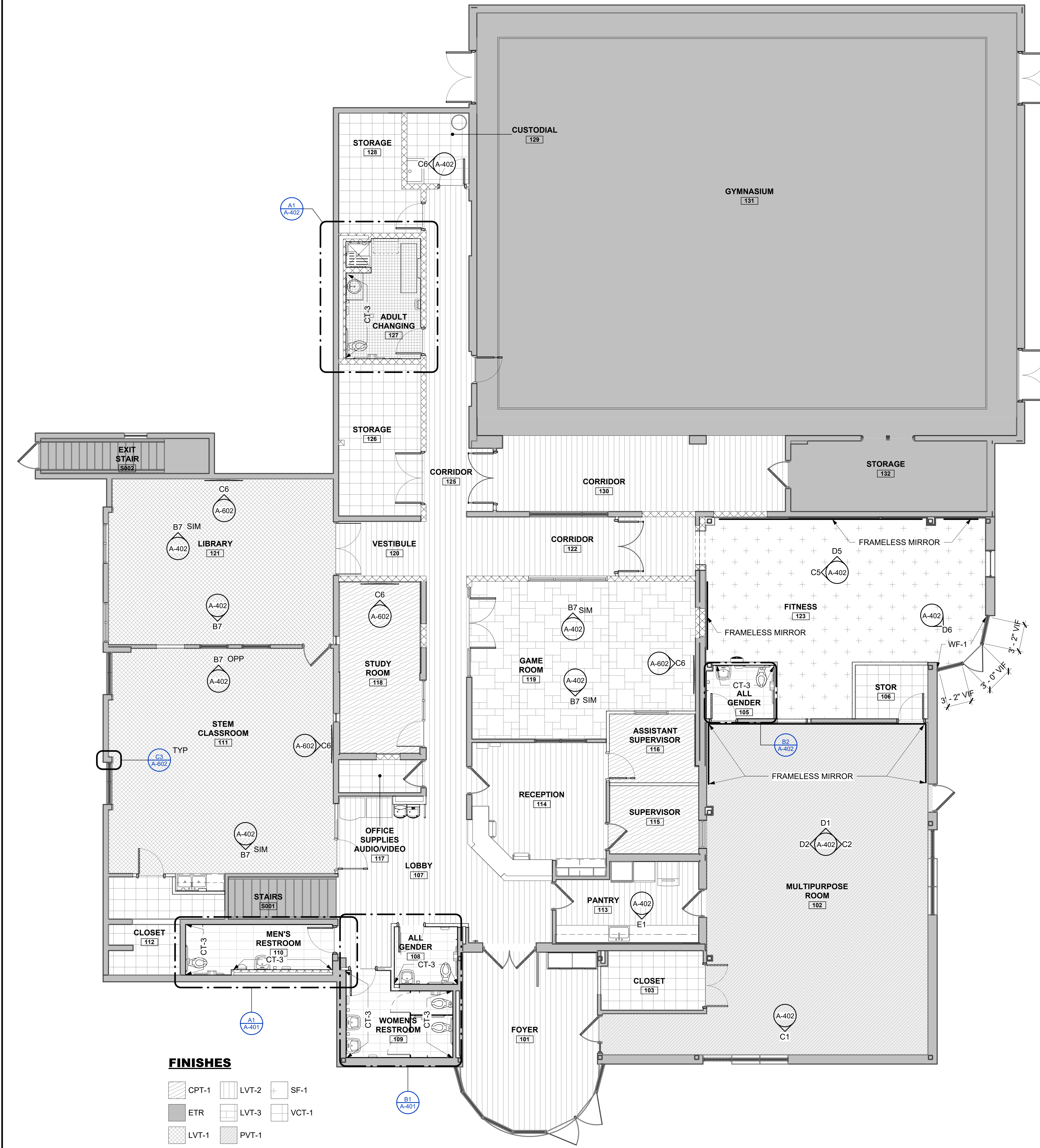
A-601

MATERIAL LEGEND

| DESIGNATION | MATERIAL | MANUFACTURER / PRODUCT | NUMBER / COLOR | SIZE | REMARKS |
|------------------|--------------------------------------|---------------------------------|--|-------------------------------------|---|
| BASE | | | | | |
| ACT-2 | PORCELAIN TILE | TRINITY TILE | COTTON, TUNE | 3" X 12" BULLNOSE | |
| RB-1 | RUBBER BASE | JOHNSONITE, TRADITIONAL 1/8" | FAWN 80 | 4" | |
| CEILING | | | | | |
| ACT-1 | ACOUSTICAL CEILING TILE | ARMSTRONG / ULTIMA TEGULAR | WHITE | 2' X 2' | |
| ACT-2 | ACOUSTICAL CEILING TILE | ARMSTRONG / CANYON TEGULAR | WHITE | 2' X 4' | STORAGE AND CLOSETS |
| ACT-3 | ACOUSTICAL CEILING TILE | ARMSTRONG / ULTIMA TEGULAR | WHITE, ANTI-MICROBIAL | 2' X 2' | ADULT CHANGING ROOM AND TOILETS |
| GYP-1 | GYP BOARD CEILING | -- | PAINT TO MATCH PT-1 | -- | |
| DOORS | | | | | |
| PTD | SHOP PRIMED PAINTED DOORS AND FRAMES | SHERWIN WILLIAMS | INTELLECTUAL GRAY SW7045 | -- | SEMI-GLOSS FINISH |
| FLOOR | | | | | |
| CPT-1 | CARPET | J+J FLOORING, KINETEX | VELOCITY 1814, MOVE 1608 | 24" X 24" | QUARTER TURN INSTALLATION |
| CT-1 | PORCELAIN TILE | DALTILE, FABRIC ART | MODERN TEXTILE, MEDIUM GRAY | 12" X 24" | MATTE FINISH |
| CT-4 | PORCELAIN TILE | DALTILE, FABRIC ART | MODERN TEXTILE, MEDIUM GRAY | 1" X 3" MOSAIC | MATTE FINISH, ADULT CHANGING ROOM |
| LVT-1 | LUXURY VINYL TILE | MILLIKEN / LUMENOLOGY | LIGHT WASH, LUCENT LLW265-189 | 25CM X 100CM | |
| LVT-2 | LUXURY VINYL TILE | FLOORFOLIO / MAPLEWOOD | 725-463 | 7.25" X 48" | |
| LVT-3 | LUXURY VINYL TILE | MILLIKEN / LUMENOLOGY | LIGHT WASH, LIGHT LLW265-126 | 25CM X 100CM | |
| PVT-1 | PERFORMANCE VINYL TILE | ECORE / HERITAGE MOTIVATE | ROCKPORT | 7MM, 6.25" X 48" | |
| SF-1 | SPORTS FLOORING | ECOSURFACES / ECOFIT | BEACH GLASS | 8MM THICKNESS | TURN MATERIAL UP WALL FOR 1'-0" |
| VCT-1 | VINYL COMPOSITE TILE | ARMSTRONG / IMPERIAL EXCELON | 51927 FIELD GRAY | 12" X 12" | |
| SPECIALTY | | | | | |
| AWP-1 | ACOUSTICAL WALL PANELS | WOLF GORDON / GATHER ACOUSTICAL | V-GROOVE STYLE MORGAN, COLOR THUNDER | SEE ELEVATION | V-GROOVE STYLE |
| AWP-2 | ACOUSTICAL WALL PANELS | WOLF GORDON / GATHER ACOUSTICAL | ESCHER, TOP COLOR THUNDER AND BACKGROUND COLOR ROYAL | SEE ELEVATION | TWO-TONE STYLE |
| FWP-1 | FLEXIBLE WALL PROTECTION | INPRO FLEXIBLE WALL PROTECTION | RICOCHET META, RC-ME-R1212, ROCKY RIVER | -- | RECEPTION DESK |
| FWP-2 | FLEXIBLE WALL PROTECTION | WOLF GORDON / RAMPART | GOH 33519877 TAMARA, COLOR JET | -- | RECEPTION DESK - INTERIOR |
| PLAM-1 | PLASTIC LAMINATE | WILSONART | LOFT OAK 7968K-12 | -- | STEM LIBRARY MILLWORK |
| PLAM-2 | PLASTIC LAMINATE | WILSONART | BLACKBIRD 524K-19 | -- | TROPHY CASE, RECEPTION MILLWORK |
| SSM-1 | SOLID SURFACE MATERIAL | CORIAN | DOMINO TERRAZZO | -- | |
| SSM-2 | SOLID SURFACE MATERIAL | INPRO / PRISM | 6" X 24" HORIZONTAL PATTERNS, FROSTED WHITE | 36" X 96" | PROVIDE 36" X 36" ADA TRANSFER SHOWER BASE BY INPRO |
| TP-1 | TOILET PARTITION | SCRANTON PRODUCTS, HINY HIDERS | STAINLESS | 66" TALL DOORS, 83" TALL PARTITIONS | FLOOR MOUNTED OVERHEAD BRACED |
| WF-1 | WINDOW FILM | DECORATIVE FILMS | ORGANIC COTTON SX-3146 | | |
| WALL | | | | | |
| CT-3 | CERAMIC TILE | TRINITY TILE | COTTON, TUNE | 12" X 24" | FLOOR TO CEILING INSTALLATION |
| CT-5 | PORCELAIN TILE | DALTILE, COLOR WHEEL LINEAR | ARCTIC WHITE, GLOSSY | 4" X 12" | PANTRY BACKSPLASH |
| EPOXY PT-1 | EPOXY PAINT | SHERWIN WILLIAMS | MATCH PT-1 | -- | |
| PT-1 | PAINT | SHERWIN WILLIAMS | GREEK VILLA 7551 | -- | EGGSHELL FINISH |

FINISH SCHEDULE

| # | SPACE DESCRIPTION ROOM NAME | SPACE FINISHES | | | | REMARKS |
|--------------------|--------------------------------|----------------|------|-----------|---------------------------|---|
| | | FLOOR | BASE | WALLS | CEILING | |
| FIRST FLOOR | | | | | | |
| 101 | FOYER | LVT-2 | RB-1 | PT-1 | ACT-1 | |
| 102 | MULTIPURPOSE ROOM | PVT-1 | RB-1 | PT-1 | ACT-1 | PROVIDE WF-1 TO STOREFRONT, SEE ELEVATIONS ON A-402. |
| 103 | CLOSET | VCT-1 | RB-1 | PT-1 | ACT-2 | |
| 105 | ALL GENDER | CT-1 | CT-2 | CT-3/PT-1 | ACT-3 | FULL HEIGHT CT-3 AT WET WALLS |
| 106 | STOR | VCT-1 | RB-1 | PT-1 | ACT-2 | |
| 107 | LOBBY | LVT-2 | RB-1 | PT-1 | ACT-1 | |
| 108 | ALL GENDER | CT-1 | CT-2 | CT-3/PT-1 | ETR | FULL HEIGHT CT-3 AT WET WALLS |
| 109 | WOMEN'S RESTROOM | CT-1 | CT-2 | CT-3/PT-1 | ACT-3 | TP-1 FOR TOILET PARTITIONS, FULL HEIGHT CT-3 AT WET WALLS |
| 110 | MEN'S RESTROOM | CT-1 | CT-2 | CT-3/PT-1 | ACT-3 | FULL HEIGHT CT-3 AT WET WALLS |
| 111 | STEM CLASSROOM | LVT-1 | RB-1 | PT-1 | ACT-1 / GYP-1 AT MILLWORK | PROVIDE ACOUSTICAL LVT UNDERLAYMENT, AWP-1 ON WALLS |
| 112 | CLOSET | VCT-1 | RB-1 | ETR | ACT-2/ACT-1 | |
| 113 | PANTRY | LVT-2 | RB-1 | PT-1 | ACT-3 | SSM-1 COUNTERTOP, CT-5 BACKSPLASH |
| 114 | RECEPTION | LVT-2 | RB-1 | PT-1 | ACT-1 / GYP-1 | |
| 115 | SUPERVISOR | CPT-1 | RB-1 | PT-1 | ACT-1 | |
| 116 | ASSISTANT SUPERVISOR | CPT-1 | RB-1 | PT-1 | ACT-1 | |
| 117 | OFFICE SUPPLIES AUDIO/VIDEO | VCT-1 | RB-1 | PT-1 | EXISTING GYP | |
| 118 | STUDY ROOM | CPT-1 | RB-1 | PT-1 | ACT-1 | |
| 119 | GAME ROOM | LVT-3 | RB-1 | PT-1 | ACT-1 / GYP-1 | AWP-2 ON WALLS |
| 120 | VESTIBULE | LVT-2 | RB-1 | PT-1 | GYP-1 | |
| 121 | LIBRARY | LVT-1 | RB-1 | PT-1 | ACT-1 | PROVIDE ACOUSTICAL LVT UNDERLAYMENT, AWP-1 ON WALLS |
| 122 | CORRIDOR | LVT-2 | RB-1 | PT-1 | ACT-1 | |
| 123 | FITNESS | SF-1 | RB-1 | PT-1 | ACT-1 | PROVIDE FRAMELESS MIRRORS |
| 125 | CORRIDOR | LVT-2 | RB-1 | PT-1 | ACT-1 / EXISTING GYP | |
| 126 | STORAGE | VCT-1 | RB-1 | PT-1 | ACT-2 | |
| 127 | ADULT CHANGING | CT-4 | CT-2 | CT-3/PT-1 | GYP-1 | PROVIDE SSM-2 AT SHOWER |
| 128 | STORAGE | VCT-1 | RB-1 | PT-1 | ACT-2 | |
| 129 | CUSTODIAL | VCT-1 | RB-1 | PT-1 | ACT-2 | |
| 130 | CORRIDOR | LVT-2 | RB-1 | PT-1 | EXISTING GYP | |
| 131 | GYMNASIUM | ETR | ETR | ETR | ETR | |
| 132 | STORAGE | ETR | ETR | ETR | ETR | |
| S001 | STAIRS | ETR | ETR | ETR | EXISTING GYP | |

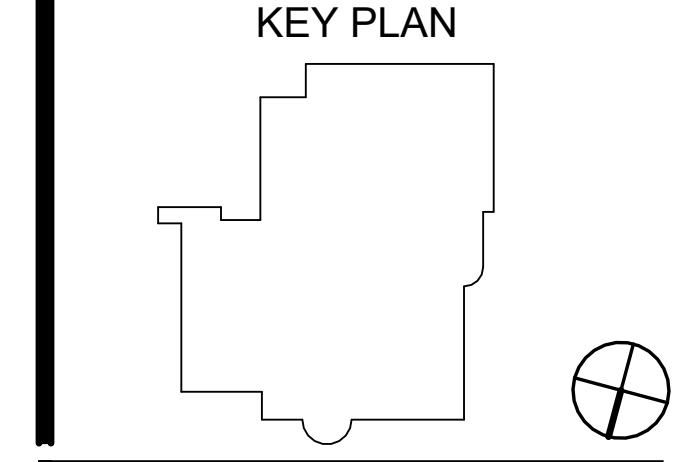


FINISHES

| | | |
|--|--|--|
| | | |
| | | |
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| | | |

A4 FIRST FLOOR FINISH PLAN
A-601 3/16" = 1'-0"

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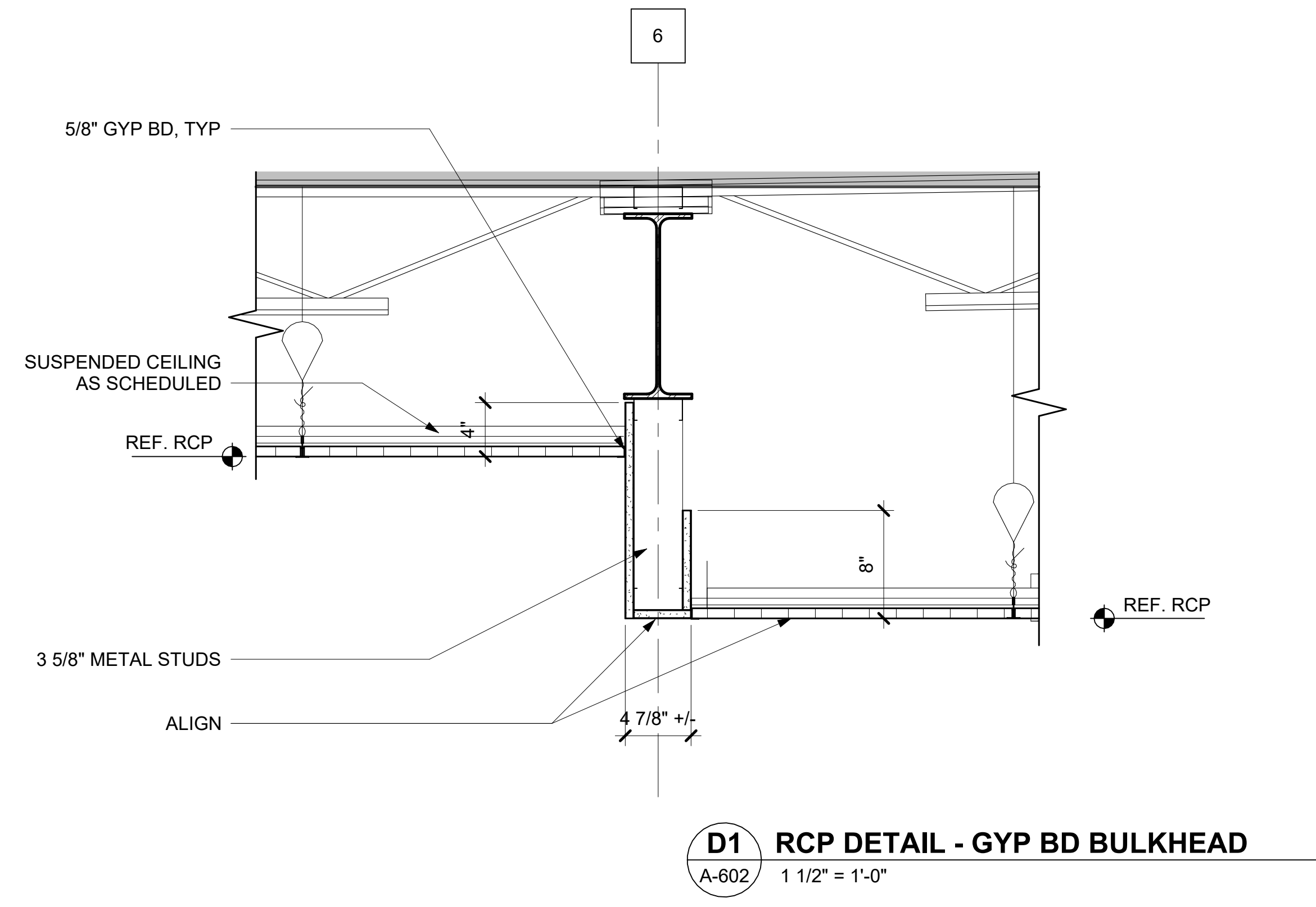


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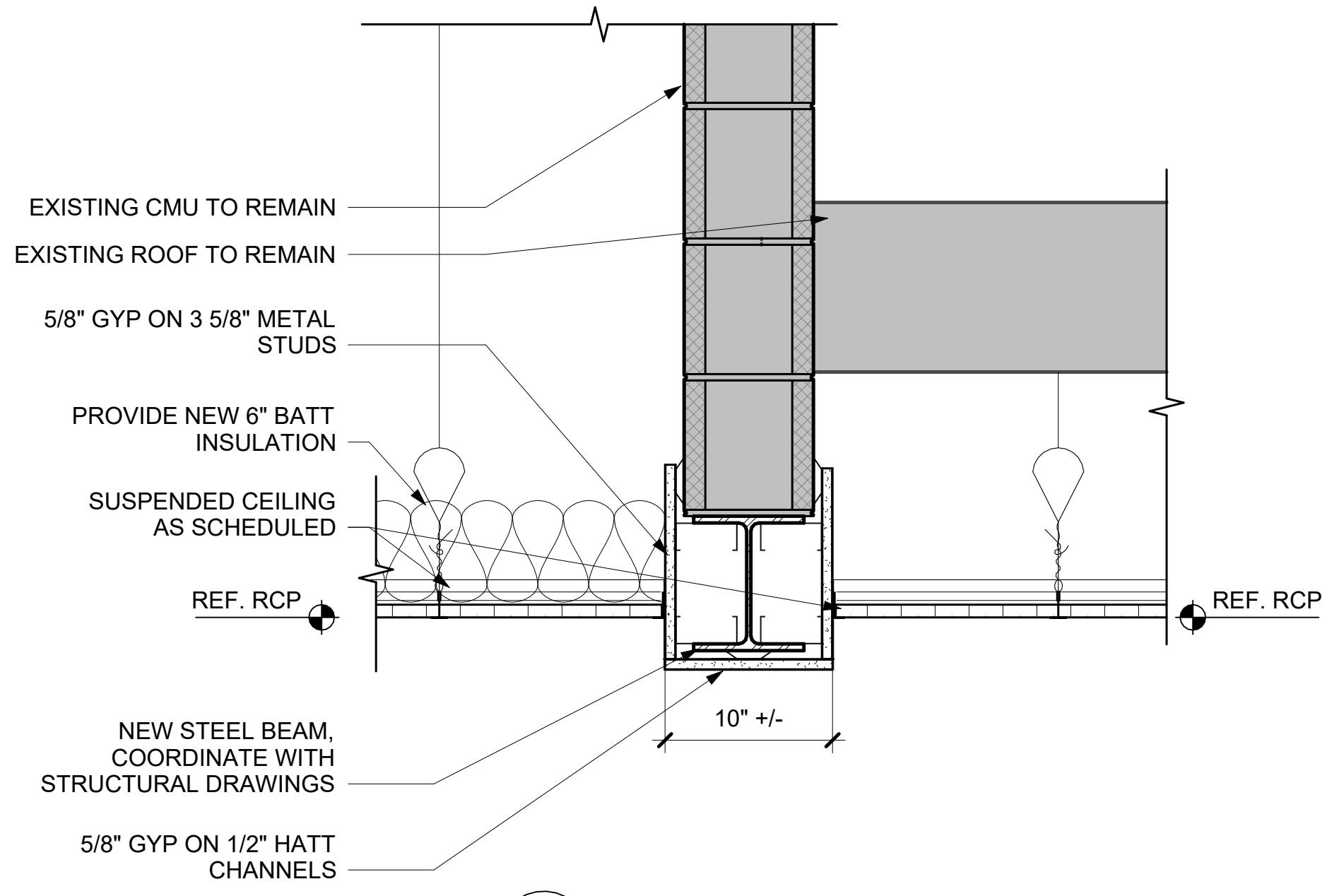
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DETAILS

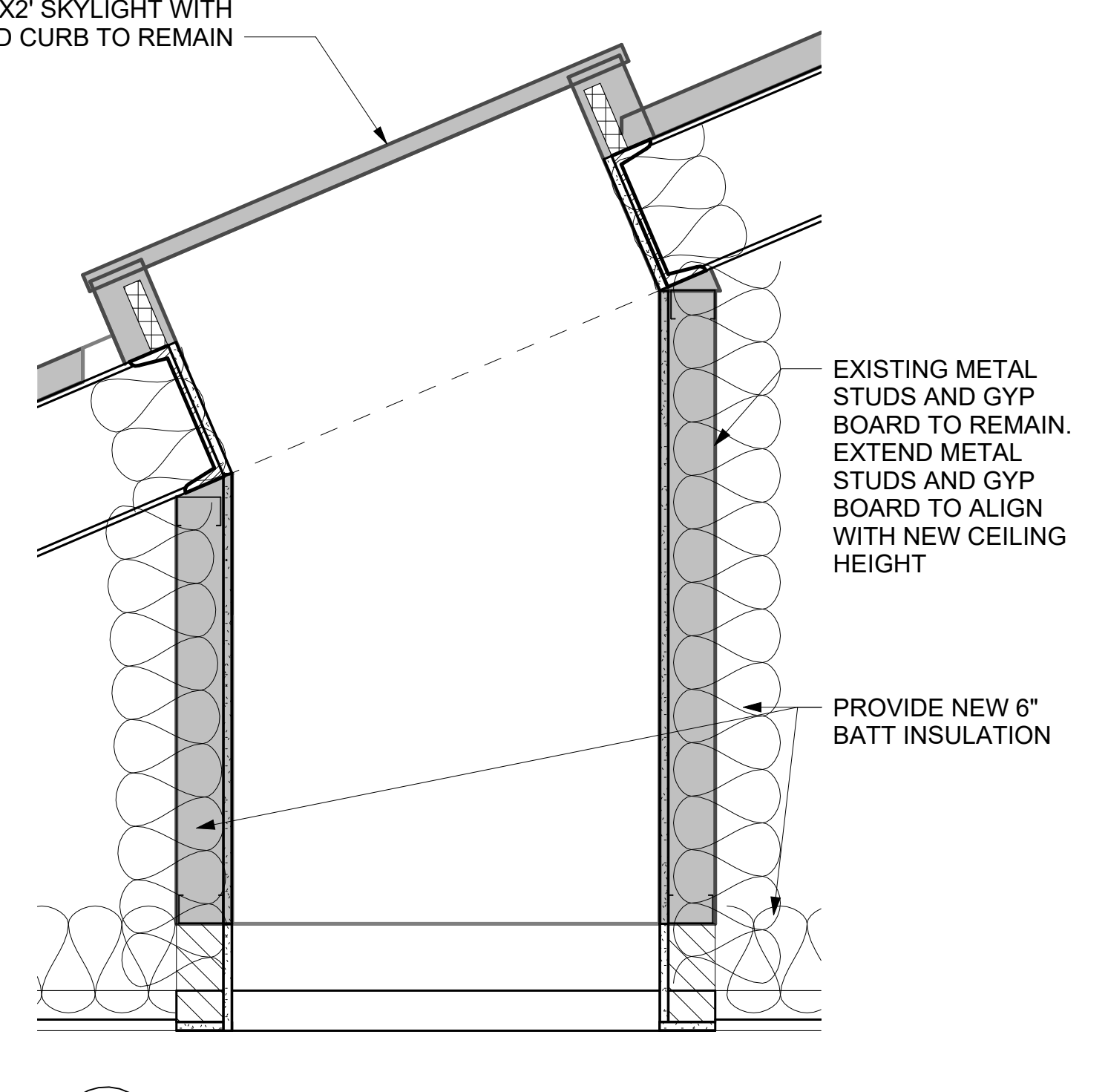
A-602



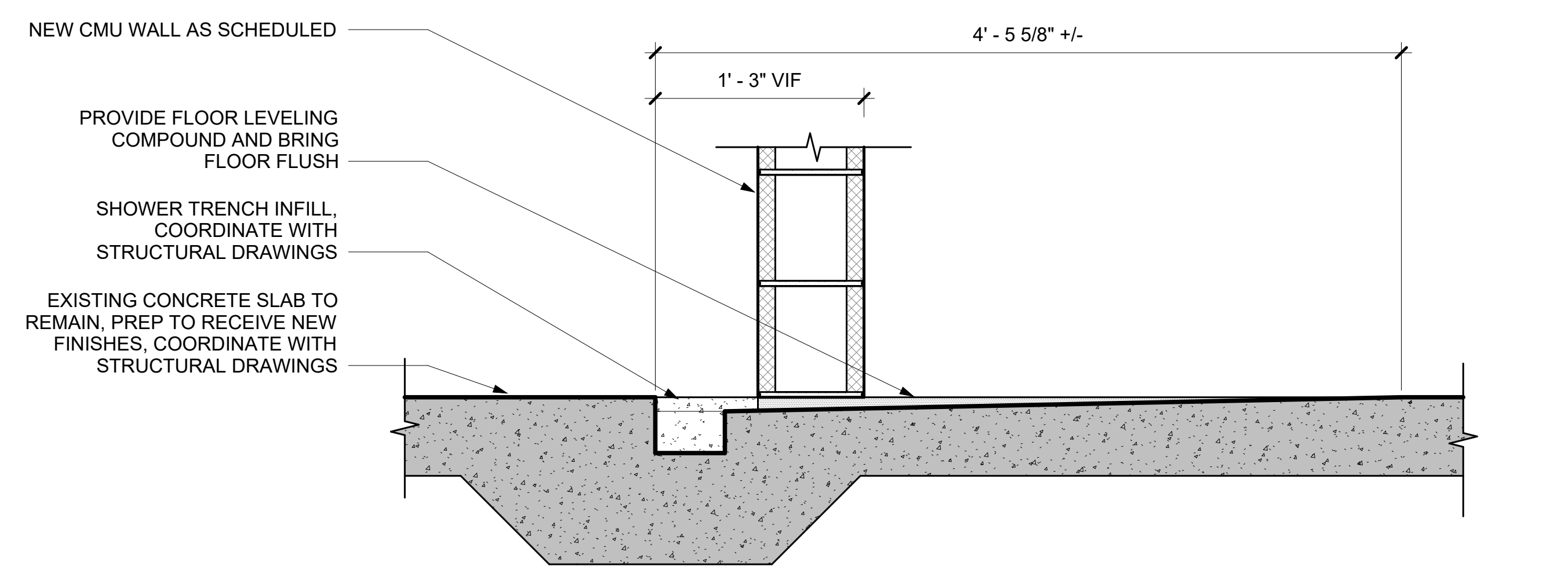
D1 RCP DETAIL - GYP BD BULKHEAD
 A-602 1 1/2" = 1'-0"



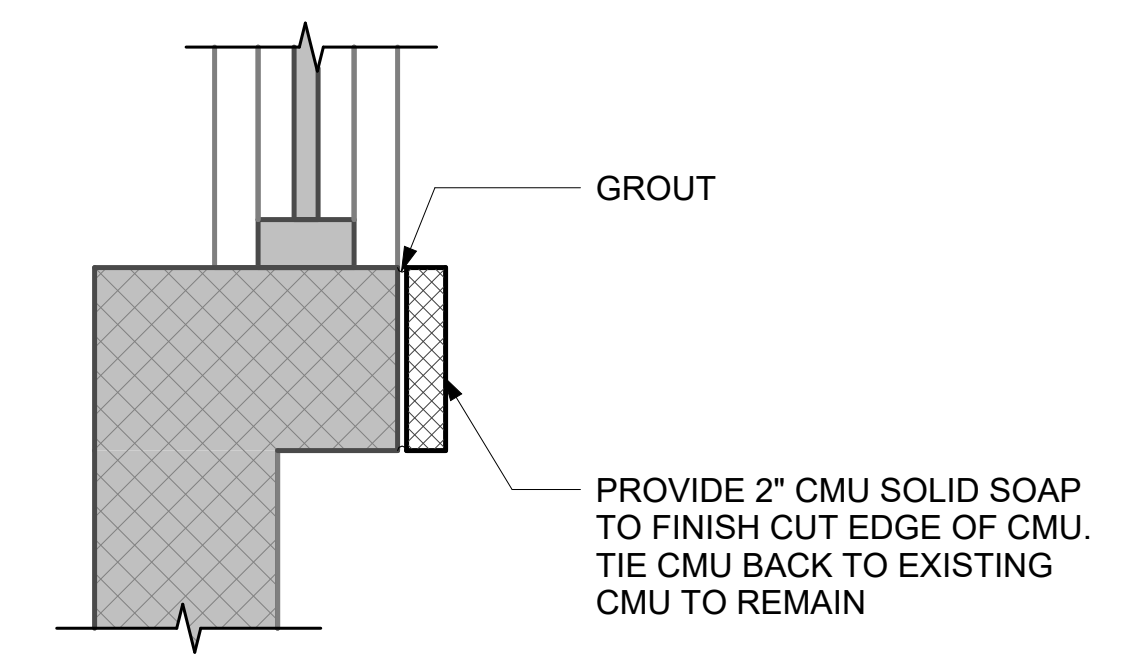
D3 RCP DETAIL - STEEL BEAM
 A-602 1 1/2" = 1'-0"



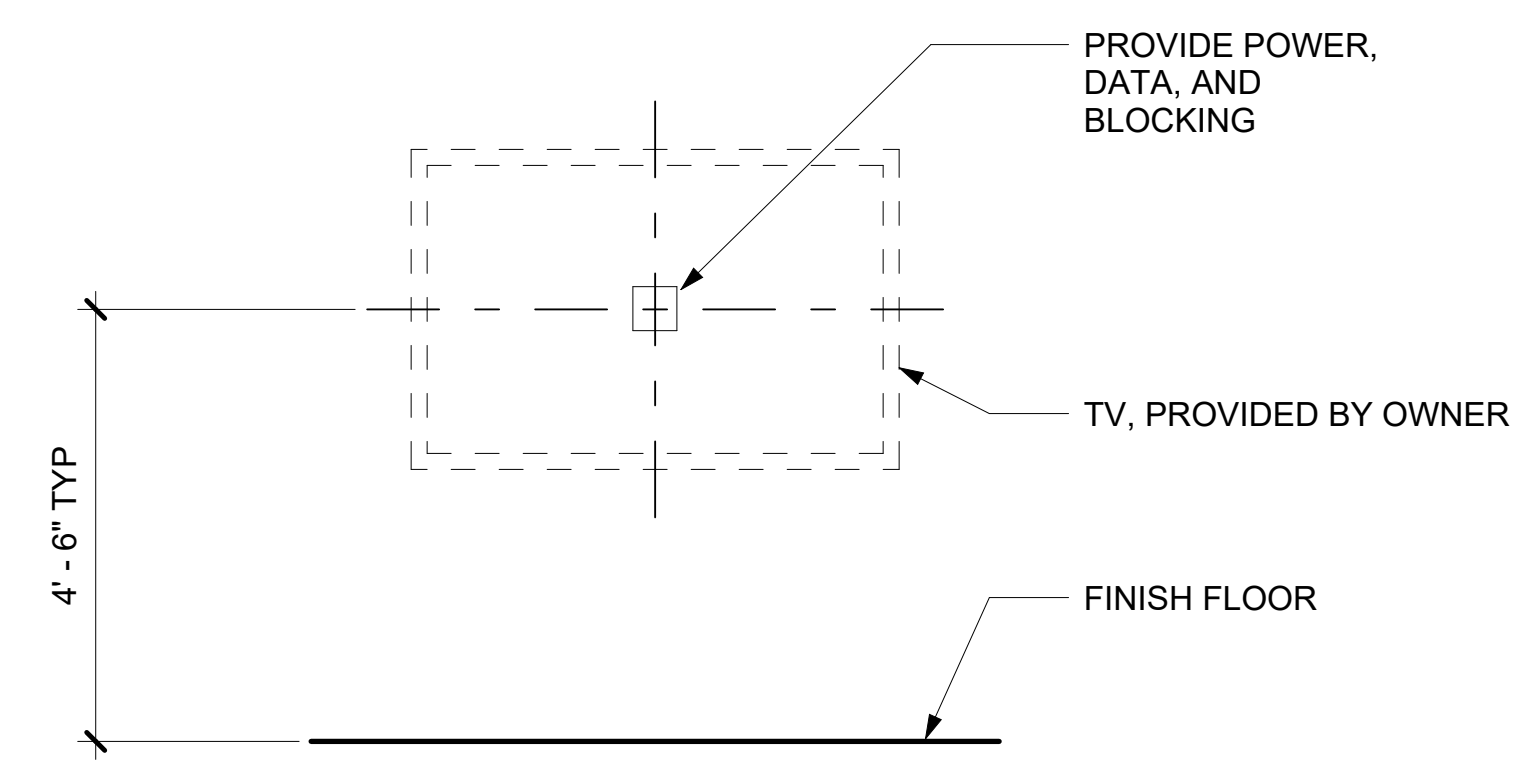
D6 RCP DETAIL - NEW WORK - SKYLIGHT
 A-602 1 1/2" = 1'-0"



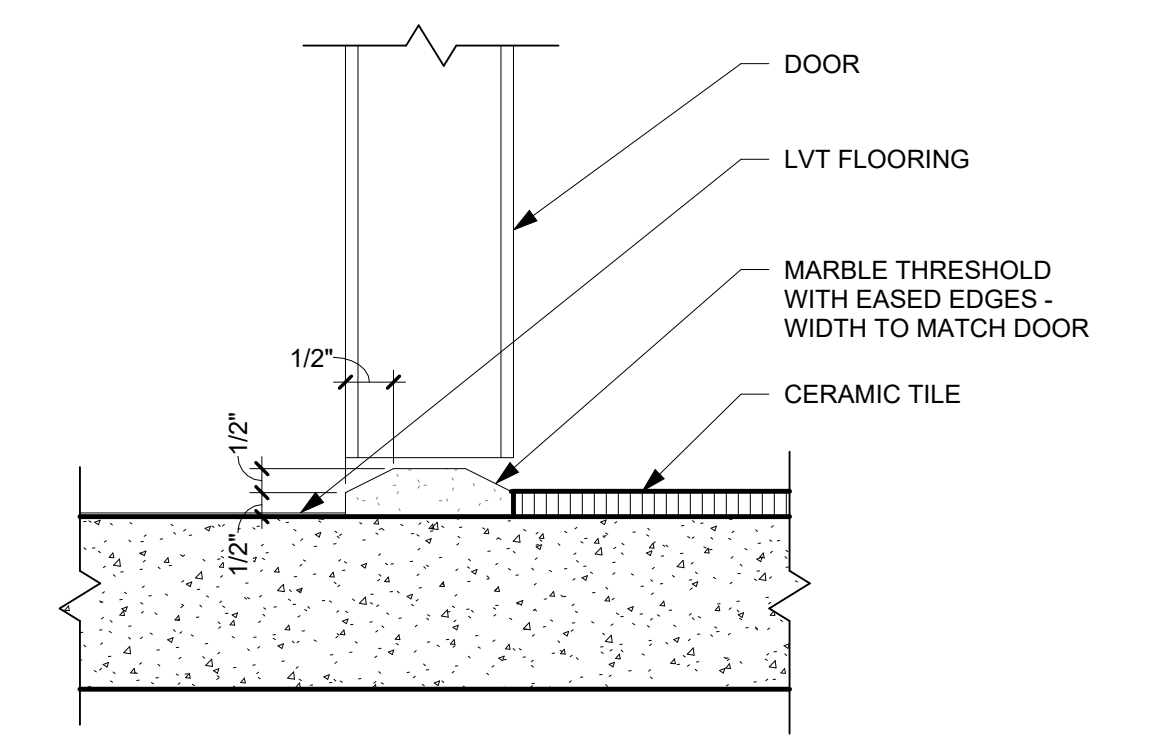
C1 SECTION DETAIL - SHOWER TRENCH
 A-602 1 1/2" = 1'-0"



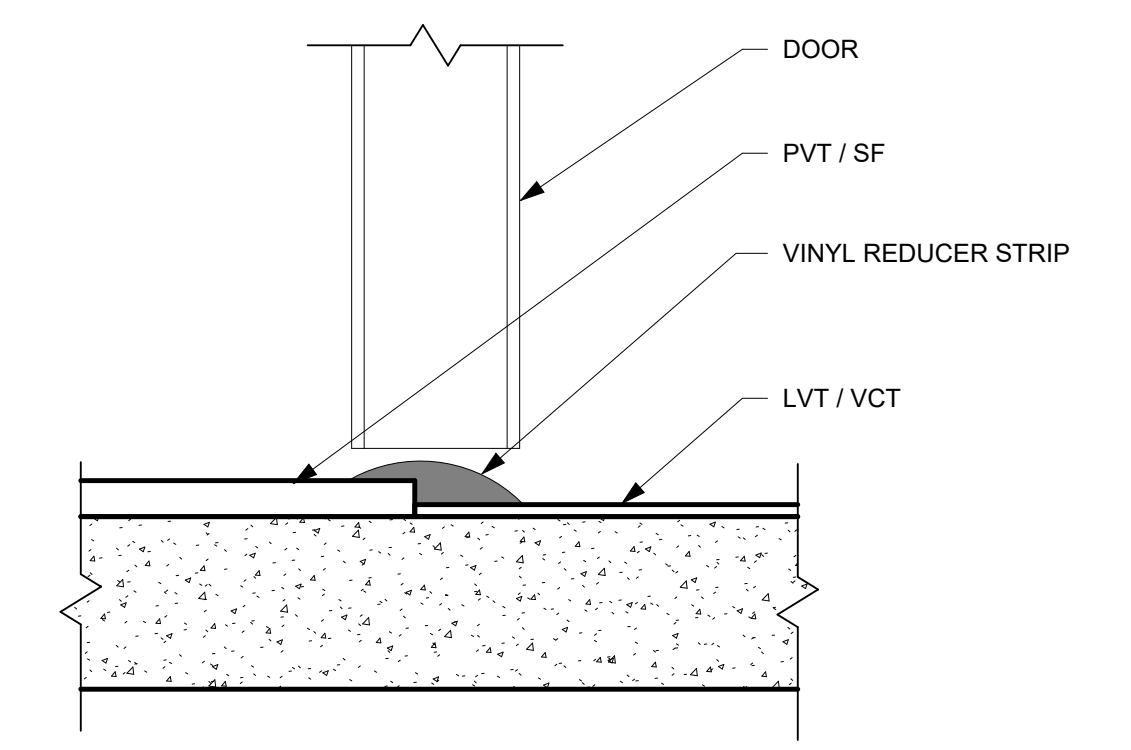
C3 FINISH DETAIL - CMU WALL
 A-602 1 1/2" = 1'-0"



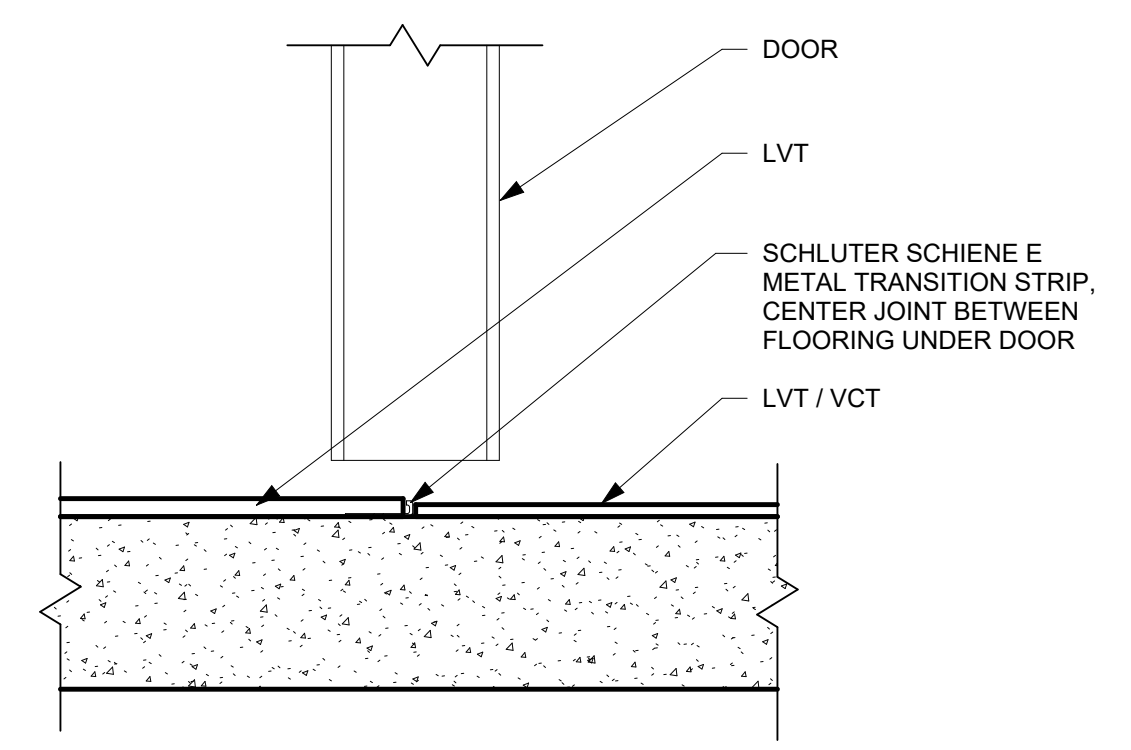
C6 MONITOR MOUNTING ELEVATION, TYP
 A-602 1/2" = 1'-0"



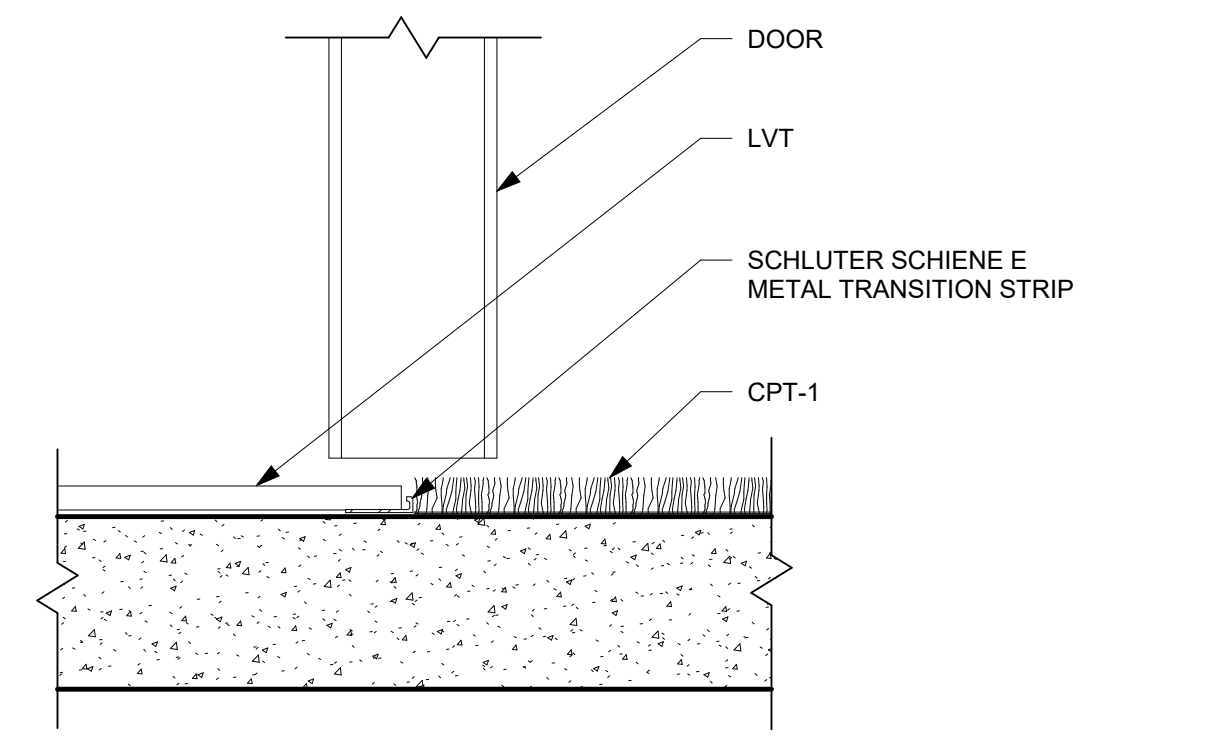
A5 FLOORING TRANSITION - CERAMIC TO LVT - MARBLE THRESHOLD
 A-602 6" = 1'-0"



A4 FLOORING TRANSITION - PVT / SF TO LVT / VCT
 A-602 6" = 1'-0"

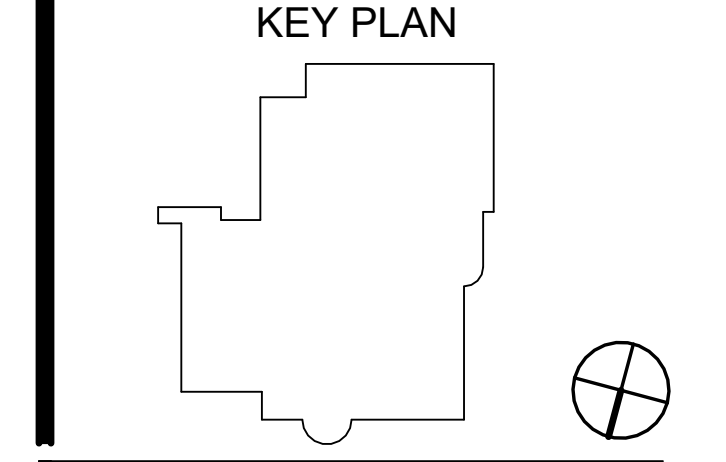


A2 FLOORING TRANSITION - LVT TO LVT / VCT
 A-602 6" = 1'-0"



A1 FLOORING TRANSITION - CARPET TO LVT - SCHLUTER
 A-602 6" = 1'-0"

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DOOR SCHEDULE AND HARDWARE

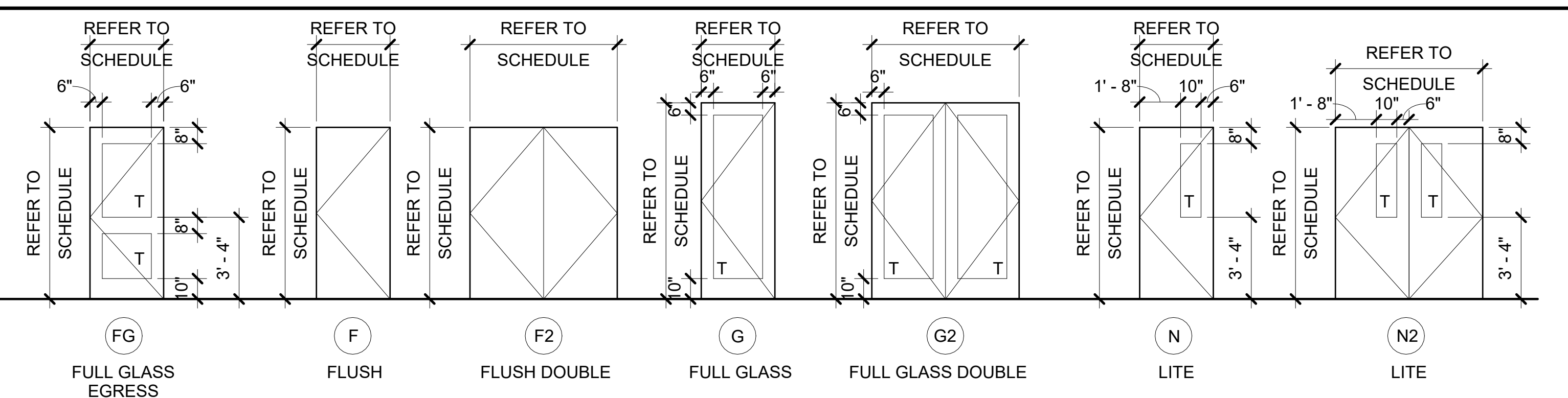
A-621

Appendix E

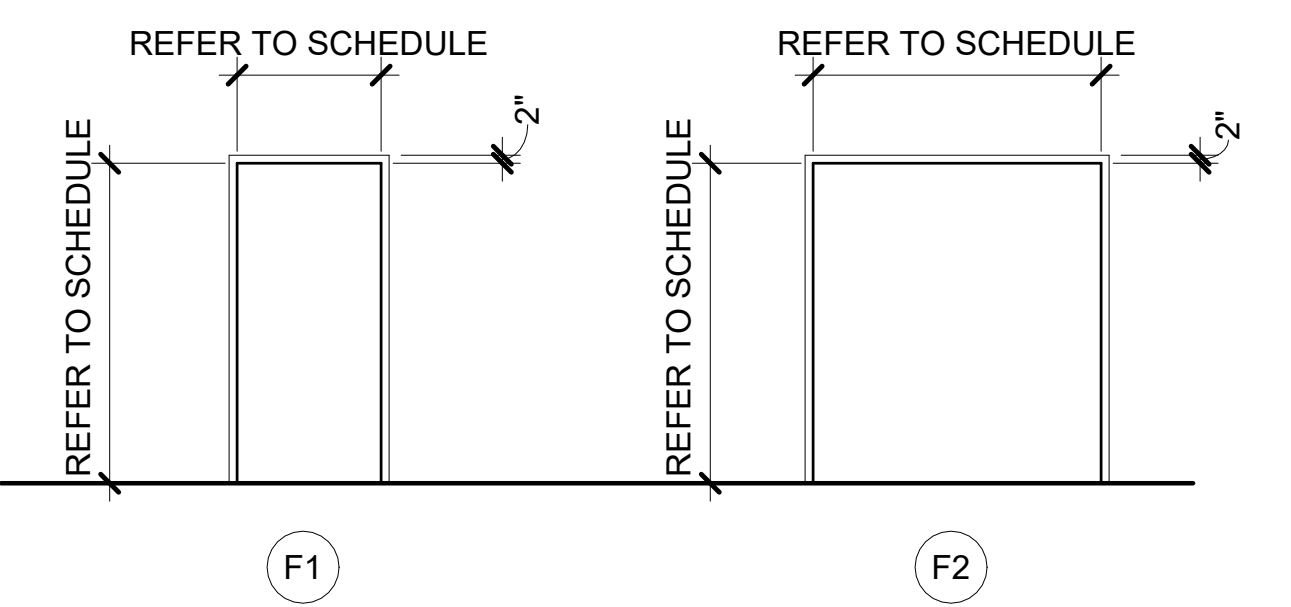
DOOR SCHEDULE

| NUMBER | ROOM NAME | DOOR | | | | | | FRAME | | | DETAILS | | HARDWARE | | REMARKS |
|--------------------|----------------------|------|-----------|--------|------|-----|-----|-------|-----|-----|---------------|---------------|----------|----------------|-----------------------------|
| | | TYPE | WIDTH | HEIGHT | PAIR | MAT | FIN | TYPE | MAT | FIN | HEAD | JAMB | SILL | SET NO. | |
| FIRST FLOOR | | | | | | | | | | | | | | | |
| 103 | CLOSET | F2 | 5'-0" | 7'-0" | X | WD | PTD | F2 | HM | PTD | B3/A-621 | A3/A-621 | 06 | | |
| 105 | MULTIPURPOSE ROOM | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B3/A-621 | A3/A-621 | 11 | | |
| 106 | MULTIPURPOSE ROOM | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B3/A-621 | A3/A-621 | 11 | | |
| 108 | ALL GENDER | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B3/A-621 | A3/A-621 | 11 | | |
| 109 | WOMEN'S RESTROOM | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B3/A-621 | A3/A-621 | 12 | | |
| 110 | MEN'S RESTROOM | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B1/A-621 | A1/A-621 | 11 | | |
| 112 | CLOSET | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B3/A-621 | A3/A-621 | 09 | | |
| 116 | ASSISTANT SUPERVISOR | N | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B3/A-621 | A3/A-621 | 08 | | |
| 117 | STEM CLASSROOM | FG | 3'-6" | 7'-0" | | AL | AL | -- | AL | AL | -- | -- | 16 | | |
| 118 | STUDY ROOM | G | 3'-0" | 6'-6" | | AL | AL | -- | AL | AL | -- | -- | 03 | | SEE DETAILS ON A-631, A-632 |
| 119 | GAME ROOM | G | 6'-0" | 6'-6" | | AL | AL | -- | AL | AL | -- | -- | 02 | | SEE DETAILS ON A-631, A-632 |
| 120 | LIBRARY | G2 | 6'-0" | 6'-6" | X | AL | AL | -- | AL | AL | -- | -- | 01 | | SEE DETAILS ON A-631, A-632 |
| 123 | CORRIDOR | N2 | 6'-0" | 7'-0" | X | WD | PTD | F2 | HM | PTD | B1/A-621, SIM | A1/A-621, SIM | 04 | | |
| 126 | STORAGE | F2 | 6'-0" | 7'-0" | X | WD | PTD | F2 | HM | PTD | B1/A-621, SIM | A1/A-621, SIM | 05 | | |
| 127 | ADULT CHANGING | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B1/A-621 | A1/A-621 | 11 | | |
| 128 | STORAGE | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B1/A-621 | A1/A-621 | 09 | | |
| 129 | CUSTODIAL | F | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B1/A-621 | A1/A-621 | 10 | | |
| 131A | CORRIDOR | N2 | 6'-0" | 7'-0" | X | WD | PTD | F2 | HM | PTD | B3/A-621 | A3/A-621 | 04 | | |
| 131B | GYMNASIUM | N | 3'-0" | 7'-0" | | WD | PTD | F1 | HM | PTD | B1/A-621 | A1/A-621 | 13 | EGRESS | TIE INTO FIRE ALARM SYSTEM |
| 131C | GYMNASIUM | F2 | 6'-0" | 7'-0" | X | HM | PTD | F2 | HM | PTD | B1/A-621, SIM | A1/A-621, SIM | 15 | EGRESS | TIE INTO FIRE ALARM SYSTEM |
| 131D | GYMNASIUM | F2 | 6'-0" | 7'-0" | X | HM | PTD | F2 | HM | PTD | B1/A-621, SIM | A1/A-621, SIM | 15 | EGRESS | TIE INTO FIRE ALARM SYSTEM |
| 131E | GYMNASIUM | F2 | 6'-0" | 7'-0" | X | HM | PTD | F2 | HM | PTD | B1/A-621, SIM | A1/A-621, SIM | 15 | EGRESS | TIE INTO FIRE ALARM SYSTEM |
| E001 | FITNESS | ETR | 3'-1 1/2" | 6'-7" | | -- | -- | -- | -- | -- | -- | -- | 14 | DELAYED EGRESS | EXISTING DOOR |

GENERAL NOTES:
1. SEE INTERIOR FINISH SCHEDULE FOR DOOR FINISHES.
2. REPLACE / REPAIR DOOR HARDWARE ON EXISTING DOORS SO DOORS OPERATE WITH A MAXIMUM 5 LBF OF FORCE.



DOOR LEGEND
1/4" = 1'-0"

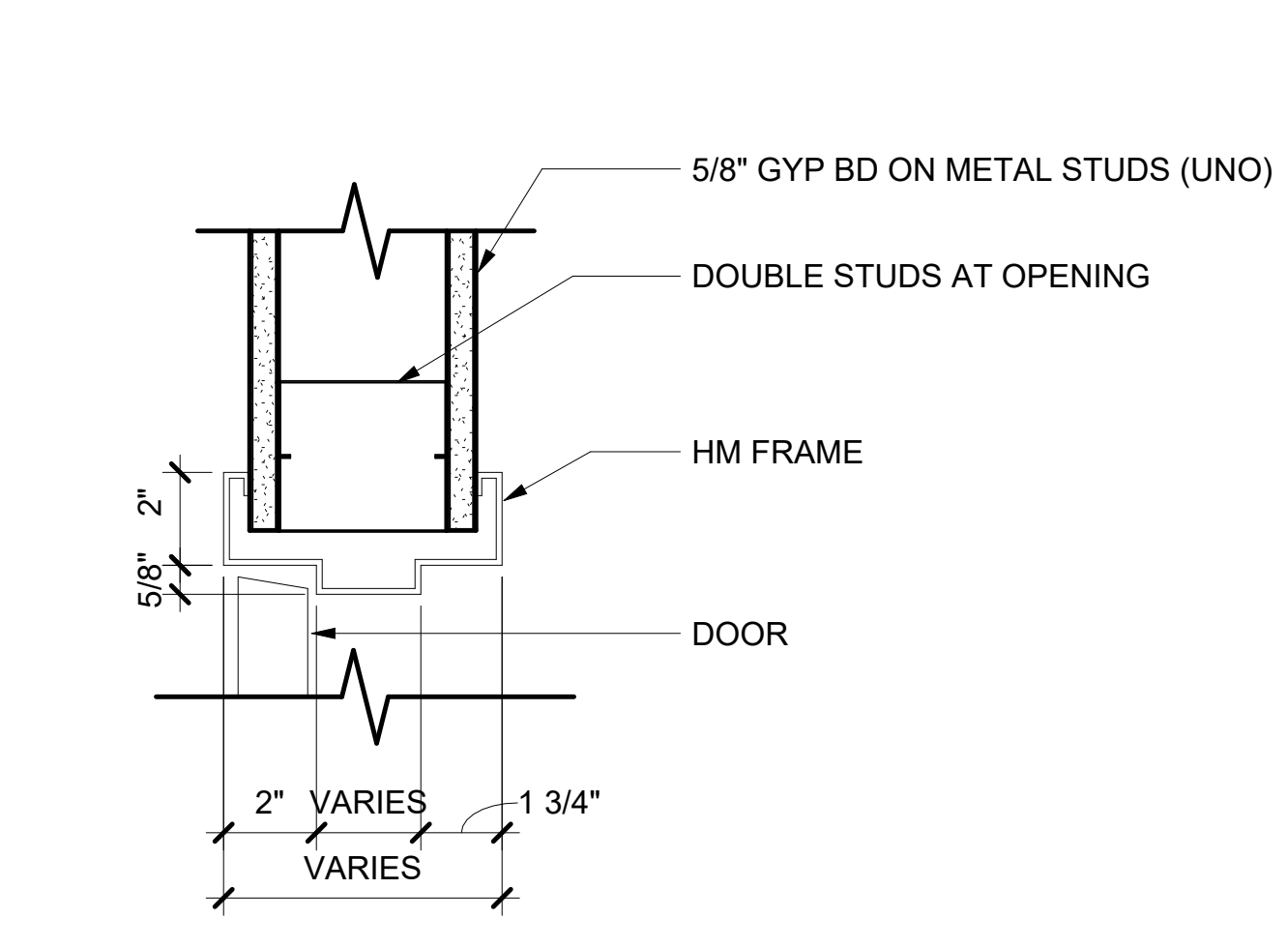


FRAME LEGEND
1/4" = 1'-0"

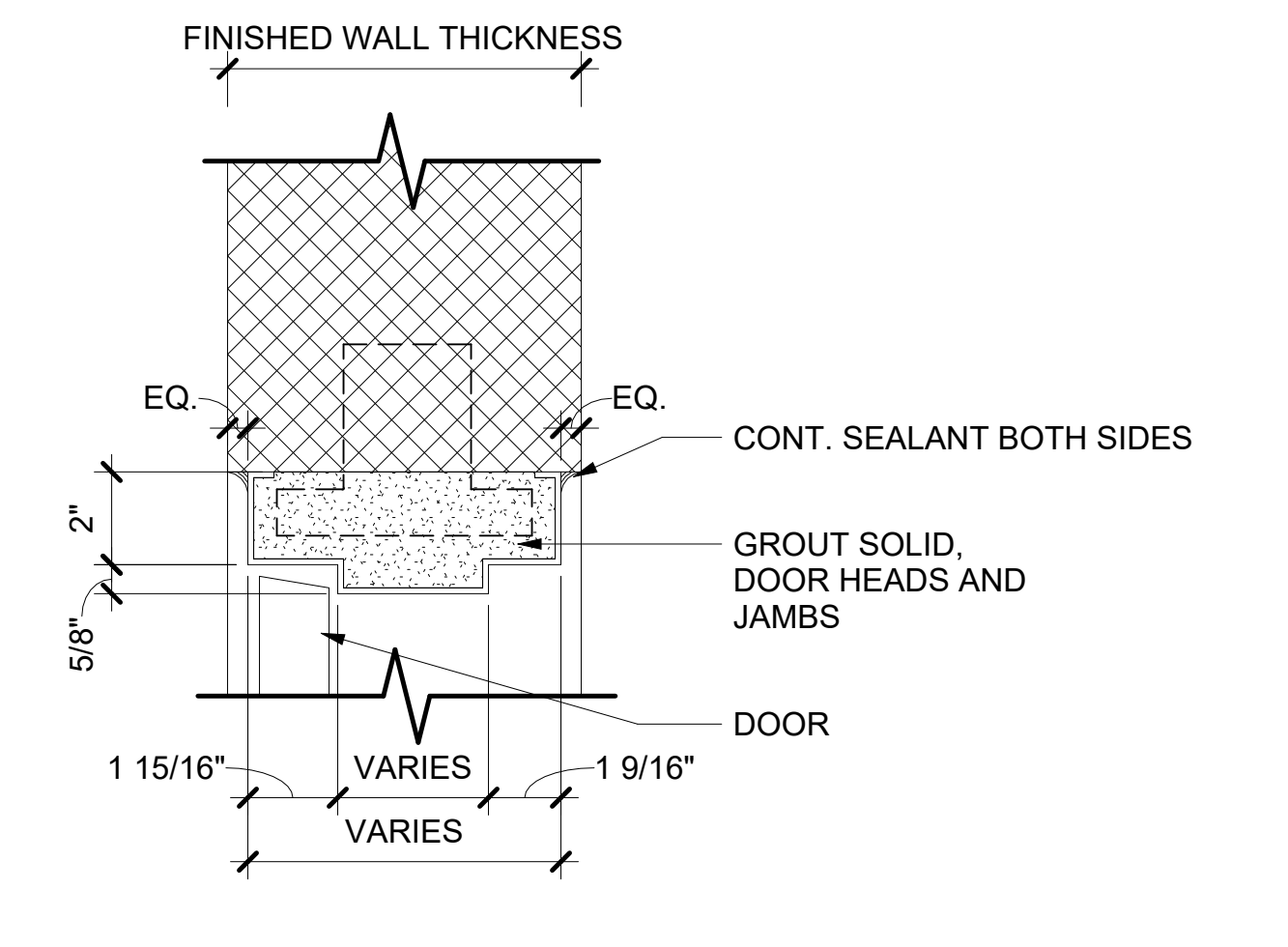
DOOR SCHEDULE SETS AND LEGEND

| MANUFACTURER LIST | | OPTION LIST | | FINISH LIST | |
|-------------------|--------------------------------|-------------|--|-------------|-----------------------------|
| CODE | NAME | CODE | DESCRIPTION | CODE | DESCRIPTION |
| BE | BEST ACCESS SYSTEMS | 26D | BEVELED 4 EDGES - KICK PLATES | 26D | SATIN CHROME |
| BY | BY RELATED SECTION | 600 | COUNTER SINKING OF KICK AND MOP PLATES | 600 | PRIMED FOR PAINTING |
| DM | DOMMA DOOR CONTROLS | 626 | DOUBLE VISUAL INDICATOR OPTION | 626 | SATIN CHROMIUM PLATED |
| NA | NATIONAL GUARD | 628E | | 628E | SATIN CHROME |
| PR | BEST PRECISION EXIT DEVICES | 630 | | 630 | SATIN STAINLESS STEEL |
| ST | BEST HINGES AND SLIDING TRIMCO | 630W | | 630W | STAINLESS STEEL WEATHERIZED |
| TR | | 689 | | 689 | ALUMINUM PAINTED |
| | | 710CU | | 710CU | CUVERRO STERALLOY |
| | | AL | | AL | ALUMINUM |
| | | GREY | | GREY | GREY |

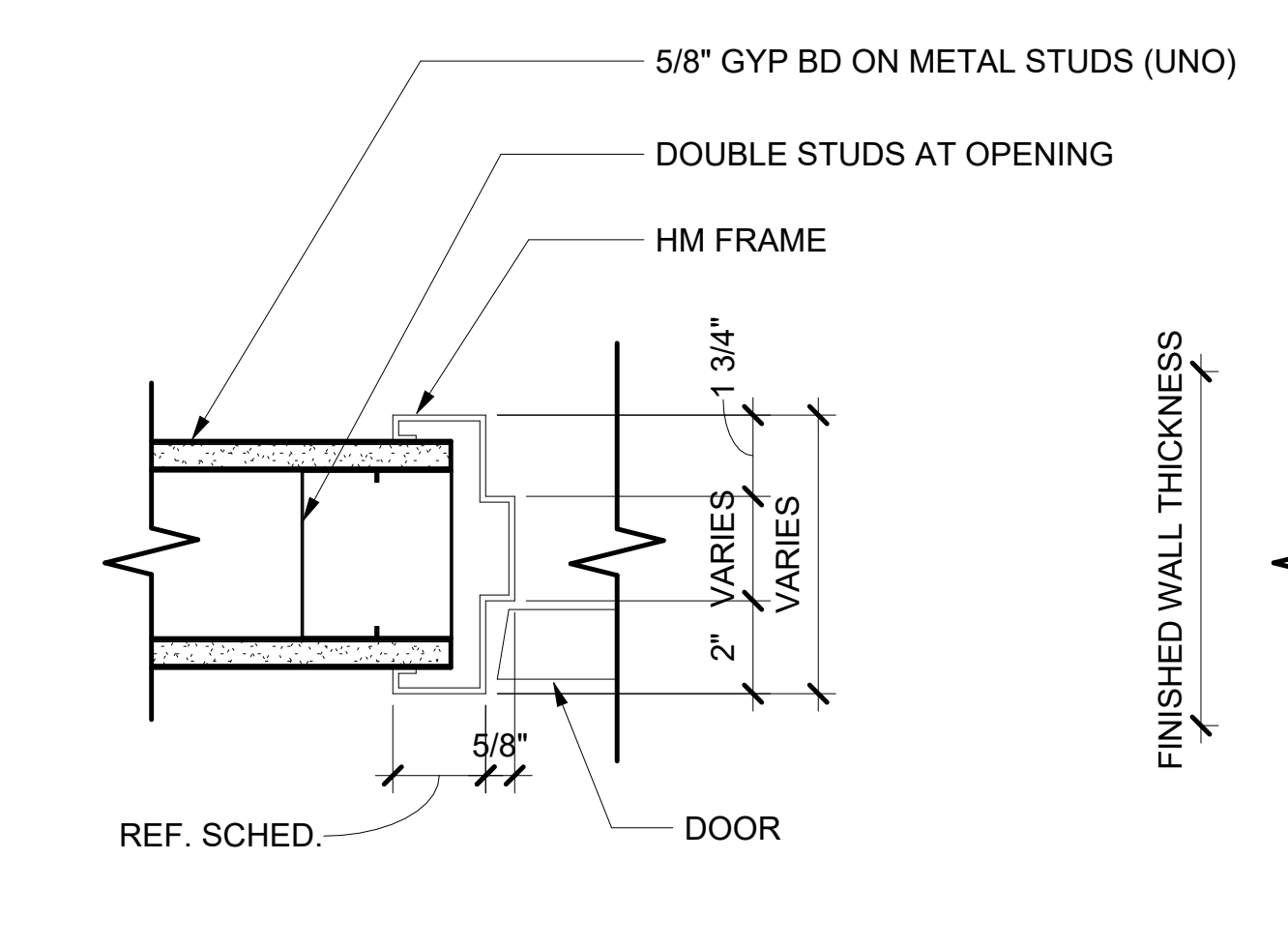
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|------------------------------------|----------------------------------|------|----|----------------------------------|------------------------|
| SET #01 - ALUM PR LIBRARY | | | | | |
| 2 CONTINUOUS HINGE | 661HD UL | AL | ST | CB199 4.5" X 4.5" | 630W |
| 1 SEMI-AUTO FLUSHBOLT | 3820 X 3810 | 630 | TR | 45H-7114H PATD VIB | 626 |
| 1 DUST PROOF STRIKE | 3910 | 630 | TR | TS9315 TH | 689 |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | KM050 10" X 34" B4E-HEAVY-KP CSK | 630 |
| 1 CLOSER/COORDINATOR | TS9315 GSR/PT | 689 | DM | 1270CV | 626 |
| 2 WALL BUMPER | 1270CV | 626 | TR | 5050C HEAD & JAMBS | NA |
| 1 GASKETING | BY ALUMINUM DOOR MANUFACTURER | BY | | | |
| SET #02 - ALUM PR GAME ROOM | | | | | |
| 2 CONTINUOUS HINGE | 661HD UL | AL | ST | CB199 4.5" X 4.5" | 630W |
| 1 SEMI-AUTO FLUSHBOLT | 3820 X 3810 | 630 | TR | 1894-4B | 710CU TR |
| 1 DUST PROOF STRIKE | 3910 | 630 | TR | TS9315 TH | 689 |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | KM050 10" X 34" B4E-HEAVY-KP CSK | 630 |
| 2 CLOSER/COORDINATOR | TS9315 GSR/PT | 689 | DM | 1270CV | 626 |
| 2 WALL BUMPER | 1270CV | 626 | TR | 5050C HEAD & JAMBS | NA |
| 1 GASKETING | BY ALUMINUM DOOR MANUFACTURER | BY | | | |
| SET #03 - ALUM STUDY ROOM | | | | | |
| 2 CONTINUOUS HINGE | 661HD UL | AL | ST | CB199 4.5" X 4.5" | 630W |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | 1894-4B | 710CU TR |
| 1 CLOSER | TS9315 T | 689 | DM | TS9315 TH | 689 |
| 1 WALL BUMPER | 1270CV | 626 | TR | KM050 10" X 34" B4E-HEAVY-KP CSK | 630 |
| 1 GASKETING | BY ALUMINUM DOOR MANUFACTURER | BY | | 1270CV | 626 |
| | | | | 5050C HEAD & JAMBS | NA |
| SET #04 - PR GYMNASIUM | | | | | |
| 2 CONTINUOUS HINGE | 662HD UL 83" | AL | ST | CB168 4.5" X 4.5" NRP | 26D |
| 1 REMOVABLE MULLION | KR822 | 600 | PR | 2101 X 4901 | 626 |
| 1 EXIT DEVICE | 2110V1 X V4908D | 630 | PR | 1E-74 PATD | 626 |
| 3 RIM CYLINDER | 12E-72 PATD | 626 | BE | ELECTROMAGNETIC LOCK | 28 |
| 1 CLOSER | EHD9016 FHD DA AVB | 689 | DM | CLOSER W/ STOP | 689 |
| 2 KICK PLATE | KM050 10" X 34" B4E-HEAVY-KP CSK | 630 | TR | 1 KICK PLATE | 630 |
| 2 WALL BUMPER | 1270CV | 626 | TR | 2 KICK PLATE | 630 |
| 1 GASKETING | 5050 C-20 20" | NA | TR | 1 GASKETING | 689 |
| 1 MULLION SEAL | 5100 S | NA | TR | 1 CLOSER W/ STOP | 689 |
| | | | | 1 KICK PLATE | 630 |
| SET #05 - PR STORAGE IIS | | | | | |
| 6 HINGES | CB179 4.5" X 4.5" | 26D | ST | 1E-74 PATD | 626 |
| 1 SEMI-AUTO FLUSHBOLT | 3825L X 3815L | 630 | TR | ELECTROMAGNETIC LOCK | 28 |
| 1 DUST PROOF STRIKE | 3910 | 630 | TR | ALL OTHER EXISTING HARDWARE | BY |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | EXISTING TO REMAIN | |
| 2 WALL BUMPER | 1270CV | 626 | TR | | |
| 1 OVERLAPPING ASTRAGAL | BY DOOR MANUFACTURER | BY | | | |
| 2 SILENCERS | 1229A | GREY | TR | | |
| SET #06 - PR CLOSET OIS | | | | | |
| 6 HINGES | CB179 4.5" X 4.5" NRP | 26D | ST | 662HD UL 83" CE-12R | AL |
| 1 SEMI-AUTO FLUSHBOLT | 3825L X 3815L | 630 | TR | 1 REMOVABLE MULLION | 600 |
| 1 DUST PROOF STRIKE | 3910 | 630 | TR | 1 RIM CYLINDER | 12E-72 PATD |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | 2 EXIT DEVICE | 630 |
| 1 OVERHEAD STOP | 712 F | 626E | DM | 2 MORTISE CYLINDER | 1E-74 PATD |
| 1 OVERLAPPING ASTRAGAL | BY DOOR MANUFACTURER | BY | | | |
| 2 SILENCERS | 1229A | GREY | TR | | |
| SET #07 - FITNESS | | | | | |
| 3 HINGES | CB168 4.5" X 4.5" NRP | 26D | ST | NOTE: FOR EXIT ALARM | |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | 2 CLOSER W/ STOP | 689 |
| 1 CLOSER | EHD9016 FHD DA AVB | 689 | DM | 2 KICK PLATE | 630 |
| 1 KICK PLATE | KM050 10" X 34" B4E-HEAVY-KP CSK | 630 | TR | 1 WEATHERSTRIP | 700 SA 1 X 72" 2 X 84" |
| 1 WALL BUMPER | 1270CV | 626 | TR | 1 MULLION SEAL | 5100 S |
| 1 GASKETING | 5050C HEAD & JAMBS | NA | TR | 2 DOOR SWEEP | CB99A 36" |
| | | | | 1 SADDLE THRESHOLD | 427 72" 1/4-20 SSMS/EA |
| SET #08 - OFFICE | | | | | |
| 3 HINGES | CB179 4.5" X 4.5" | 26D | ST | | |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | | |
| 1 WALL BUMPER | 1270CV | 626 | TR | | |
| 1 GASKETING | 5050C HEAD & JAMBS | NA | TR | | |
| SET #09 - CLOSET / STORAGE | | | | | |
| 3 HINGES | CB179 4.5" X 4.5" | 26D | ST | | |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | | |
| 1 WALL BUMPER | 1270CV | 626 | TR | | |
| 3 SILENCERS | 1229A | GREY | TR | | |
| SET #10 - CUSTODIAL | | | | | |
| 3 HINGES | CB199 4.5" X 4.5" | 630W | ST | | |
| 1 UNR LOCKSET | 45H-7UNR14 PATD | 626 | BE | | |
| 1 CLOSER W/ H.O. | TS9315 TH | 689 | DM | | |
| 1 KICK PLATE | KM050 10" X 34" B4E-HEAVY-KP CSK | 630 | TR | | |
| 1 MOP PLATE | 630 | 630 | TR | | |
| 1 WALL BUMPER | 1270CV | 626 | TR | | |
| 3 SILENCERS | 1229A | GREY | TR | | |



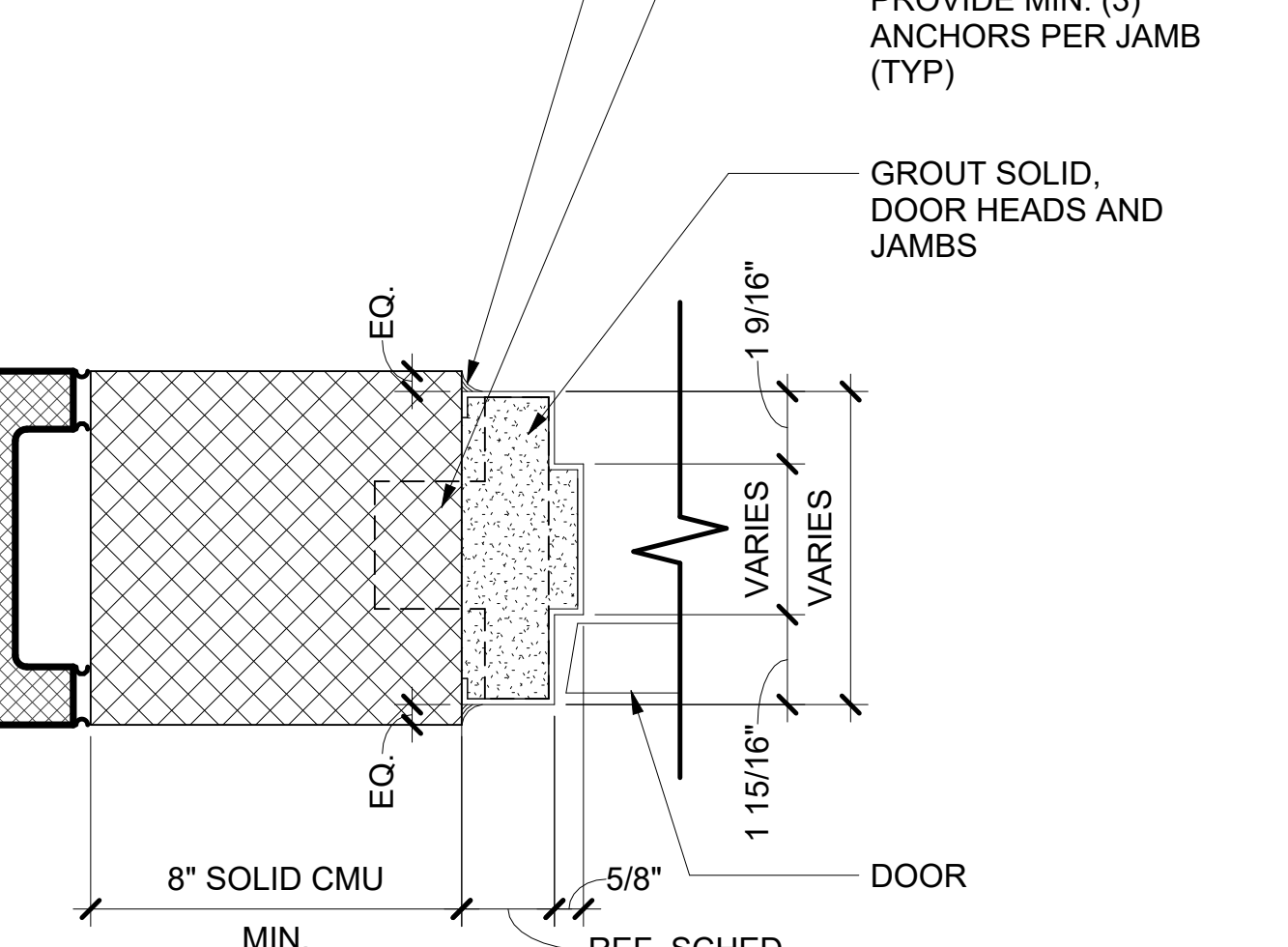
B3 INTERIOR HM FRAME HEAD (METAL STUD)
A-621 3" = 1'-0"



B1 INTERIOR HM FRAME HEAD (CMU)
A-621 3" = 1'-0"



A3 INTERIOR HM FRAME JAMB (METAL STUD)
A-621 3" = 1'-0"



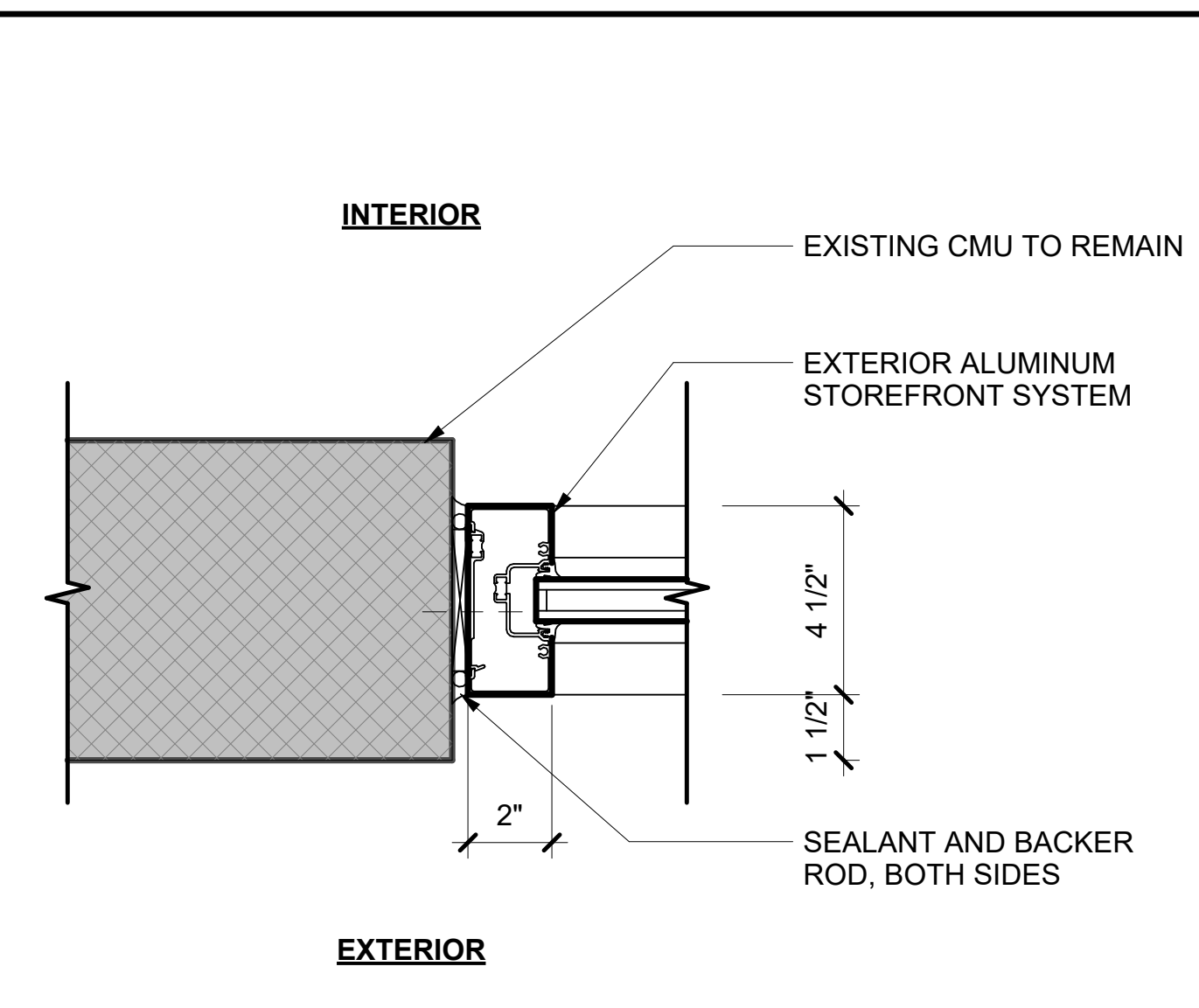
A1 INTERIOR HM FRAME JAMB (CMU)
A-621 3" = 1'-0"

GLAZING LEGEND

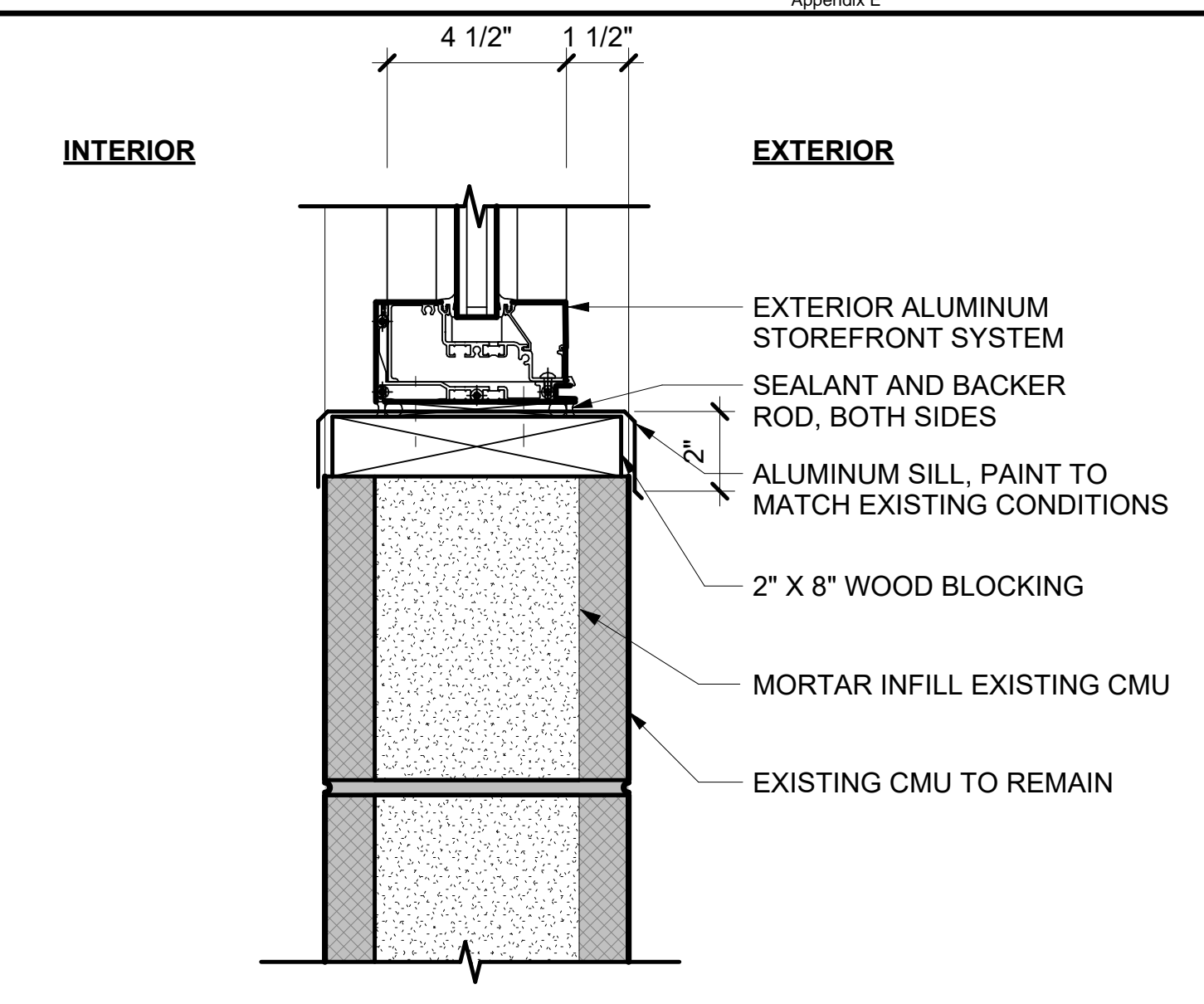
- T PROVIDE TEMPERED SAFETY GLAZING
- GL-2, TINTED GLAZING

GENERAL NOTES

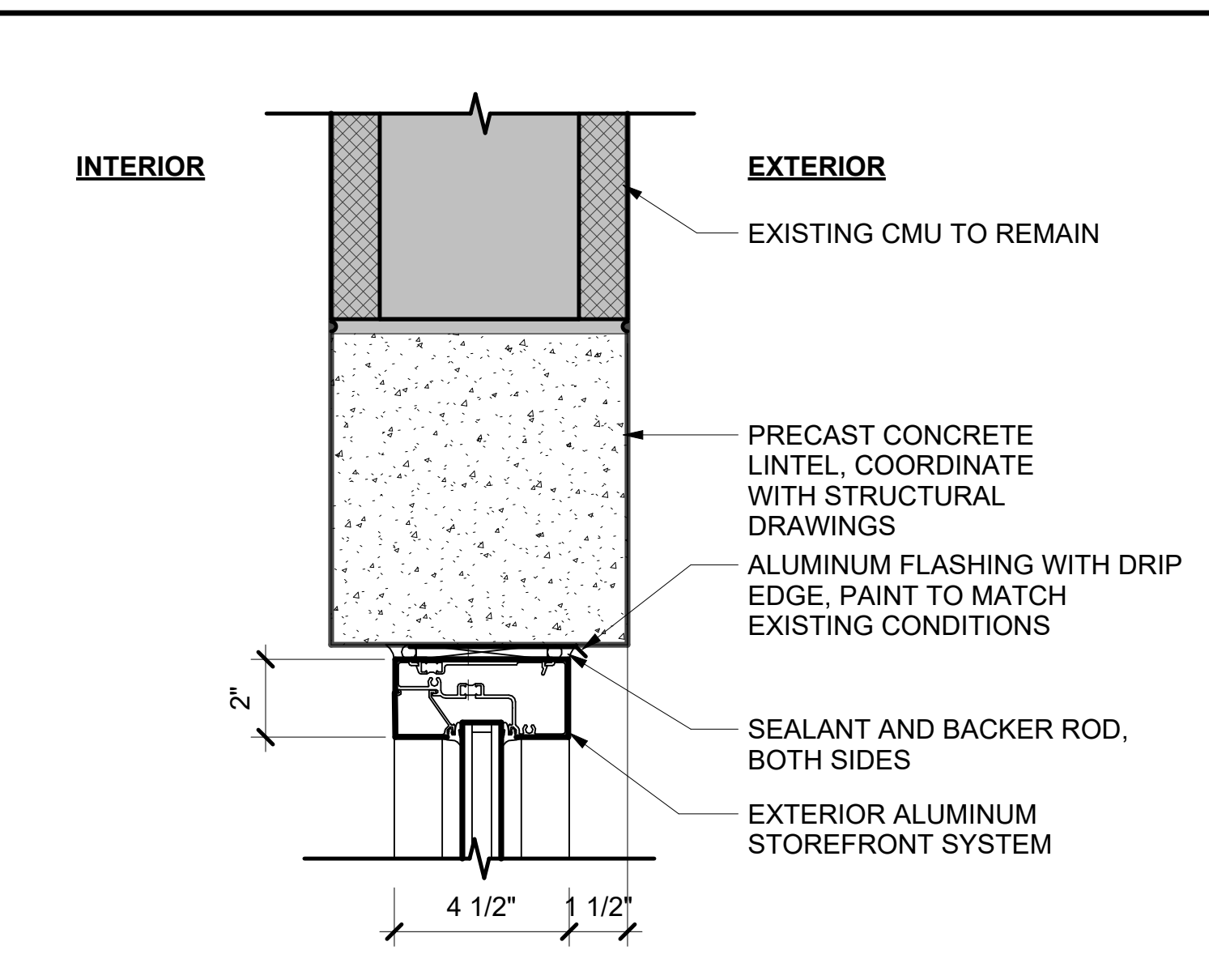
1. EXISTING EXTERIOR GLAZING IS TINTED. GC TO MATCH EXISTING EXTERIOR GLAZING. SUBMIT SAMPLES OF GLAZING TO ARCHITECT FOR REVIEW.
2. STOREFRONT FRAMES TO BE FACTORY FINISHED TO MATCH EXISTING CONDITIONS.



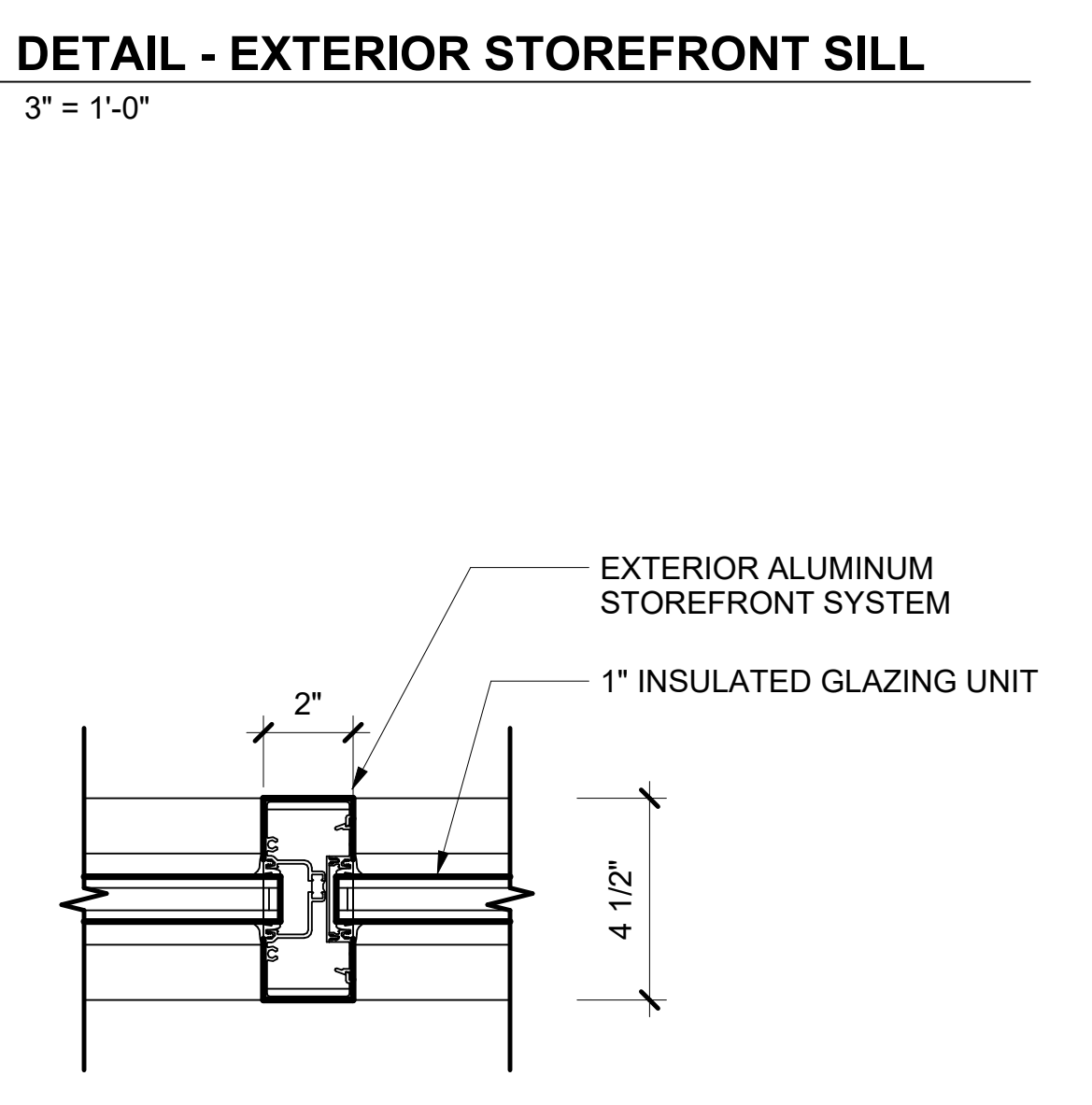
D4 DETAIL - EXTERIOR STOREFRONT JAMB
A-631 3" = 1'-0"



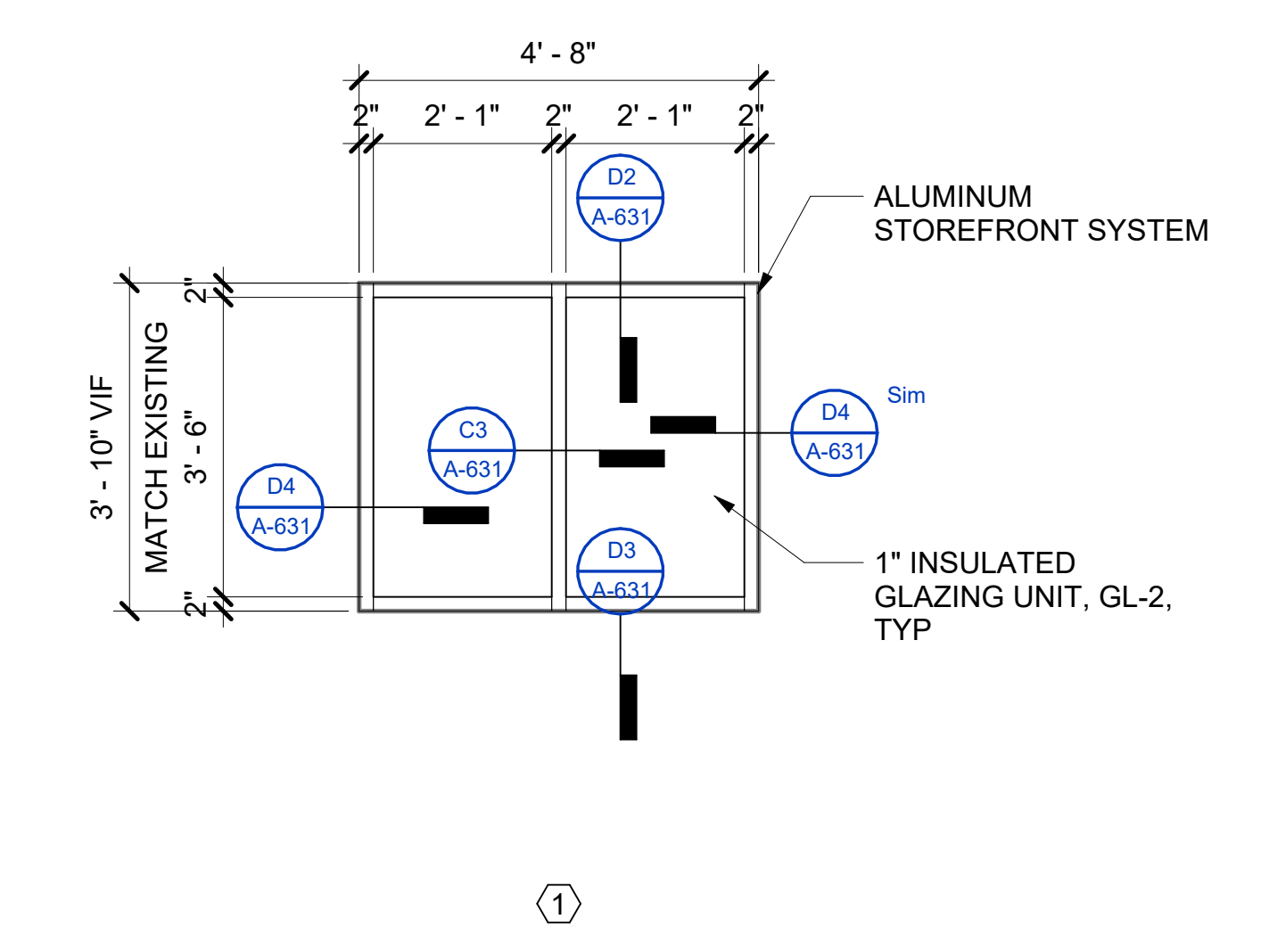
D3 DETAIL - EXTERIOR STOREFRONT SILL
A-631 3" = 1'-0"



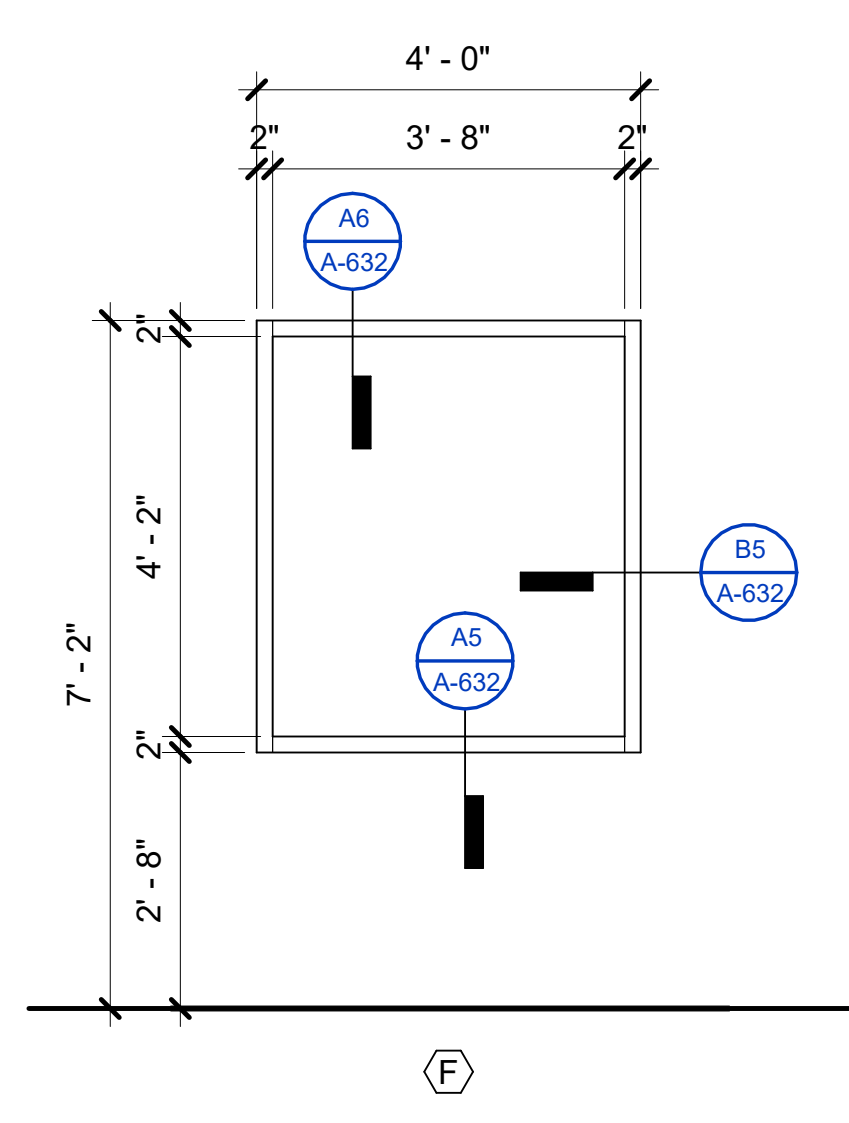
D2 DETAIL - EXTERIOR STOREFRONT HEAD
A-631 3" = 1'-0"



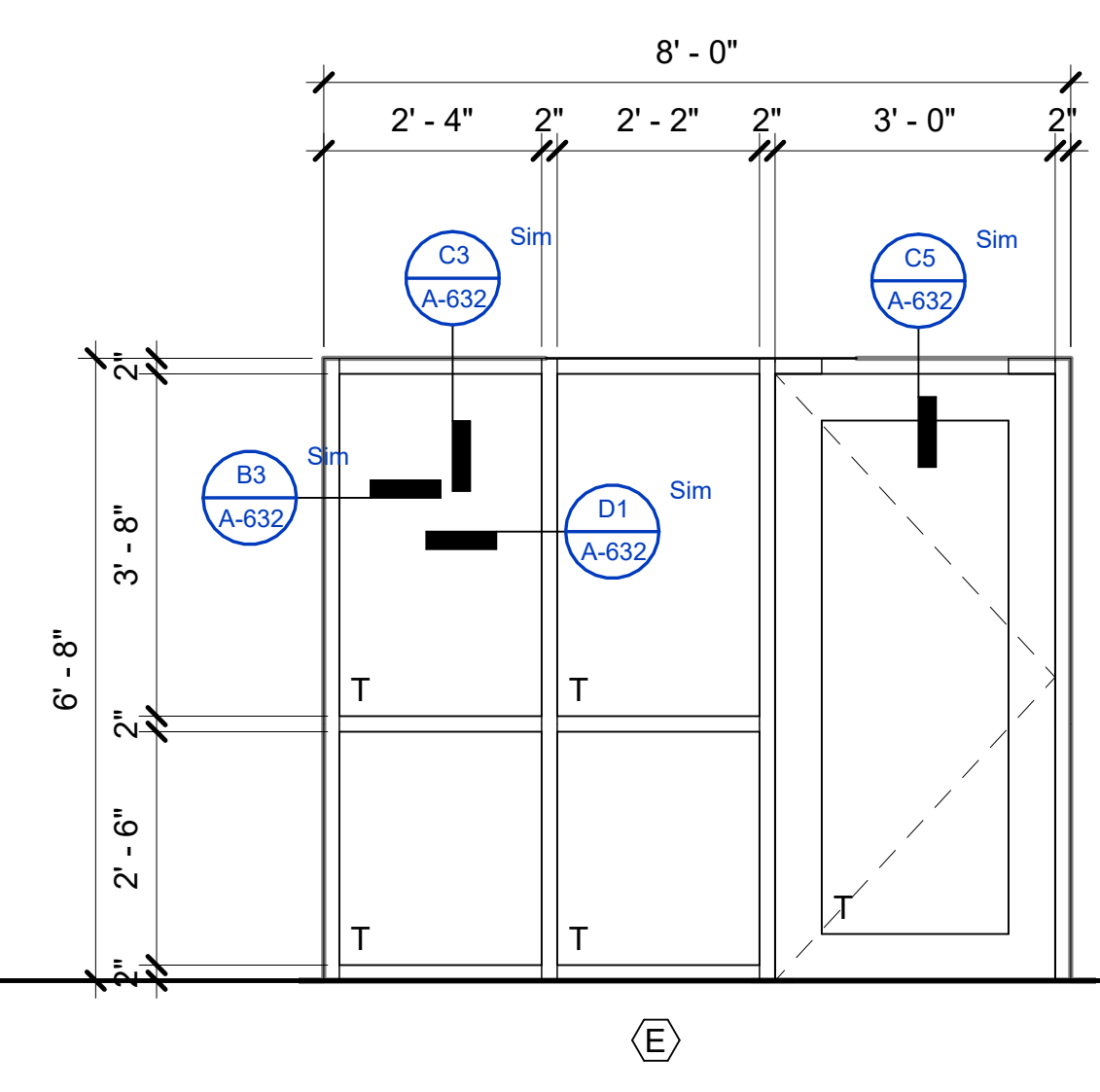
C3 DETAIL - EXTERIOR STOREFRONT MULLION
A-631 3" = 1'-0"



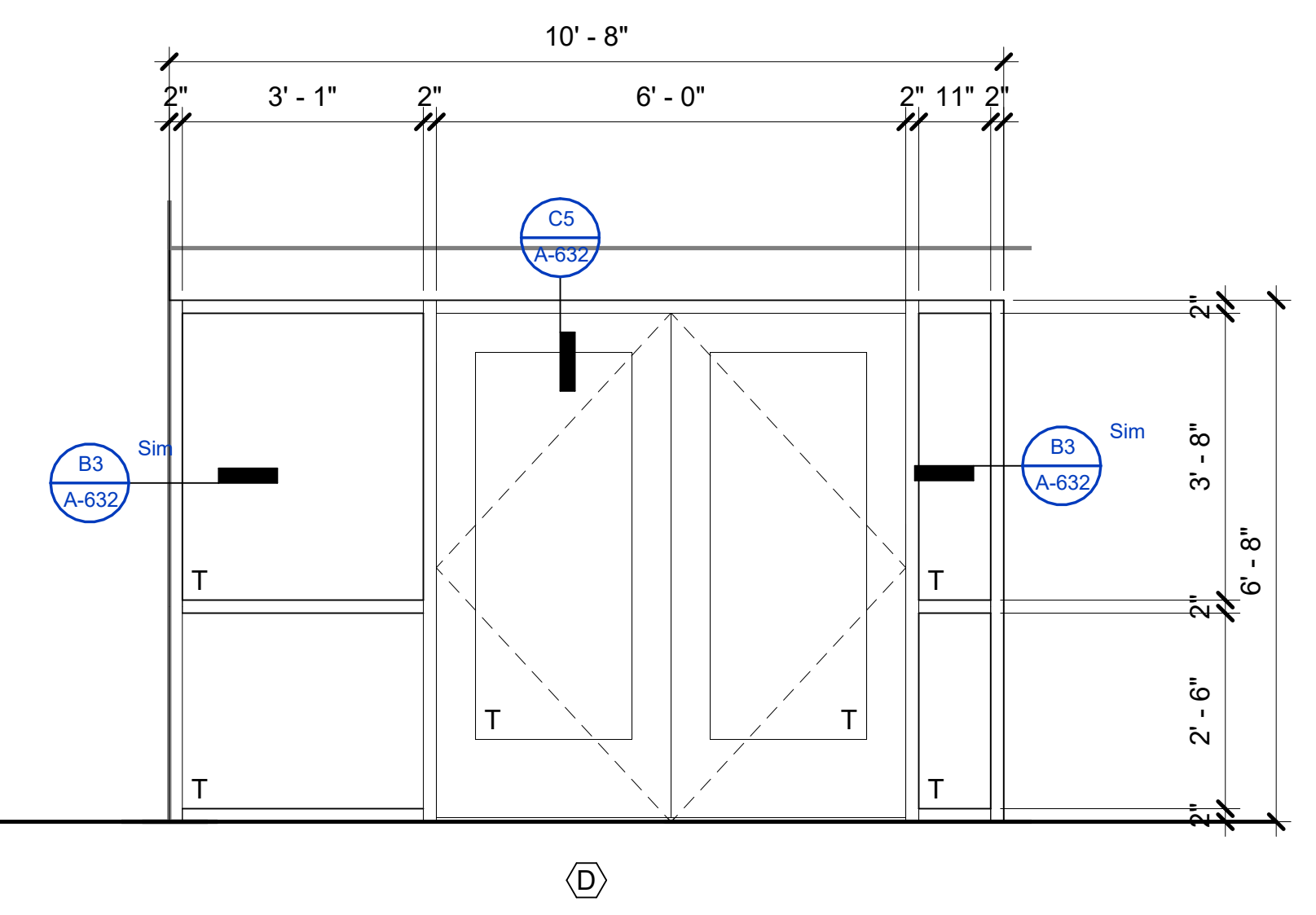
C2 EXTERIOR STOREFRONT ELEVATION
A-631 1/2" = 1'-0"



F

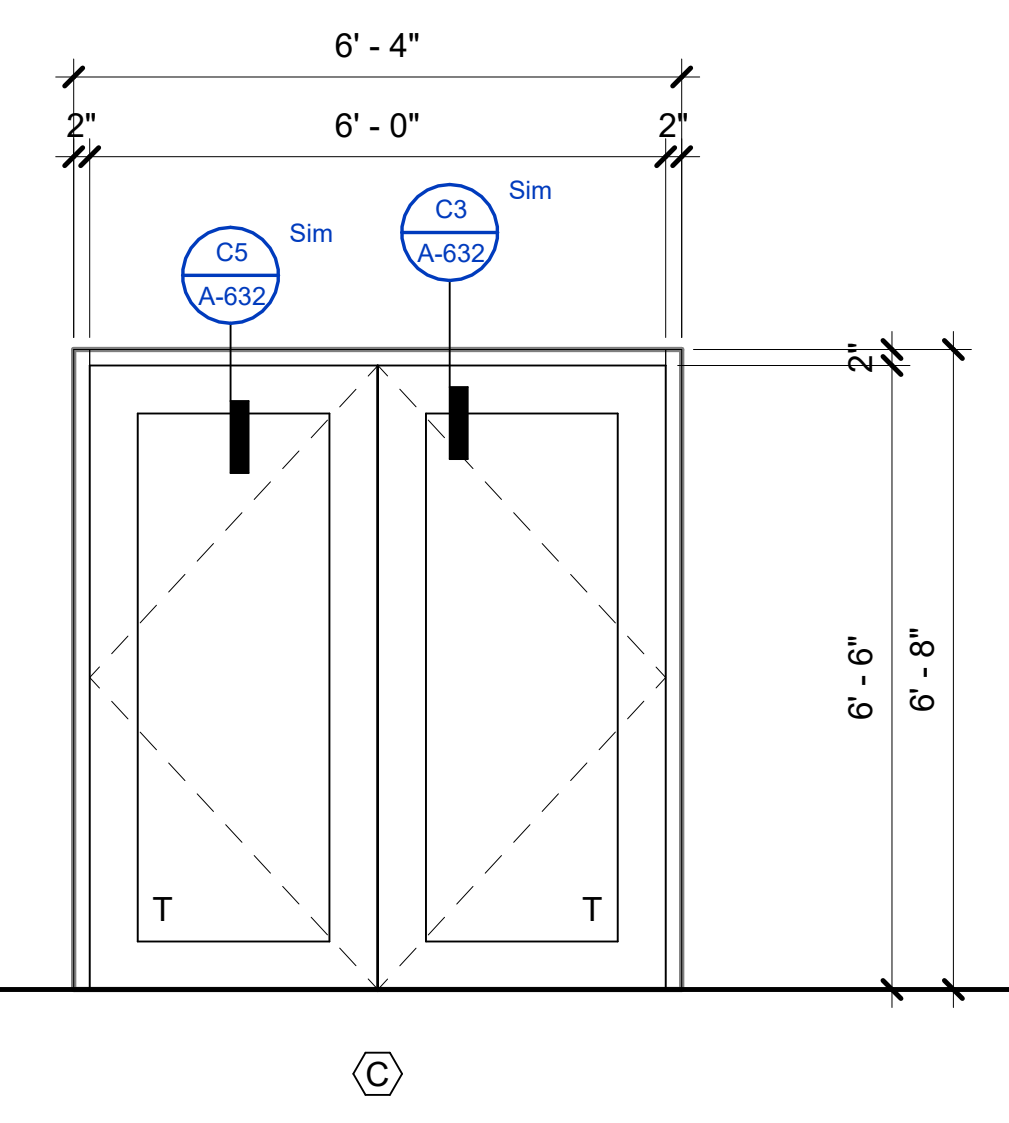


E

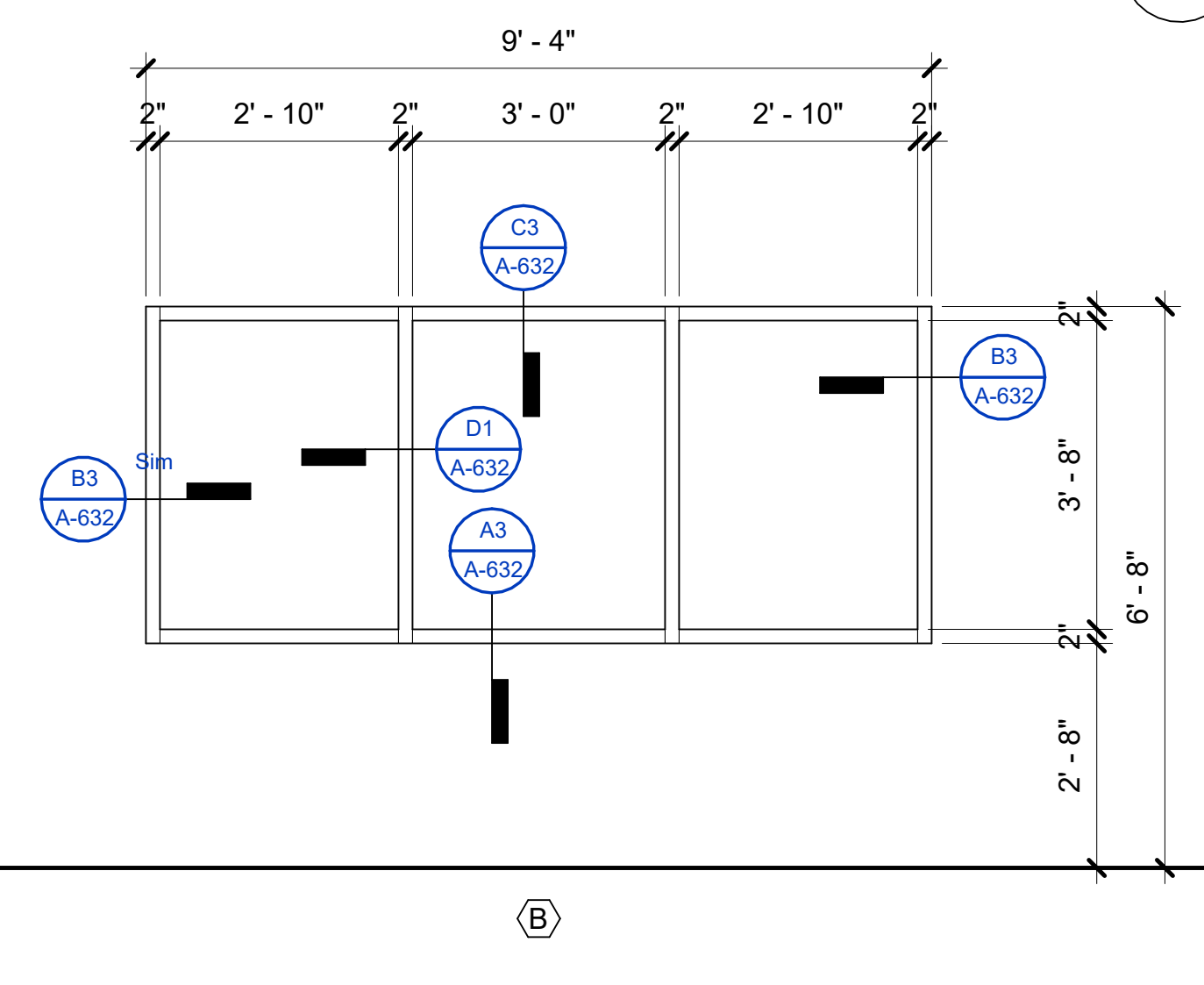


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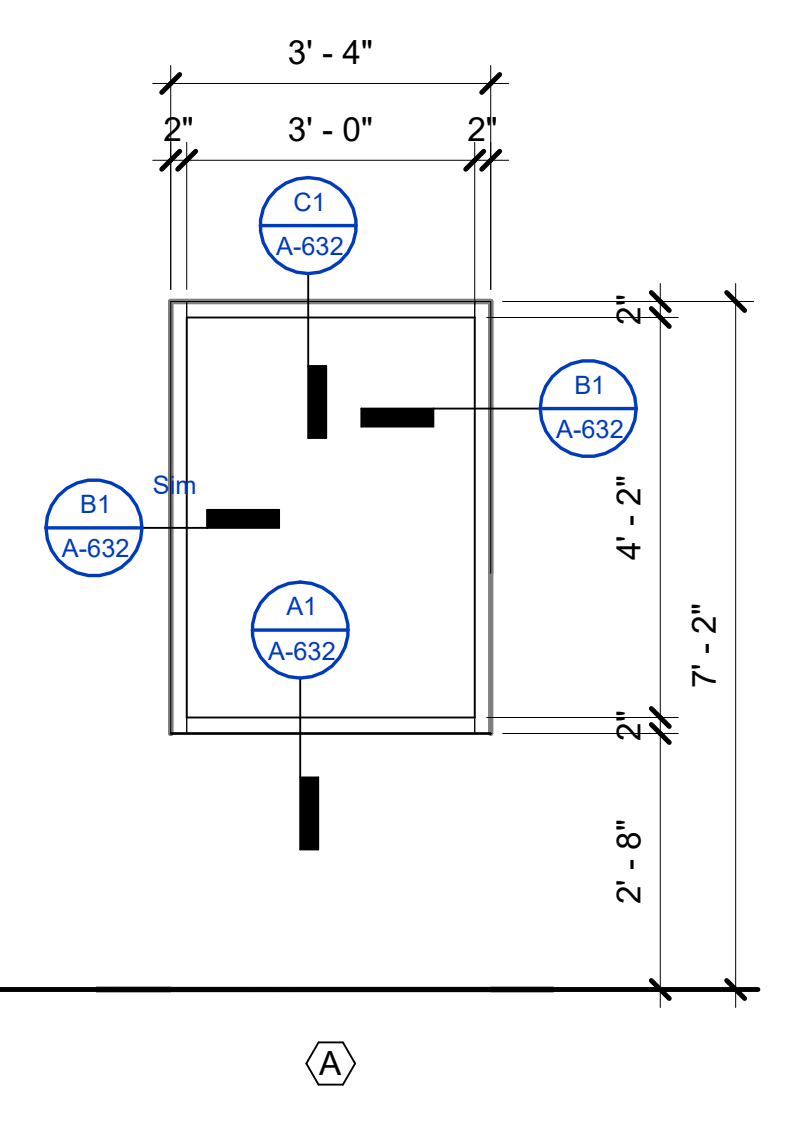
B2 INTERIOR STOREFRONT ELEVATION
A-631 1/2" = 1'-0"



C



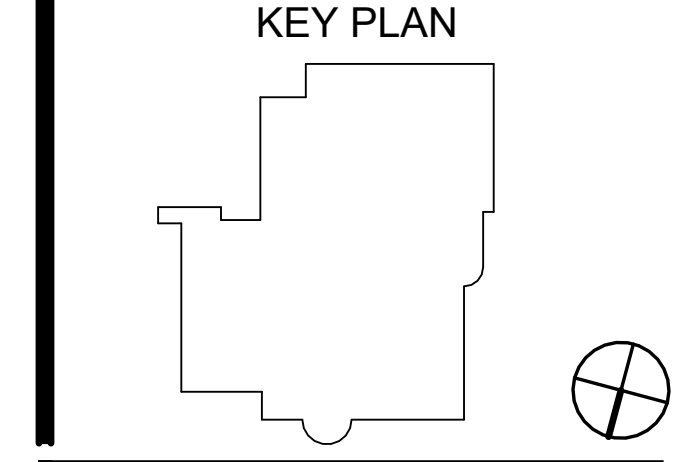
B



A

A2 INTERIOR STOREFRONT ELEVATIONS
A-631 1/2" = 1'-0"

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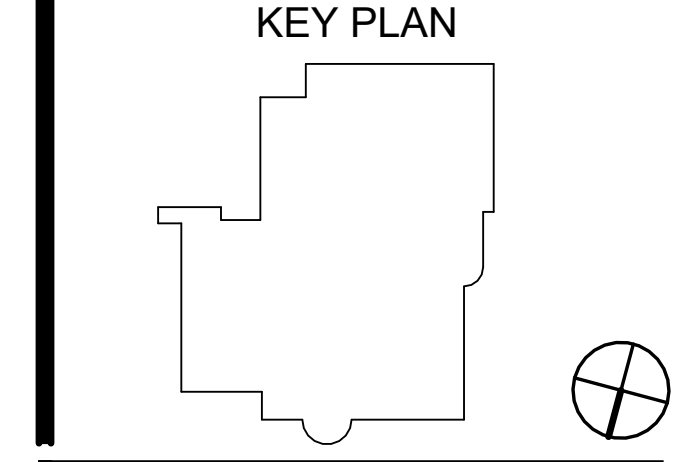
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**STOREFRONT
GLAZING ELEVATIONS**

A-631

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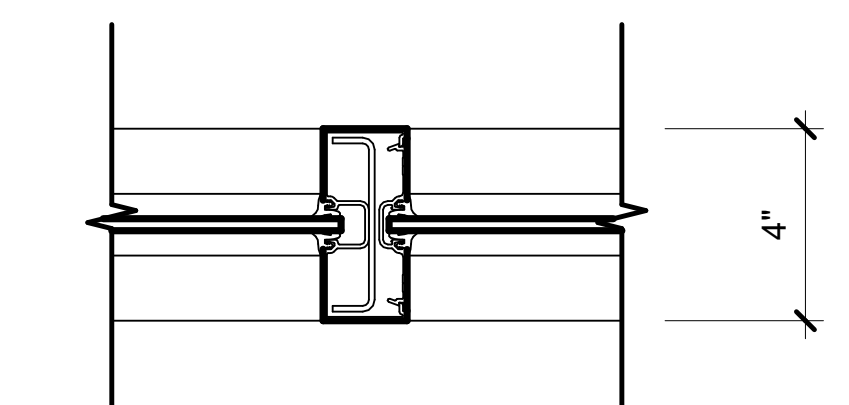
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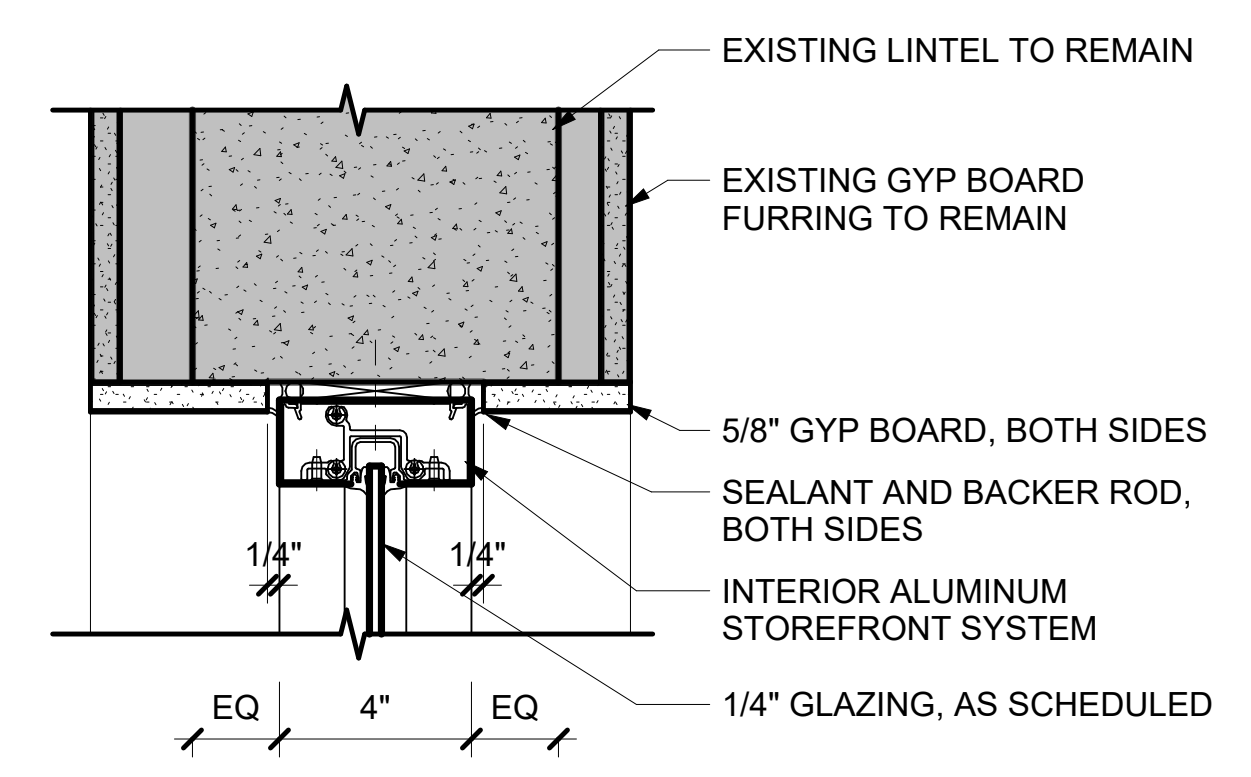
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**STOREFRONT
 GLAZING DETAILS**

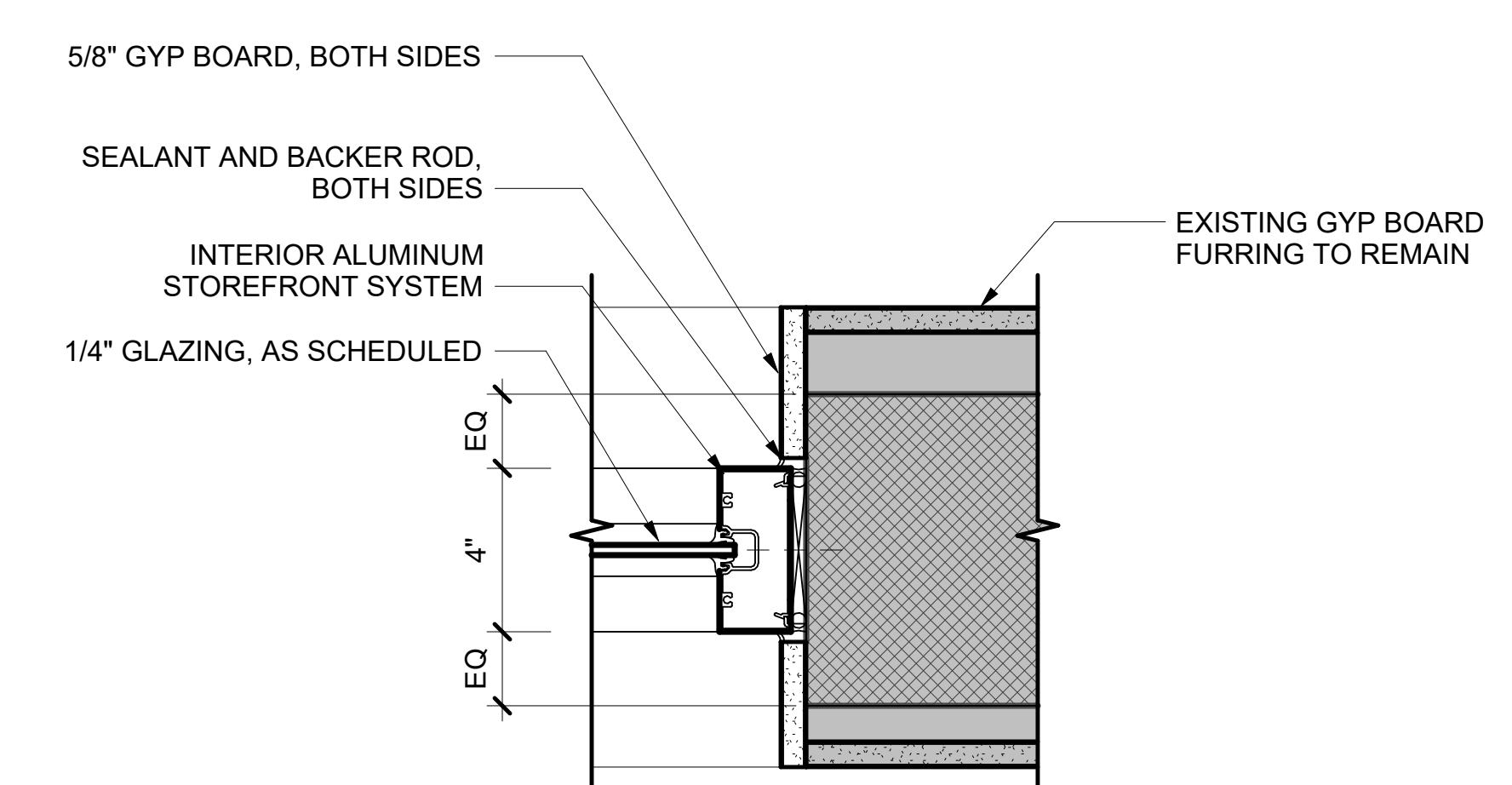
A-632



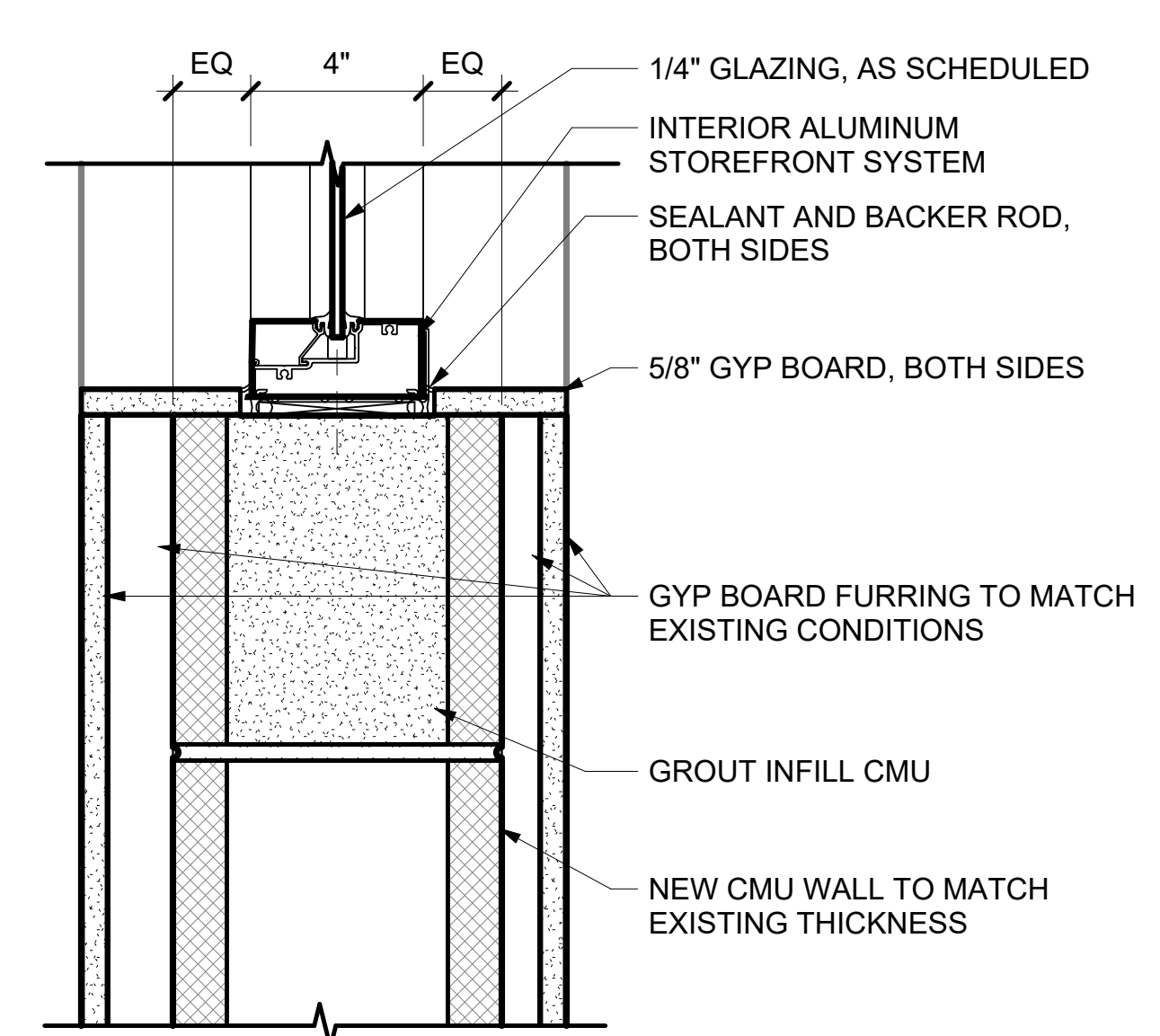
D1 DETAIL - INTERIOR STOREFRONT
 A-632 3" = 1'-0"



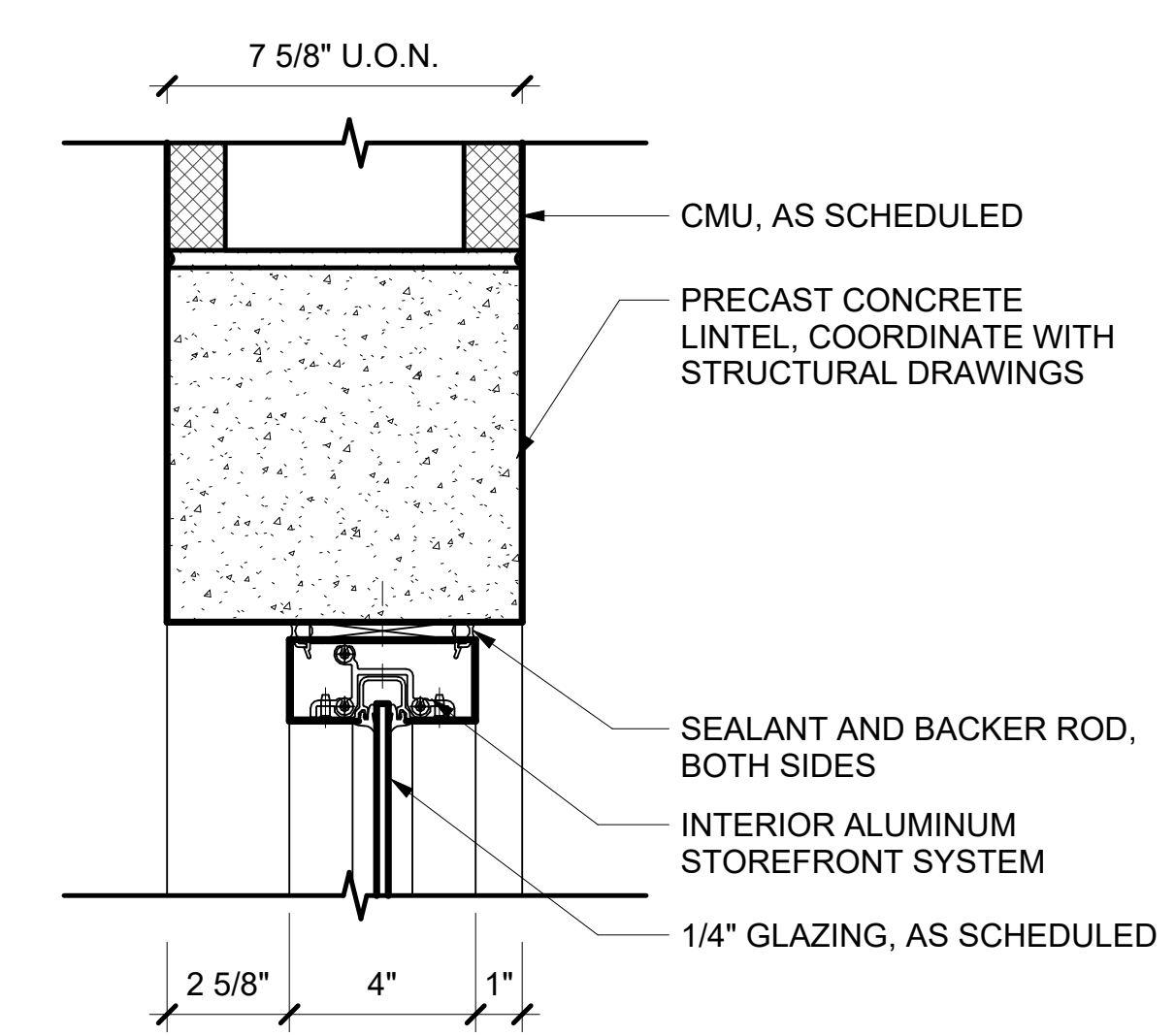
C1 DETAIL - INTERIOR STOREFRONT HEAD
 A-632 3" = 1'-0"



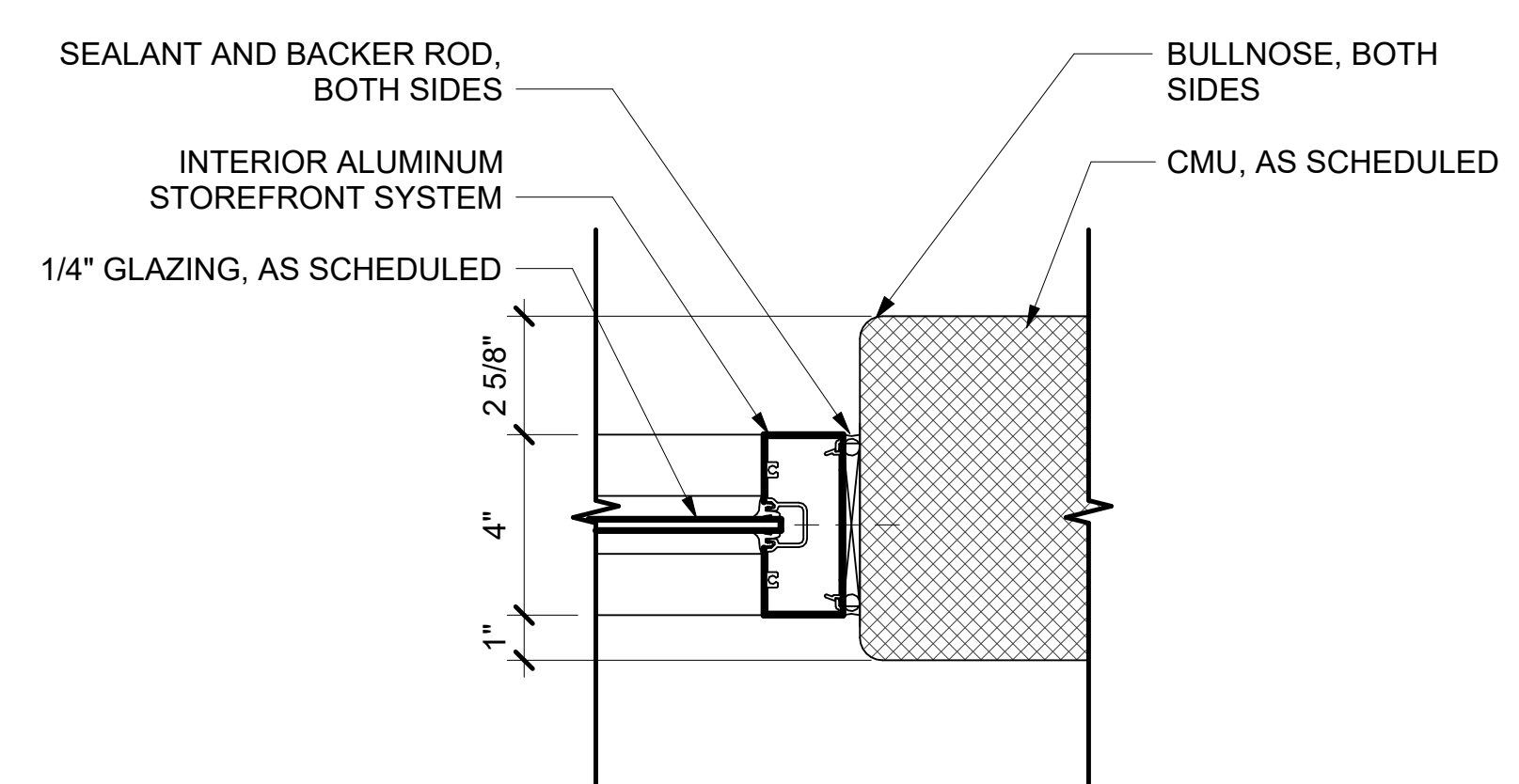
B1 DETAIL - INTERIOR STOREFRONT JAMB
 A-632 3" = 1'-0"



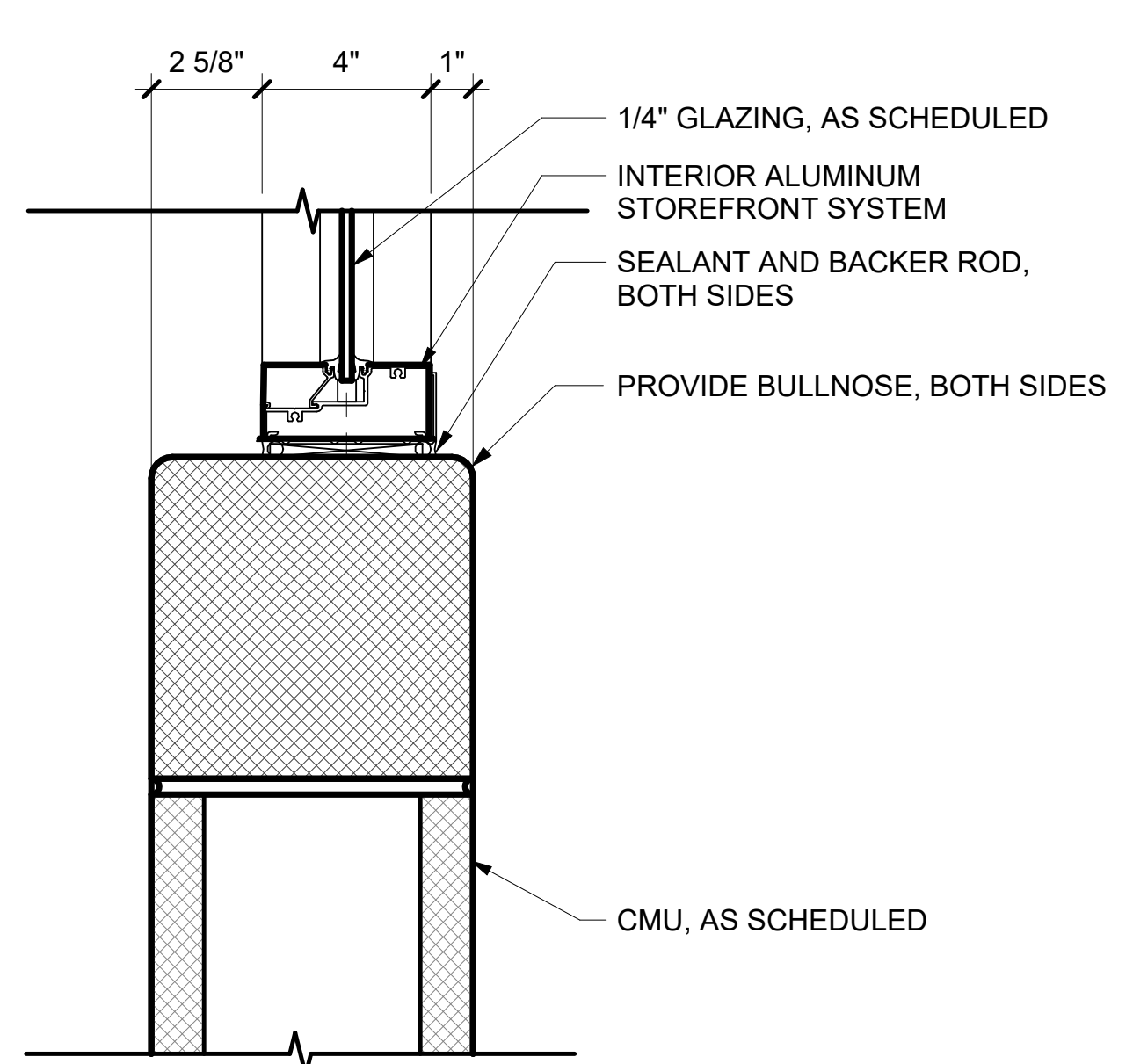
A1 DETAIL - INTERIOR STOREFRONT SILL
 A-632 3" = 1'-0"



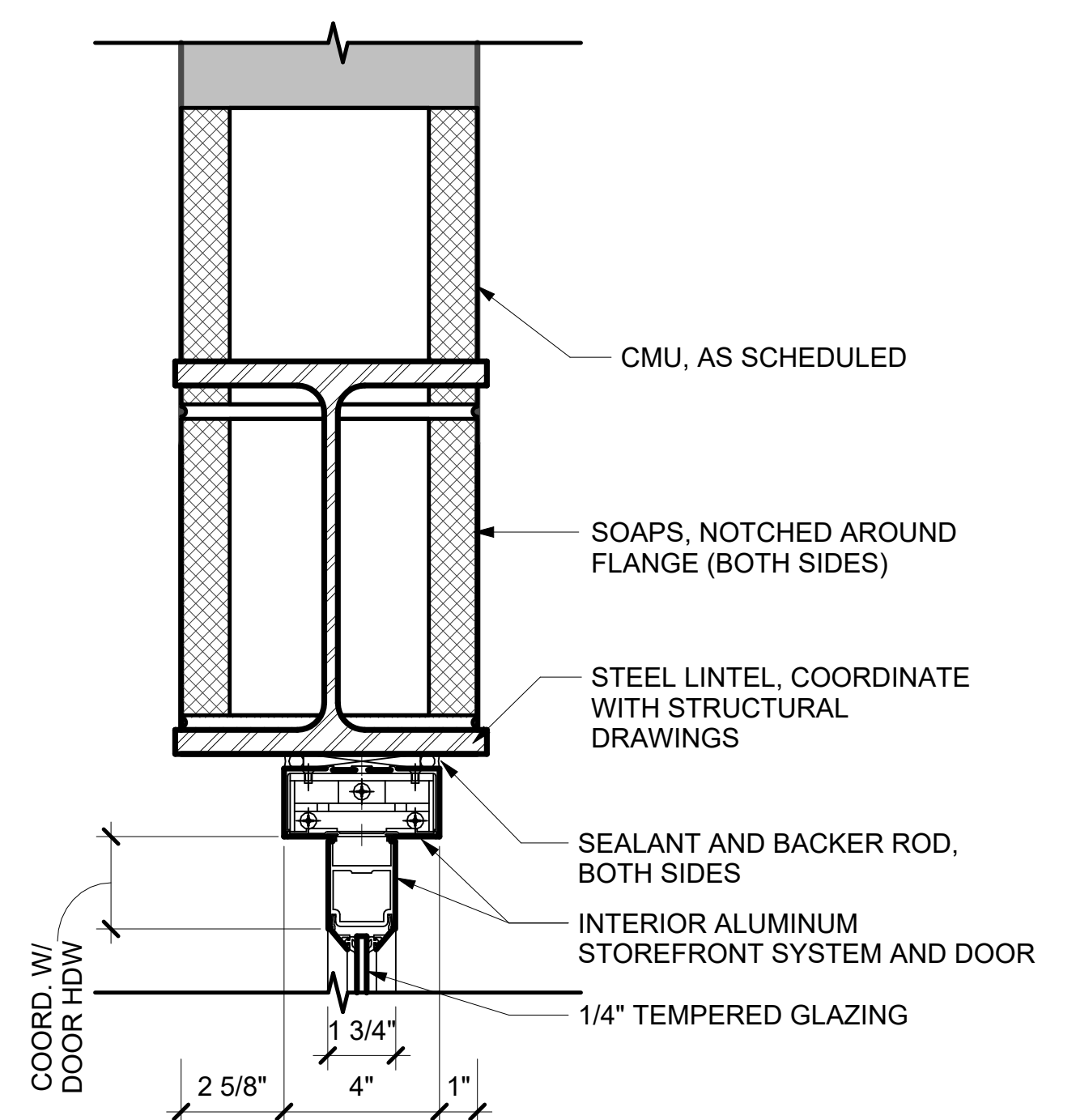
C3 DETAIL - INTERIOR STOREFRONT HEAD (CMU)
 A-632 3" = 1'-0"



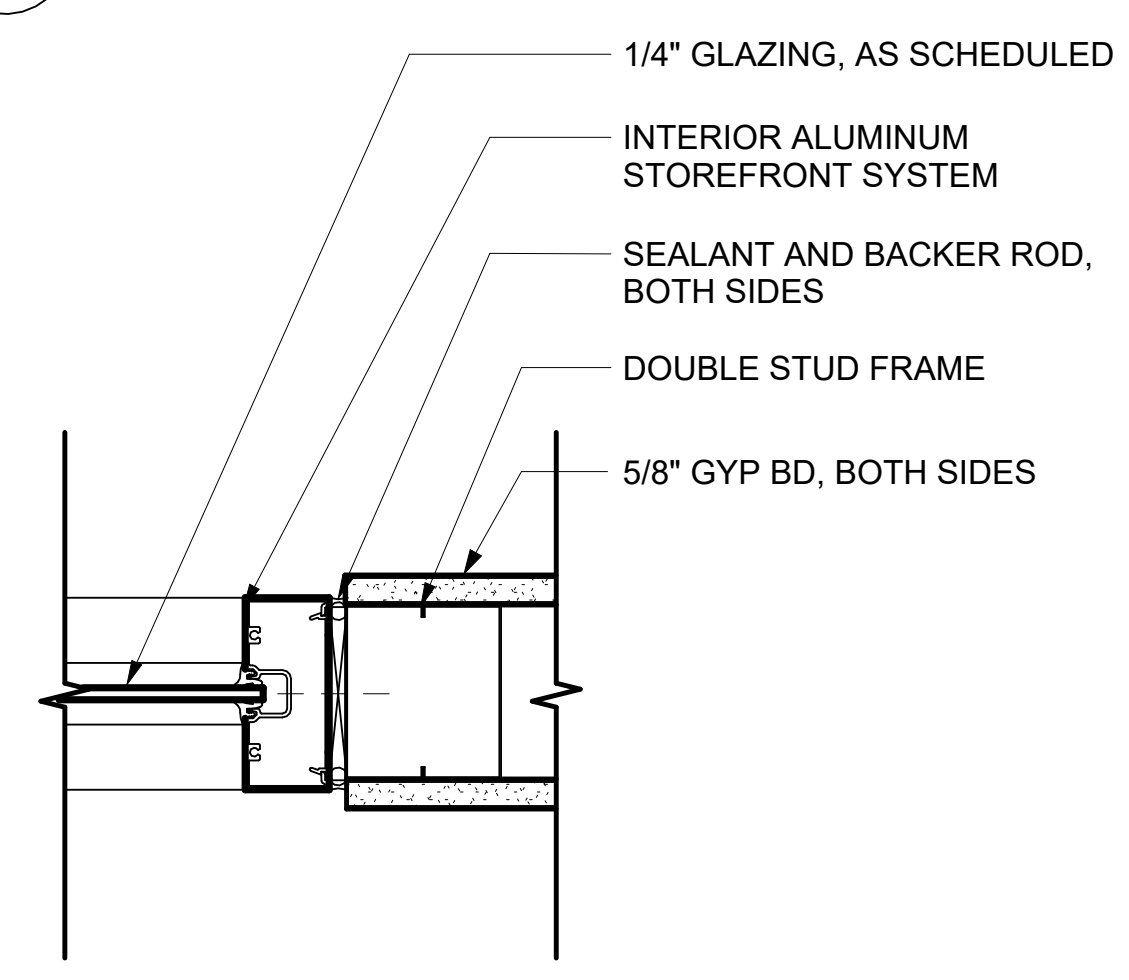
B3 DETAIL - INTERIOR STOREFRONT JAMB (CMU)
 A-632 3" = 1'-0"



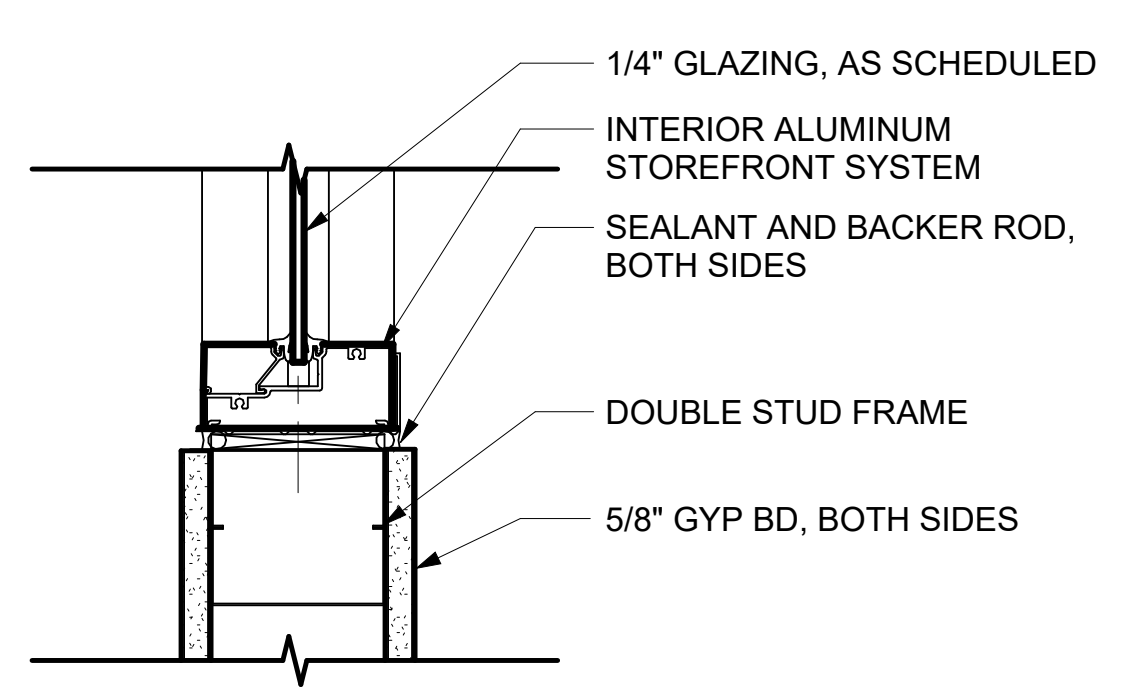
A3 DETAIL - INTERIOR STOREFRONT SILL (CMU)
 A-632 3" = 1'-0"



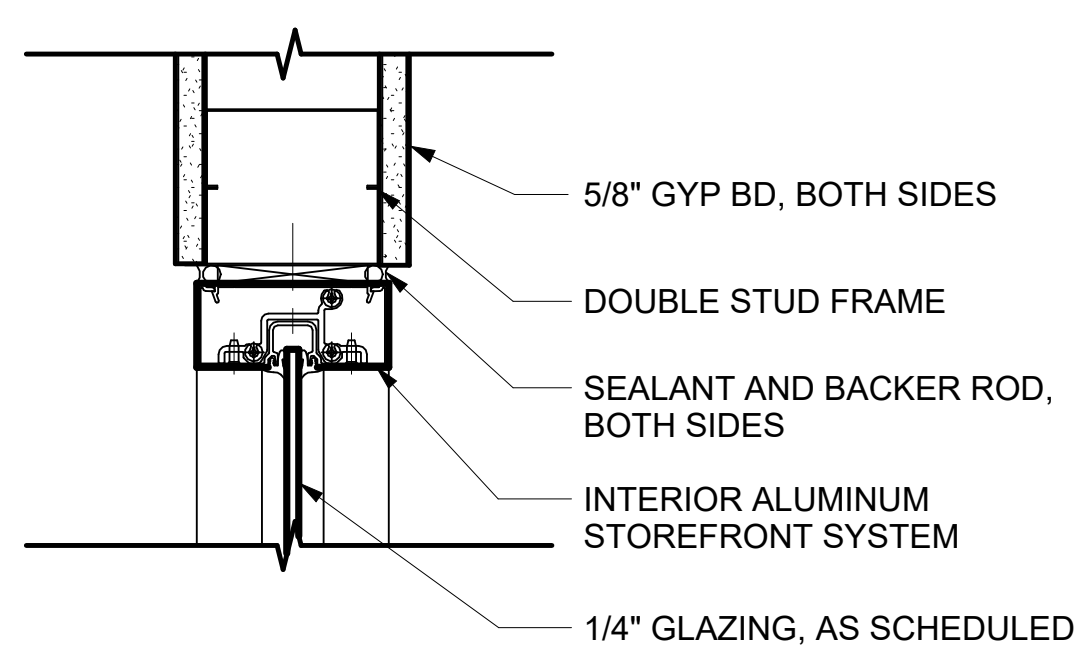
C5 DETAIL - INTERIOR STOREFRONT HEAD
 A-632 3" = 1'-0"



B5 INTERIOR STOREFRONT JAMB (STUD)
 A-632 3" = 1'-0"

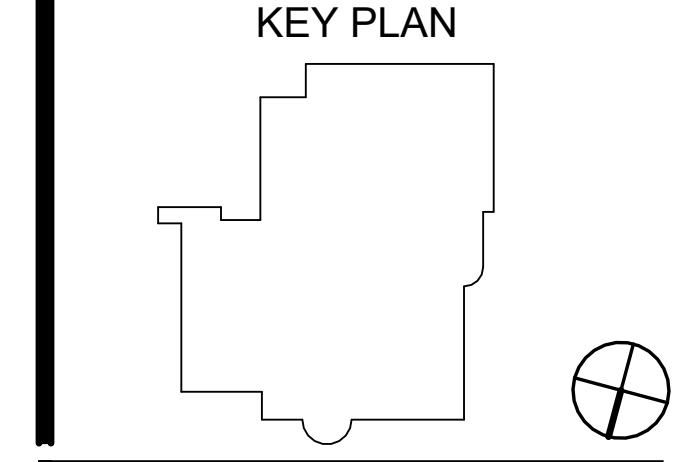


A5 INTERIOR STOREFRONT SILL (STUD)
 A-632 3" = 1'-0"



A6 INTERIOR STOREFRONT HEAD (STUD)
 A-632 3" = 1'-0"

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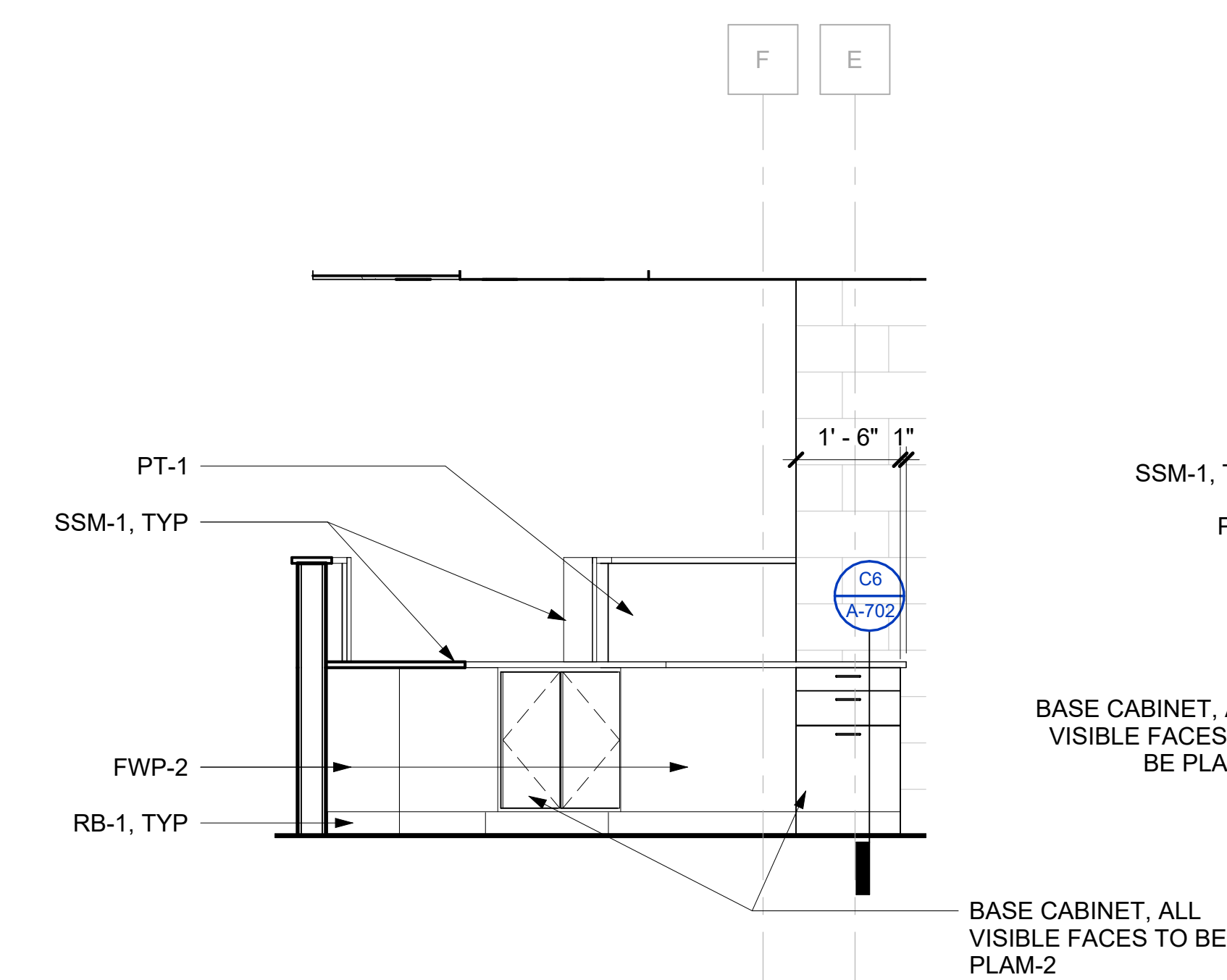
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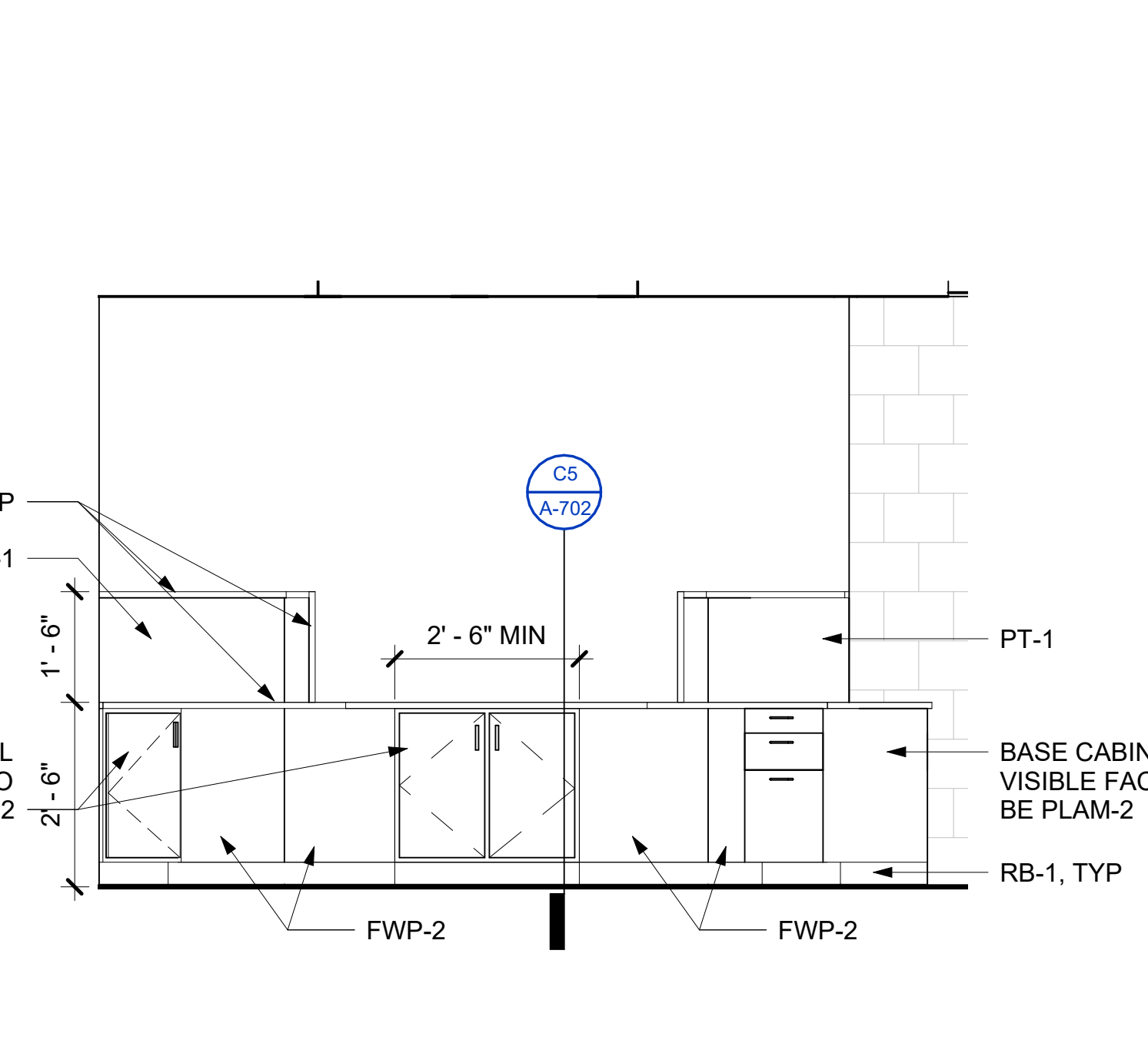
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MILLWORK

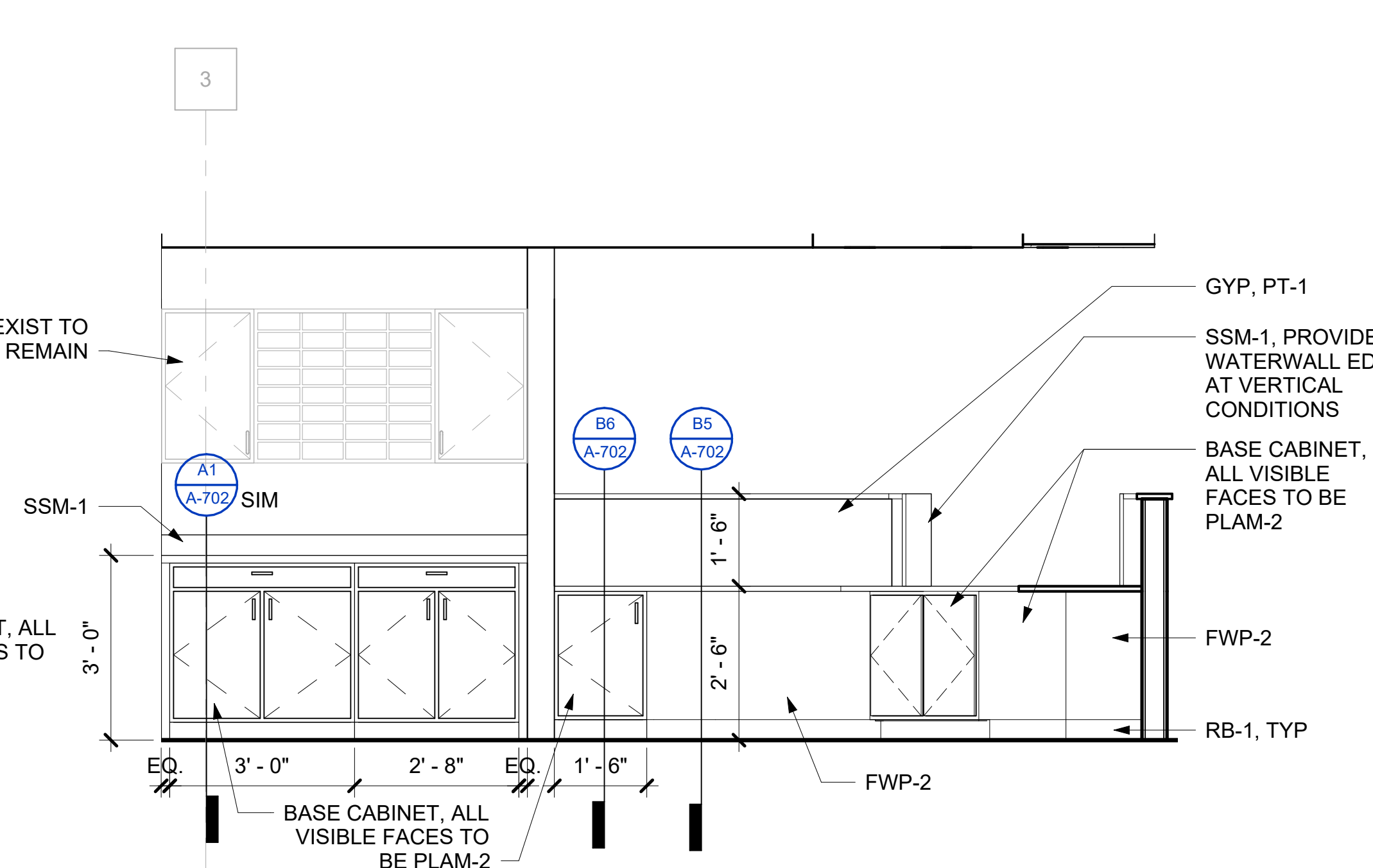
A-701



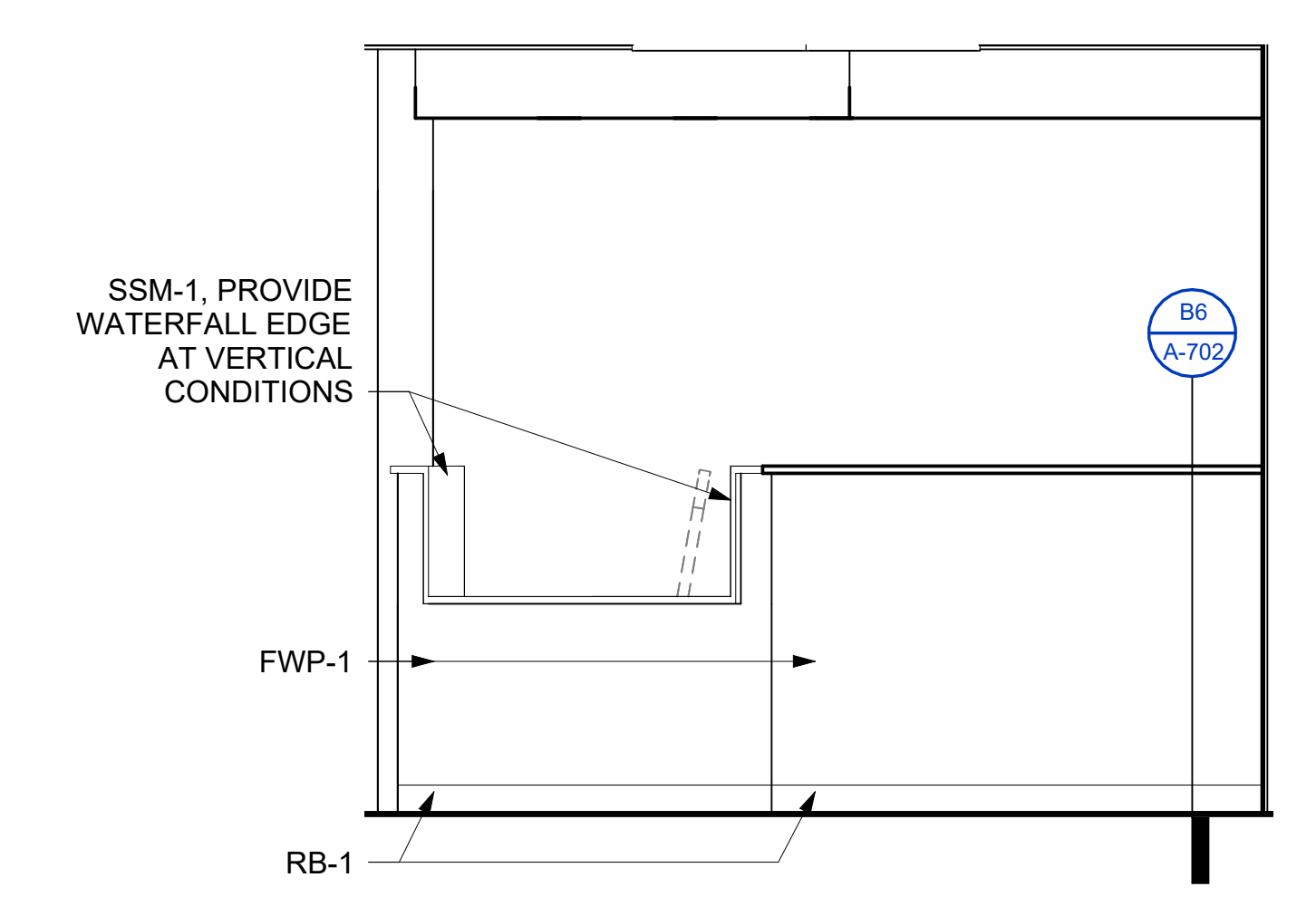
C5 MILLWORK ELEVATION - RECEPTION INTERIOR RIGHT
 A-701 1/2" = 1'-0"



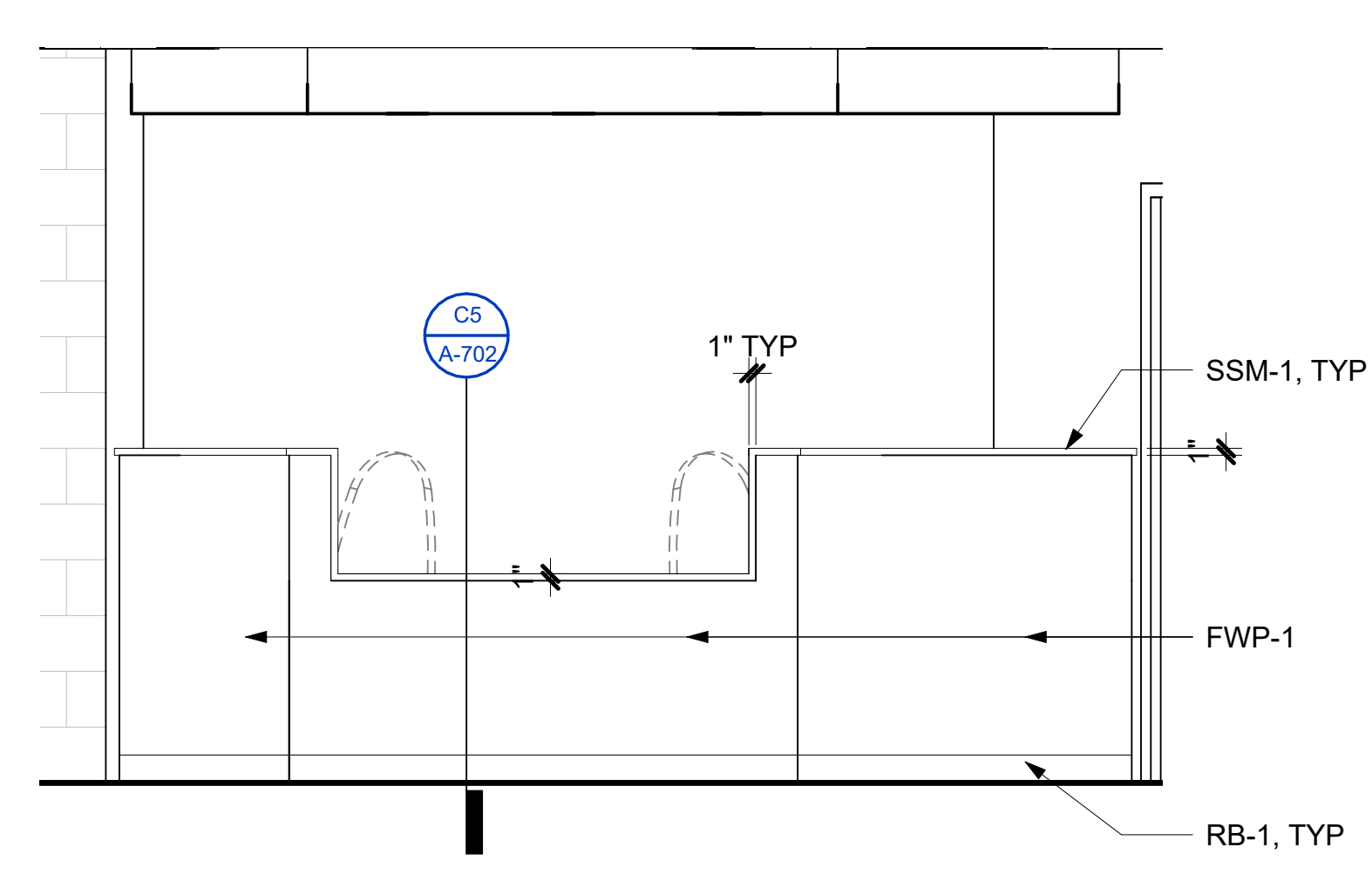
C4 MILLWORK ELEVATION - RECEPTION INTERIOR CENTER
 A-701 1/2" = 1'-0"



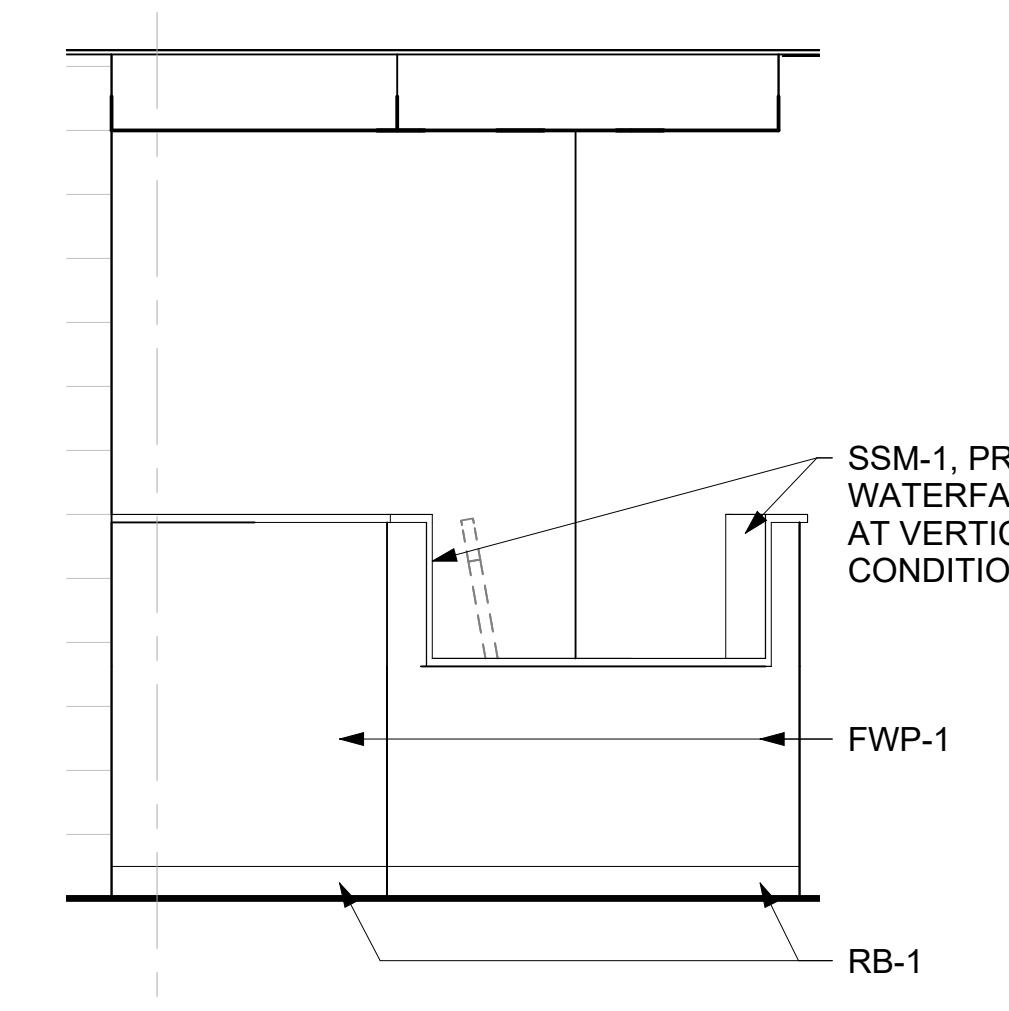
C3 MILLWORK ELEVATION - RECEPTION INTERIOR LEFT
 A-701 1/2" = 1'-0"



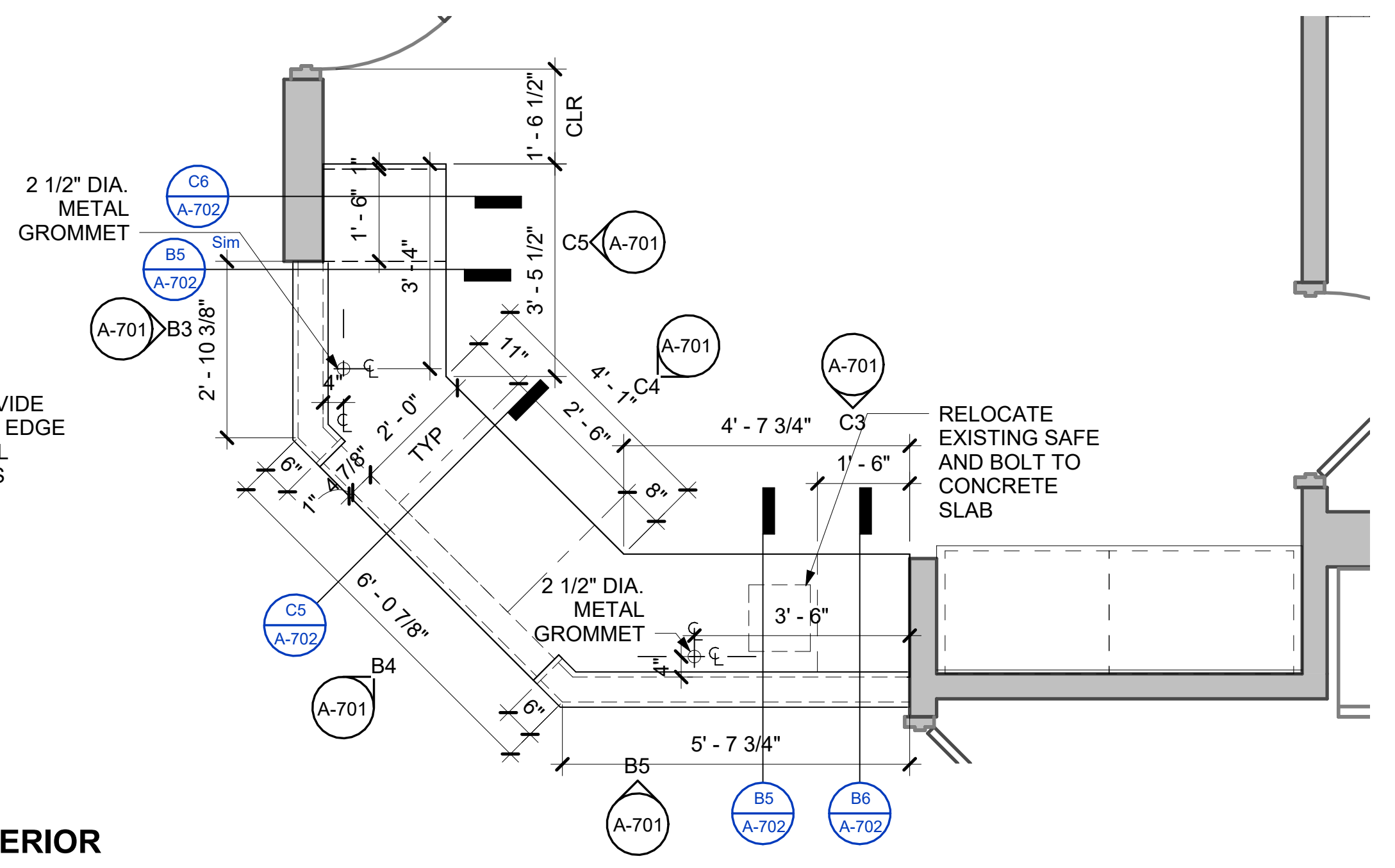
B5 MILLWORK ELEVATION - RECEPTION EXTERIOR RIGHT
 A-701 1/2" = 1'-0"



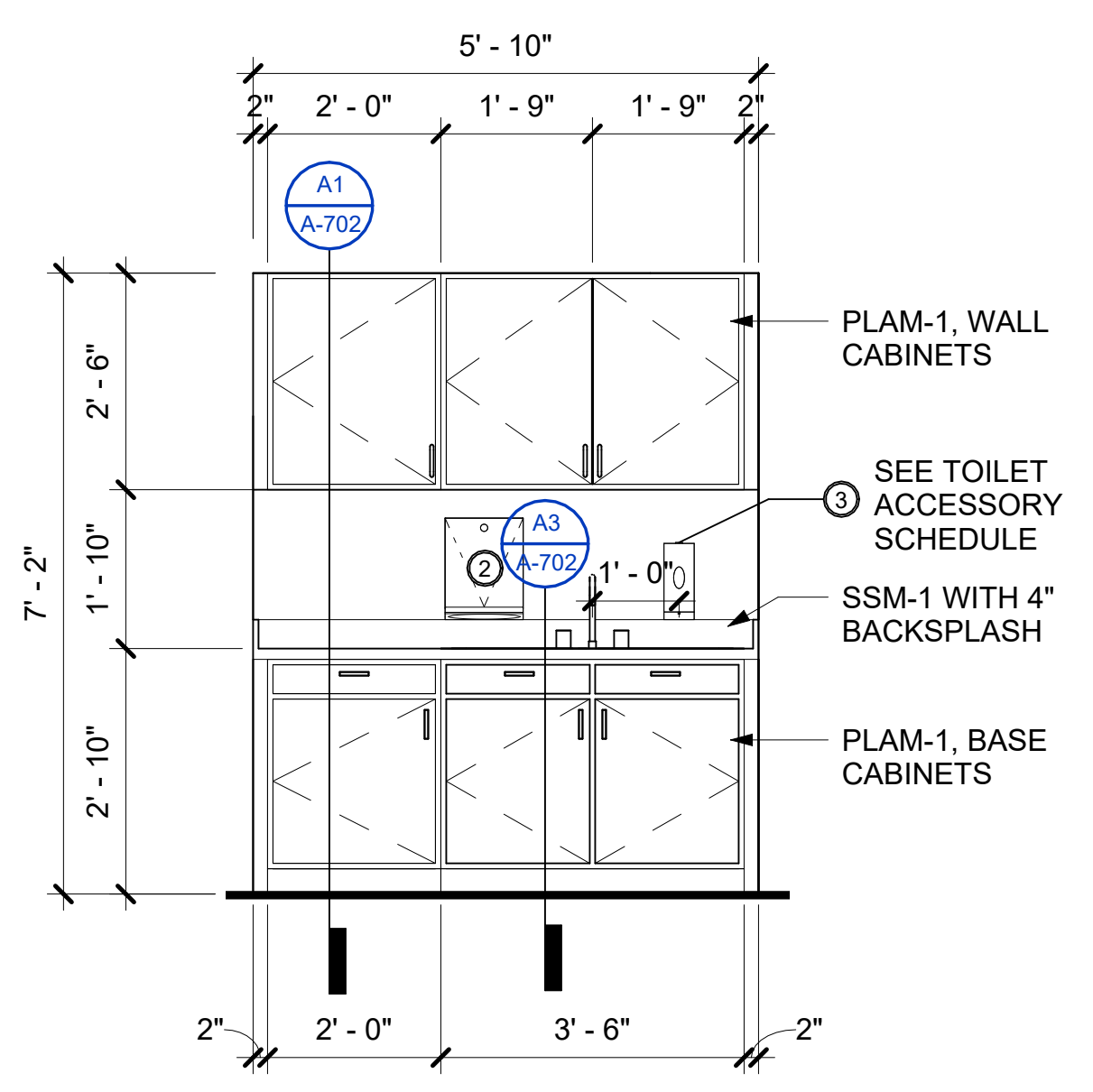
B4 MILLWORK ELEVATION - RECEPTION EXTERIOR CENTER
 A-701 1/2" = 1'-0"



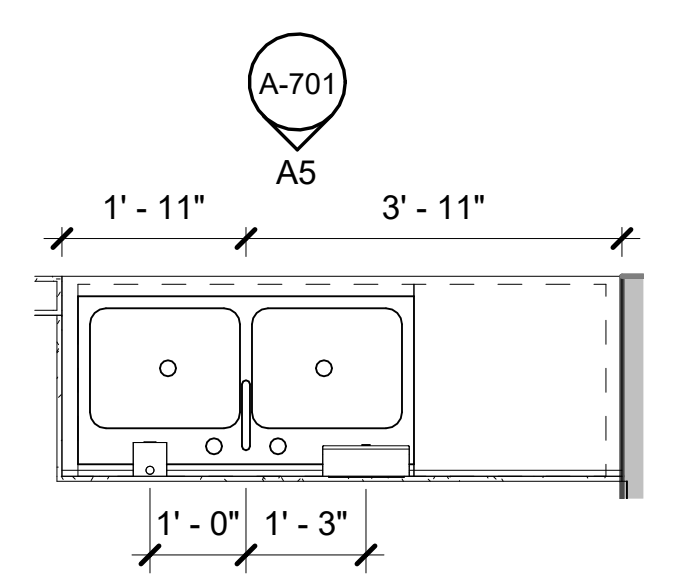
B3 MILLWORK ELEVATION - RECEPTION EXTERIOR LEFT
 A-701 1/2" = 1'-0"



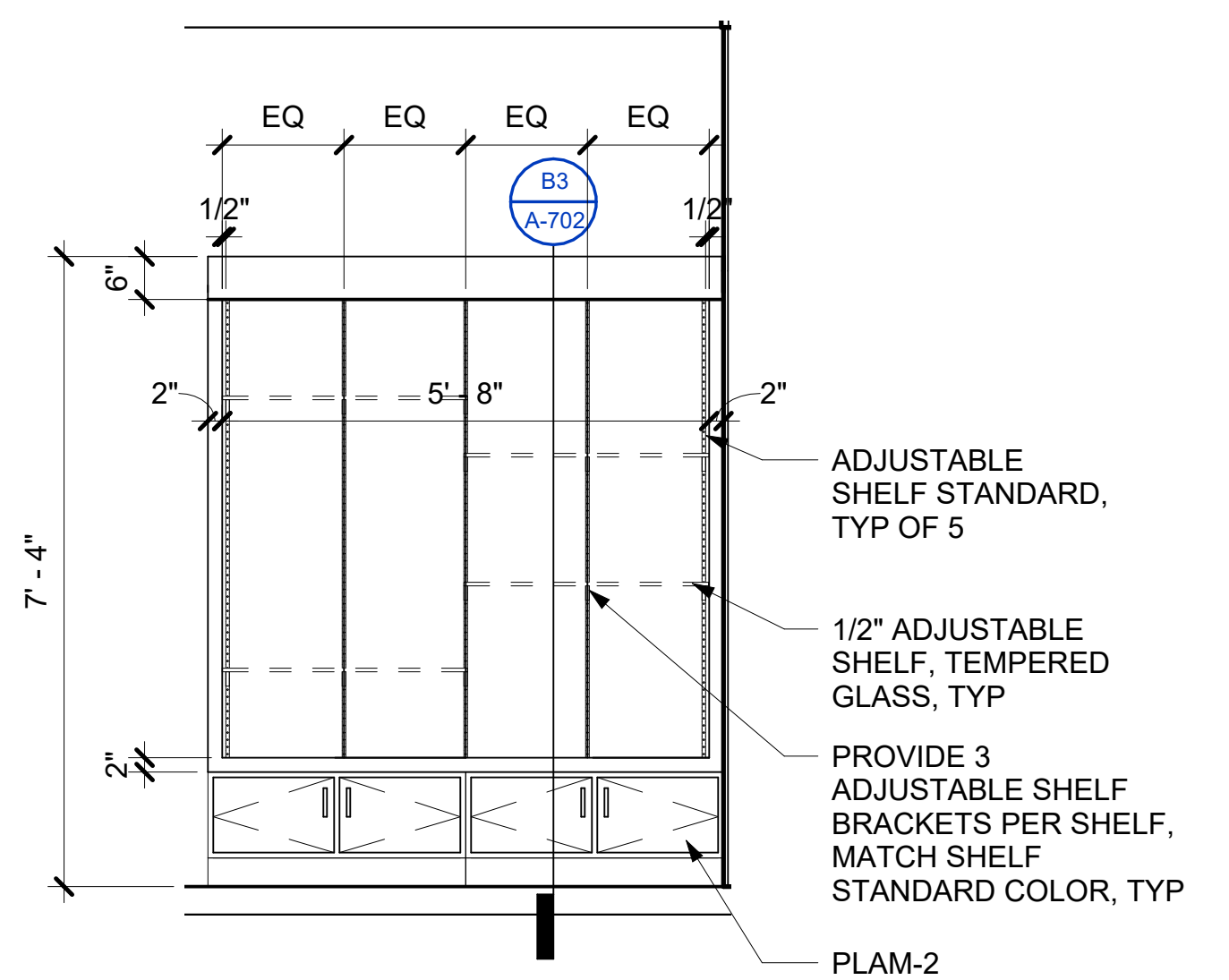
B1 MILLWORK PLAN - RECEPTION DESK
 A-701 1/2" = 1'-0"



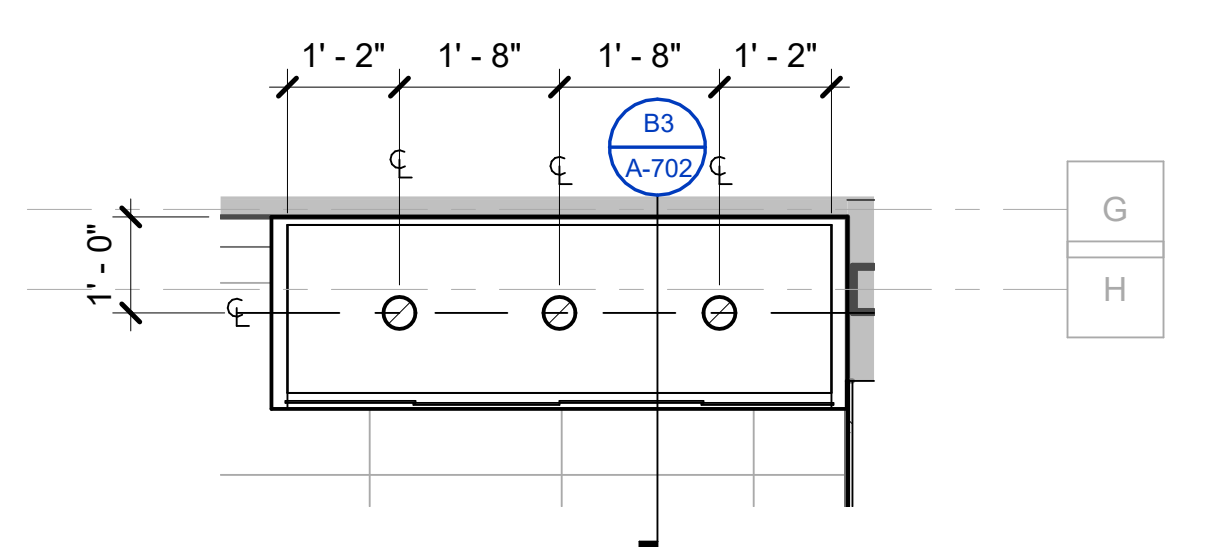
A5 MILLWORK ELEVATION - STEM CLASSROOM
 A-701 1/2" = 1'-0"



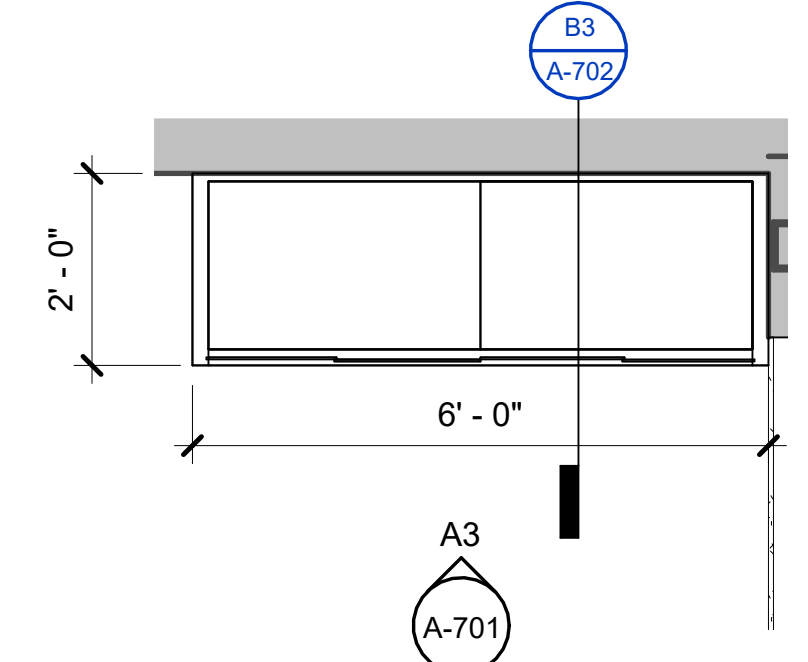
A4 MILLWORK PLAN - STEM CLASSROOM
 A-701 1/2" = 1'-0"



A3 MILLWORK ELEVATION - TROPHY CASE
 A-701 1/2" = 1'-0"



A2 MILLWORK RCP - TROPHY CASE
 A-701 1/2" = 1'-0"



A1 MILLWORK PLAN - TROPHY CASE
 A-701 1/2" = 1'-0"

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KEY PLAN

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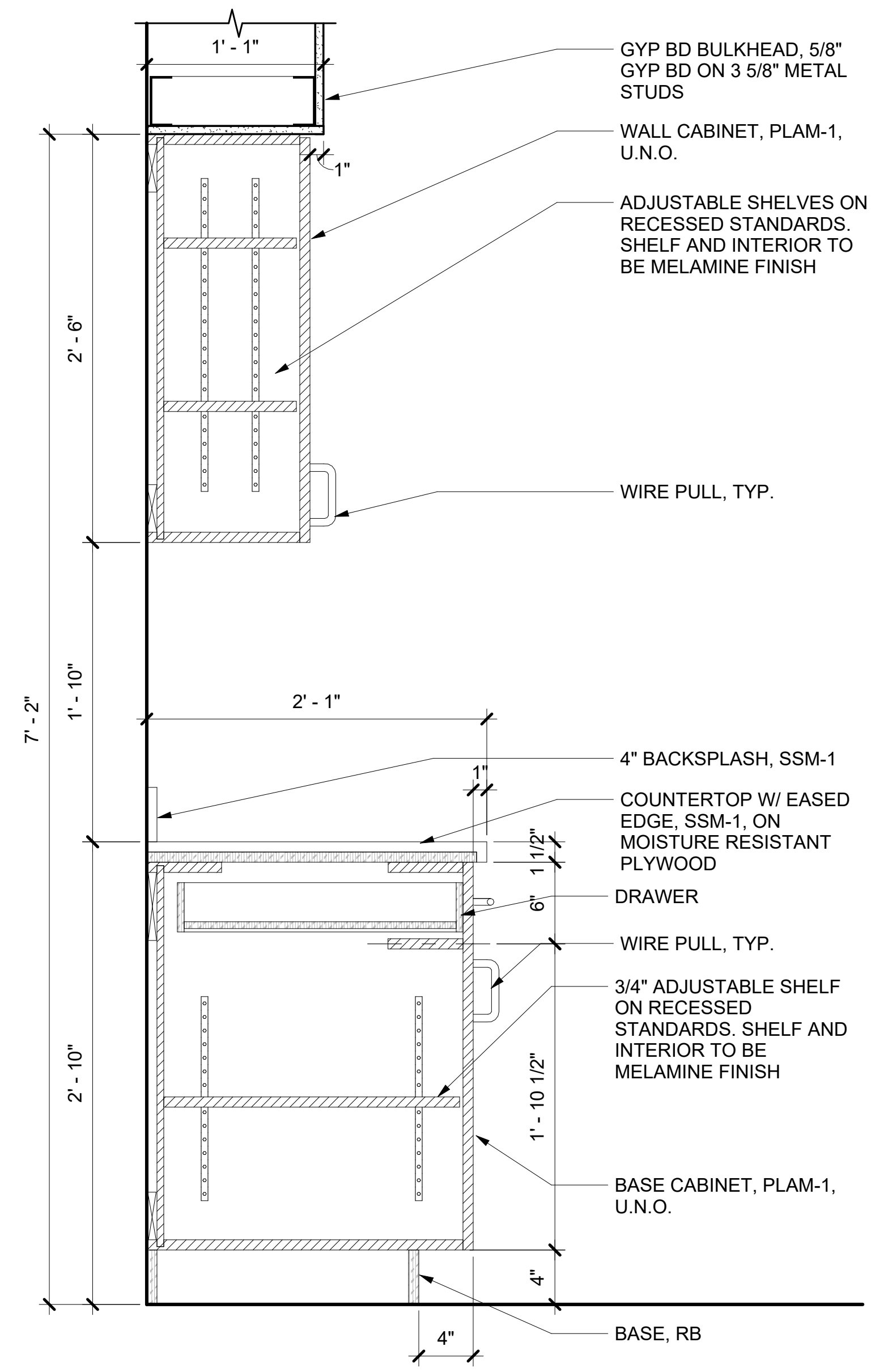
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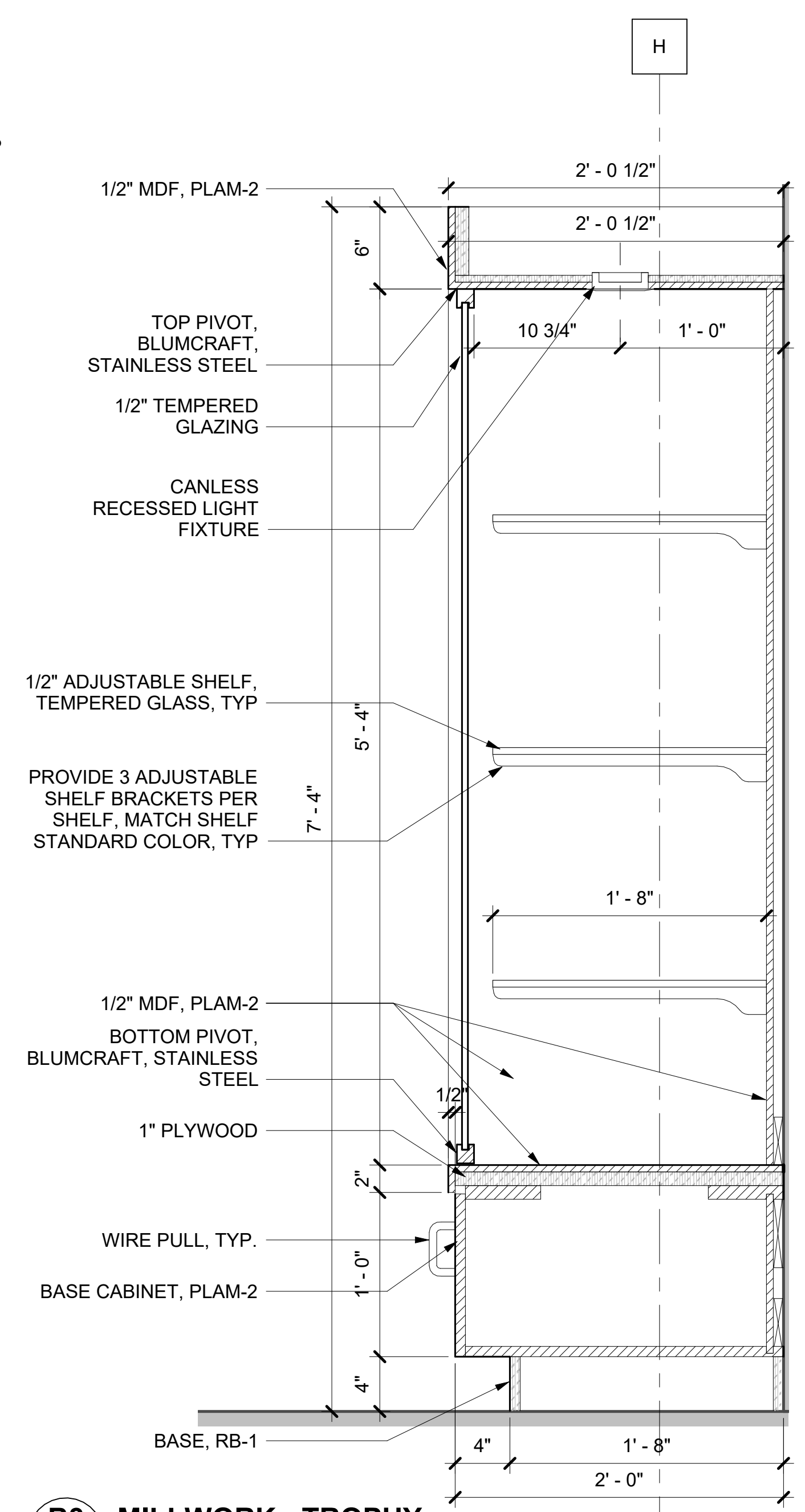
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MILLWORK DETAILS

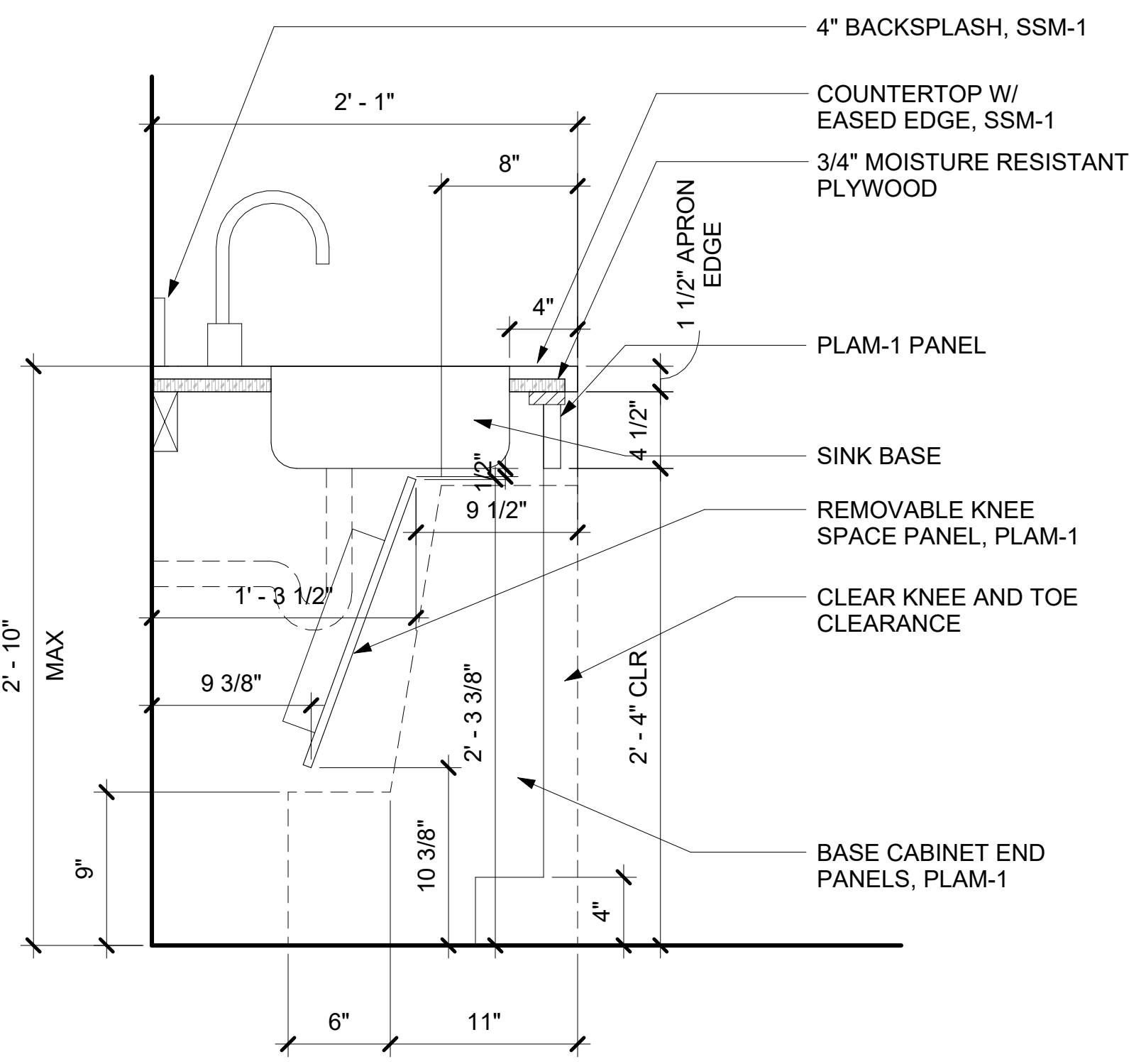
A-702



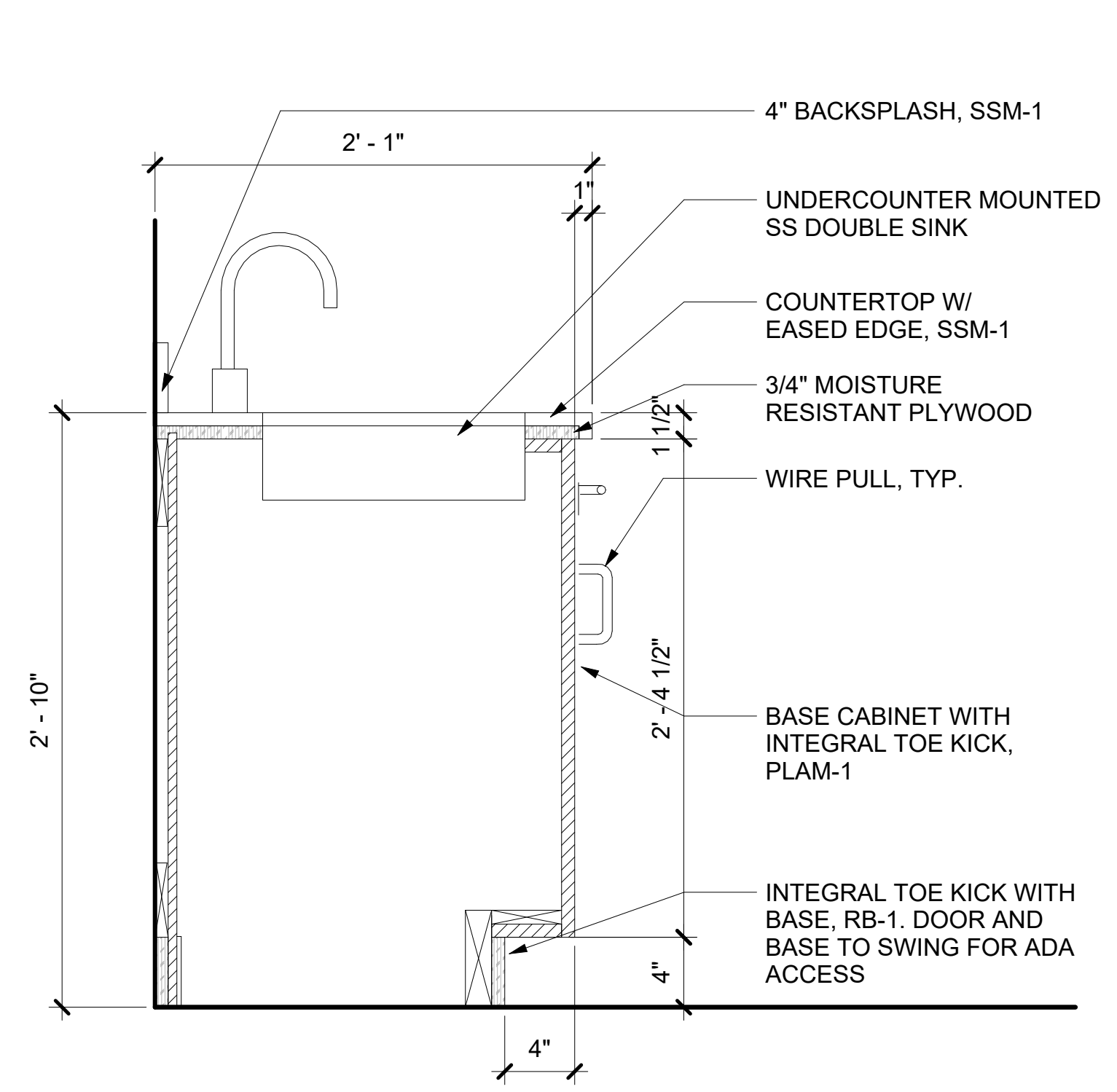
A1 MILLWORK - CABINET, TYP
 A-702 1 1/2" = 1'-0"



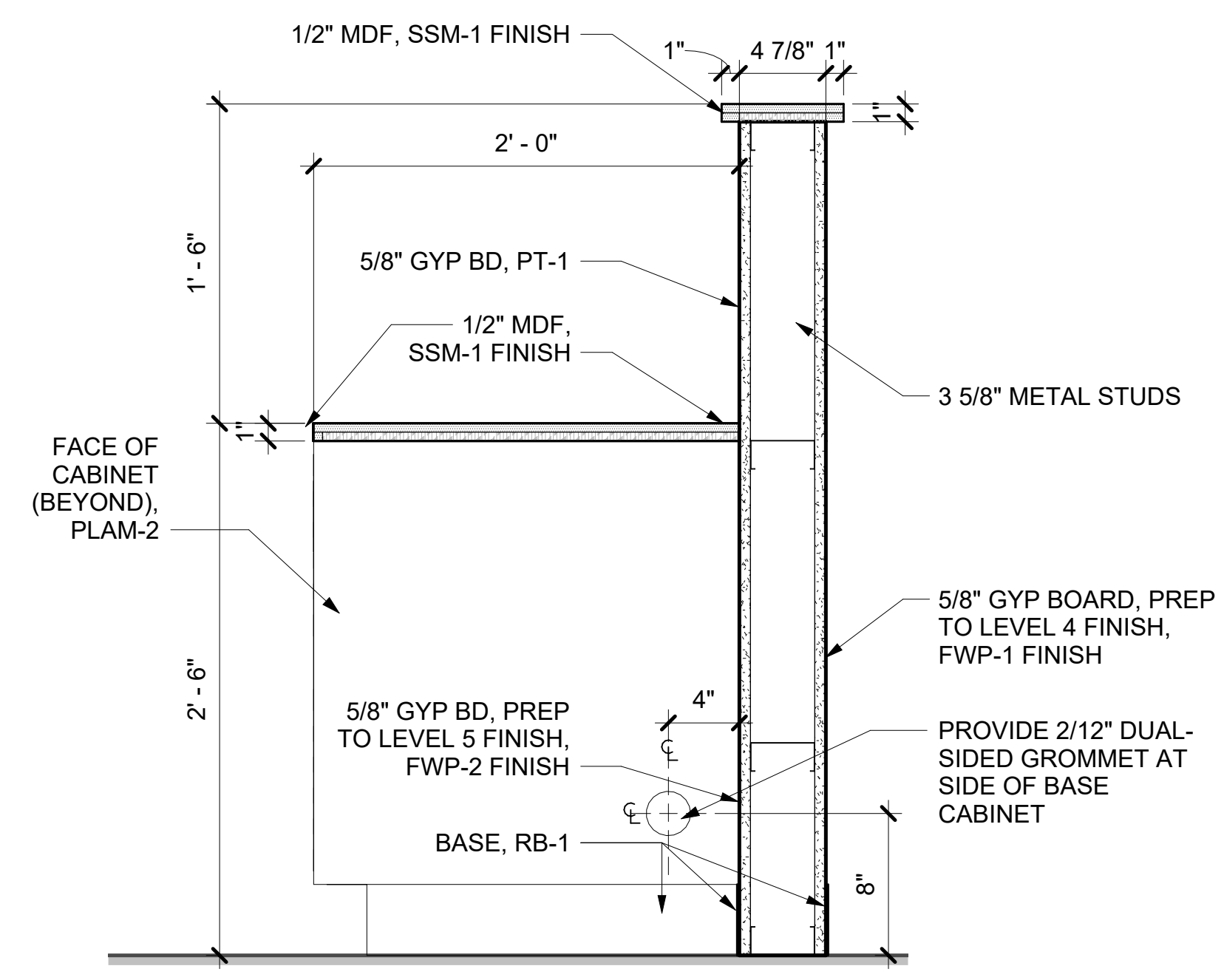
B3 MILLWORK - TROPHY
 A-702 1 1/2" = 1'-0"



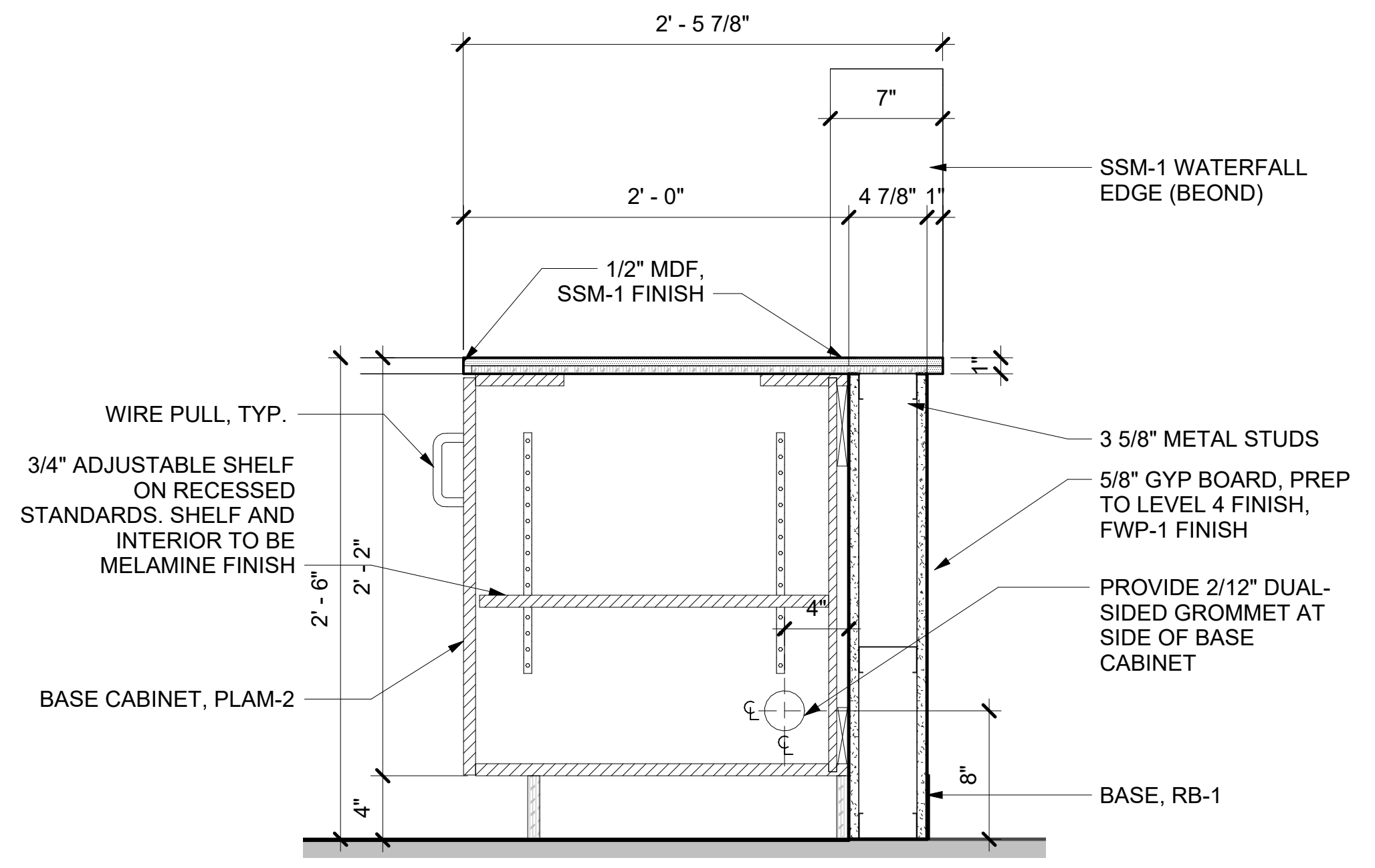
A5 MILLWORK - ADA SINK BASE
 A-702 1 1/2" = 1'-0"



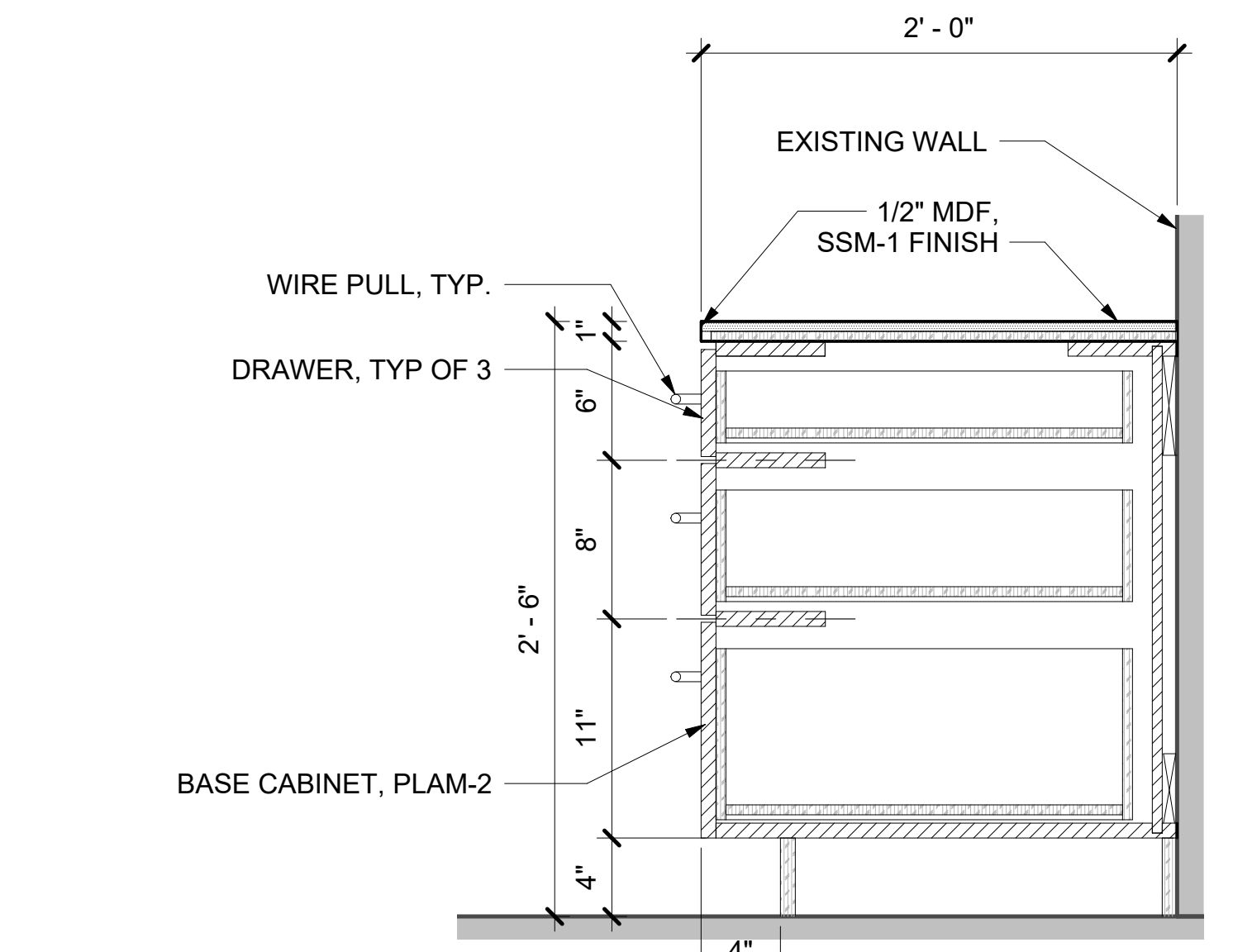
A3 MILLWORK - SINK BASE
 A-702 1 1/2" = 1'-0"



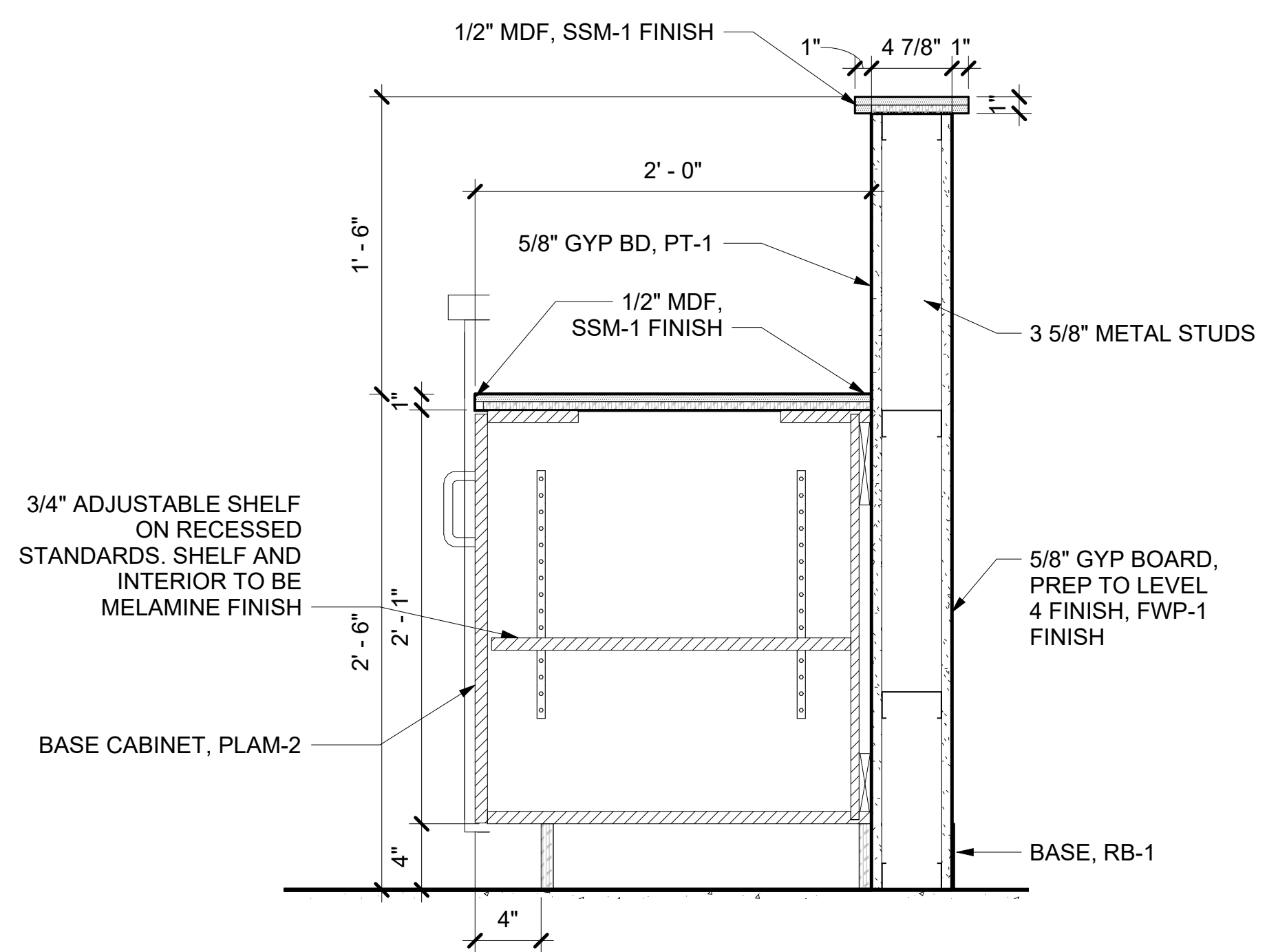
B5 MILLWORK - RECEPTION DESK
 A-702 1 1/2" = 1'-0"



C5 MILLWORK - RECEPTION DESK
 A-702 1 1/2" = 1'-0"



C6 MILLWORK - RECEPTION DESK
 A-702 1 1/2" = 1'-0"



B6 MILLWORK - RECEPTION DESK
 A-702 1 1/2" = 1'-0"

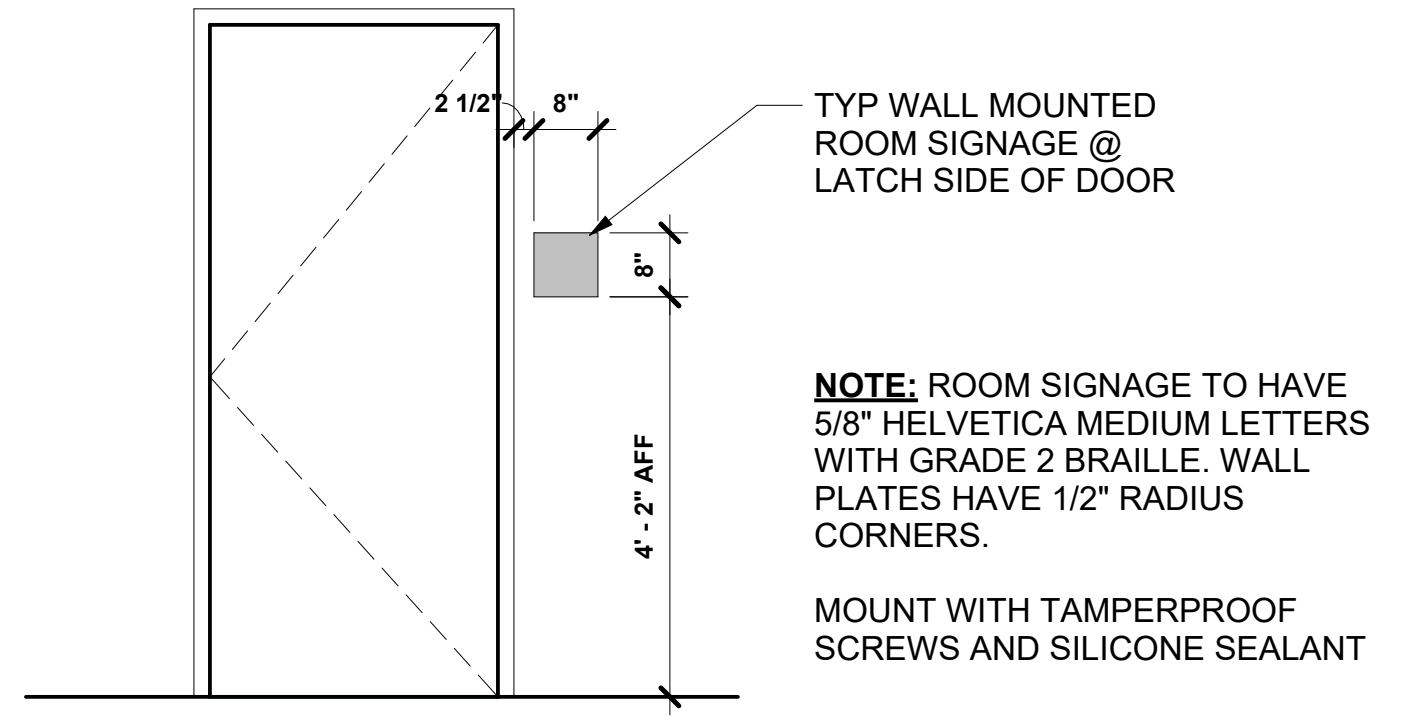
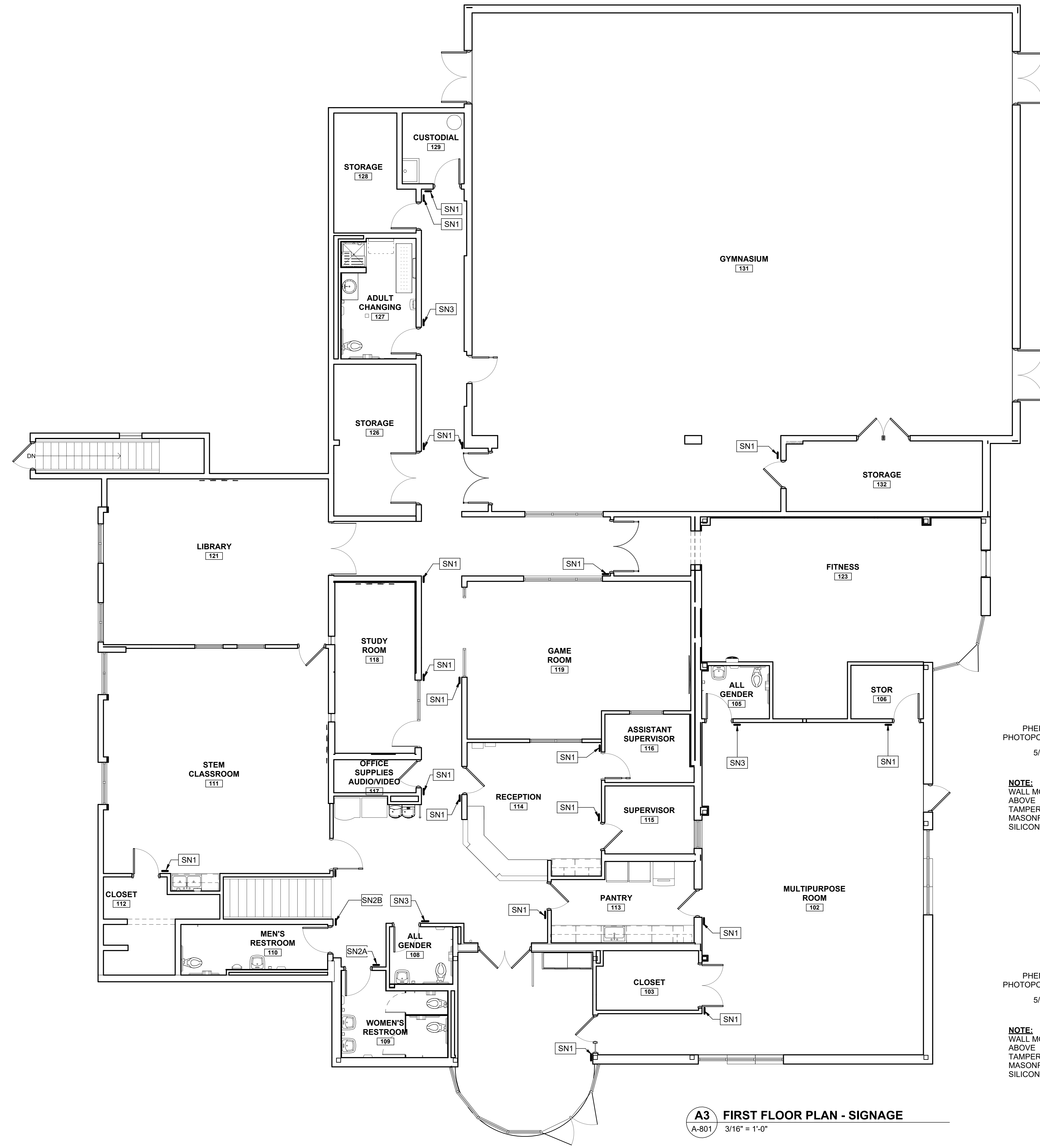
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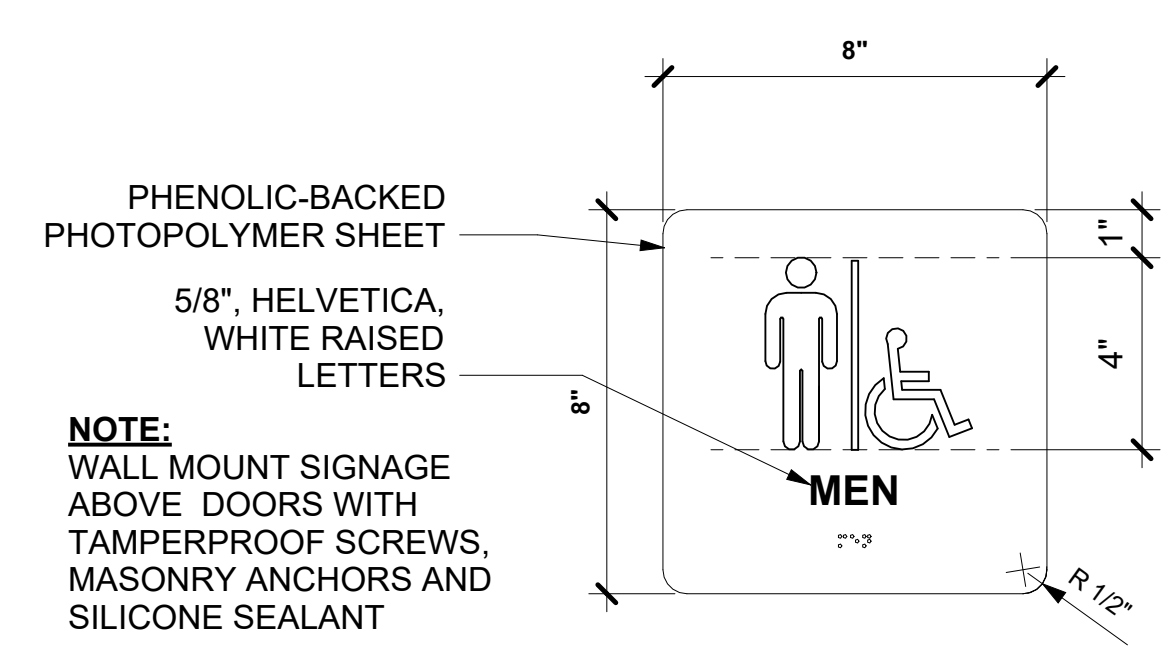
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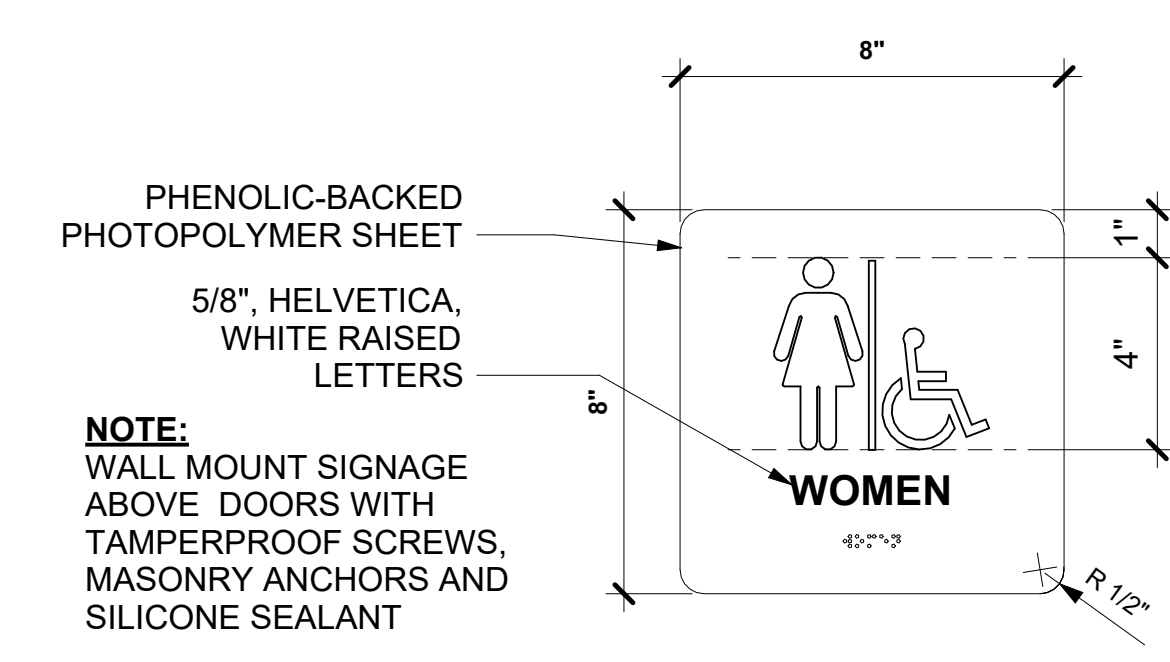
| SIGNAGE SCHEDULE | | | | | |
|------------------|-----------------------------|-----------|----------------------|-----------------------|---------|
| ROOM # | ROOM NAME | SIGN TYPE | FIRST LINE SIGN TEXT | SECOND LINE SIGN TEXT | REMARKS |
| 101 | FOYER | -- | | | |
| 102 | MULTIPURPOSE ROOM | TYPE 1 | MULTIPURPOSE | ROOM | |
| 103 | CLOSET | TYPE 1 | STORAGE | | |
| 105 | ALL GENDER | TYPE 3 | ALL GENDER | | |
| 106 | STOR | TYPE 1 | STORAGE | | |
| 107 | LOBBY | -- | | | |
| 108 | ALL GENDER | TYPE 3 | ALL GENDER | | |
| 109 | WOMEN'S RESTROOM | TYPE 2A | WOMEN | | |
| 110 | MEN'S RESTROOM | TYPE 2B | MEN | | |
| 111 | STEM CLASSROOM | TYPE 1 | STEM | CLASSROOM | |
| 112 | CLOSET | TYPE 1 | STORAGE | | |
| 113 | PANTRY | TYPE 1 | PANTRY | | |
| 114 | RECEPTION | TYPE 1 | RECEPTION | | |
| 115 | SUPERVISOR | TYPE 1 | OFFICE | | |
| 116 | ASSISTANT SUPERVISOR | TYPE 1 | OFFICE | | |
| 117 | OFFICE SUPPLIES AUDIO/VIDEO | TYPE 1 | AUDIO / VISUAL | | |
| 118 | STUDY ROOM | TYPE 1 | STUDY ROOM | | |
| 119 | GAME ROOM | TYPE 1 | GAME ROOM | | |
| 120 | VESTIBULE | -- | | | |
| 121 | LIBRARY | TYPE 1 | LIBRARY | | |
| 122 | CORRIDOR | -- | | | |
| 123 | FITNESS | TYPE 1 | FITNESS | | |
| 124 | ALL GENDER | TYPE 3 | ALL GENDER | | |
| 125 | CORRIDOR | -- | | | |
| 126 | STORAGE | TYPE 1 | STORAGE | | |
| 127 | ADULT CHANGING | TYPE 3 | ADULT | CHANGING | |
| 128 | STORAGE | TYPE 1 | STORAGE | | |
| 129 | CUSTODIAL | TYPE 1 | CUSTODIAL | | |
| 130 | CORRIDOR | -- | | | |
| 131 | GYMNASIUM | TYPE 1 | GYMNASIUM | | |
| 132 | STORAGE | TYPE 1 | STORAGE | | |
| B001 | WEIGHT ROOM | -- | | | |
| B002 | TOILET | -- | | | |
| B003 | WATER HEATER | -- | | | |
| B004 | UTILITY CLOSET | -- | | | |
| B005 | EXIT STAIR | -- | | | |
| S001 | STAIRS | -- | | | |
| S002 | EXIT STAIR | -- | | | |



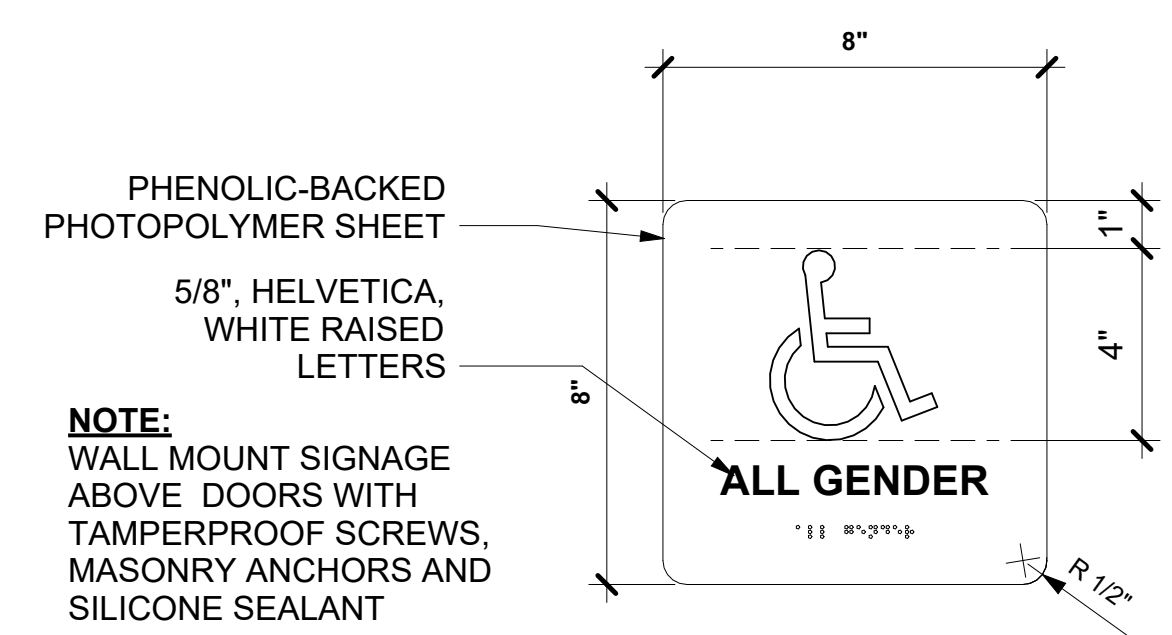
C1 TYP SIGNAGE ELEVATION
A-801 1/2" = 1'-0"



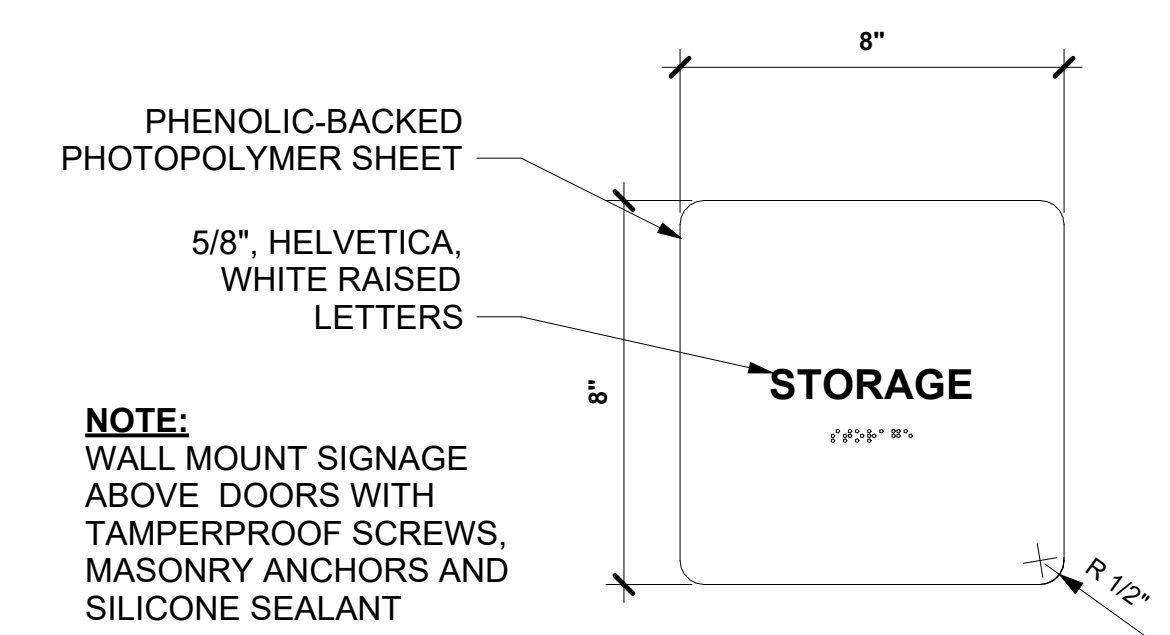
B2 SIGNAGE - TYPE 2B
A-801 3" = 1'-0"



B1 SIGNAGE - TYPE 2A
A-801 3" = 1'-0"

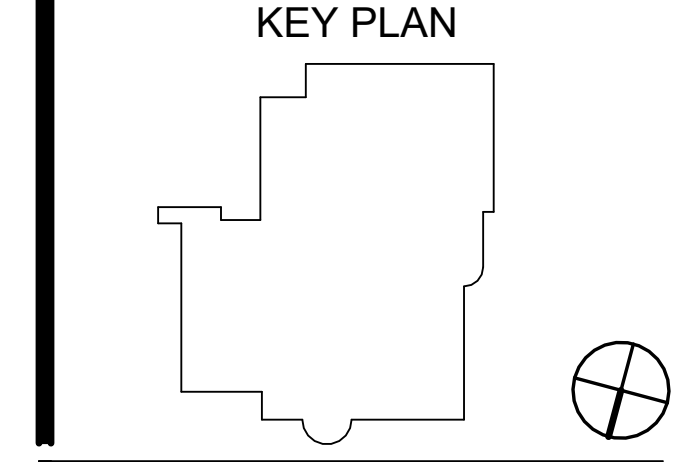


A2 SIGNAGE - TYPE 3
A-801 3" = 1'-0"



A1 SIGNAGE - TYPE 1
A-801 3" = 1'-0"

A3 FIRST FLOOR PLAN - SIGNAGE
A-801 3/16" = 1'-0"



| REVISIONS | | |
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| MARK | DATE | ISSUE |
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| ISSUANCES | |
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| DATE | ISSUANCE |
| 10/20/2023 | PERMIT |
| 3/20/2024 | BID SET |

SIGNAGE PLAN

A-801

STRUCTURAL SPECIAL INSPECTION STATEMENT

THIS STATEMENT IS SUBMITTED IN ACCORDANCE WITH SECTION 1704 OF THE INTERNATIONAL BUILDING CODE - 2018. IT INCLUDES A SCHEDULE OF STRUCTURAL SPECIAL INSPECTIONS APPLICABLE TO THE PROJECT AS WELL AS THE IDENTITY OF THE INDIVIDUALS, AGENCIES, OR FIRMS INTENDED TO BE RETAINED FOR CONDUCTING THESE INSPECTIONS.

THE SPECIAL INSPECTOR(S) SHALL KEEP RECORDS OF ALL INSPECTIONS AND SHALL FURNISH INTERIM INSPECTION REPORTS TO THE ARCHITECT, CONTRACTOR AND STRUCTURAL ENGINEER AND BUILDING OFFICIAL AT A FREQUENCY AGREED UPON BY THE PERMIT APPLICANT. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THE DISCREPANCIES ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE PERMIT OFFICIAL, ARCHITECT, AND STRUCTURAL ENGINEER PRIOR TO COMPLETION OF THAT PHASE OF WORK. A FINAL REPORT OF SPECIAL INSPECTIONS DOCUMENTING REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS SHALL BE SUBMITTED AT THE CONCLUSION OF THE PROJECT.

THE SPECIAL INSPECTION PROGRAM DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO COMPLY WITH THE CONTRACT DOCUMENTS. JOBSITE SAFETY AND MEANS AND METHODS OF CONSTRUCTION ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE FOR ENSURING THE SPECIAL INSPECTION PROGRAM IS CONDUCTED IN ACCORDANCE WITH THIS PLAN.

THE SCHEDULE OF STRUCTURAL SPECIAL INSPECTIONS PROVIDES AN ITEMIZED LIST OF WHICH SPECIAL INSPECTION ACTIVITIES ARE REQUIRED FOR THE SPECIFIC PROJECT. THE SCHEDULE LISTS THE VARIOUS STRUCTURAL TASKS REQUIRED BY CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE AND INDICATES WITH A "YES" WHICH ITEMS APPLY TO THIS PROJECT.

THIS STATEMENT OF STRUCTURAL SPECIAL INSPECTIONS IS NOT INTENDED TO INCORPORATE ALL ASPECTS OF THE SPECIAL INSPECTION PROGRAM AS DEFINED IN CHAPTER 17 OF THE BUILDING CODE. REFER TO OTHER DISCIPLINES FOR REMAINING SPECIAL INSPECTIONS THAT MAY BE REQUIRED.

FREQUENCY OF INTERIM REPORT SUBMITTALS ISSUED TO THE REGISTERED PROFESSIONAL IN RESPONSIBLE CHARGE: **WEEKLY**

PREPARED BY: Cagley & Associates

SIGNATURE AND DATE

SEAL OF PREPARER

STRUCTURAL SPECIAL INSPECTION SCHEDULE: CONCRETE CONSTRUCTION

| VERIFICATION AND INSPECTION TASK | APPLICABLE TO THIS PROJECT? | FREQUENCY | | REFERENCED STANDARD | IBC CODE REFERENCE | AGENT |
|---|-----------------------------|------------|----------|---|--------------------------------|--------------|
| | | CONTINUOUS | PERIODIC | | | |
| 1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT. | YES | - | X | ACI 318: CH 20, 25, 2.25.3, 26.5.1; 26.5.3 | 1910.4 | SIER and ITA |
| 2. REINFORCING BAR WELDING: | | | | | | |
| a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706 | NO | - | X | | - | ITA |
| b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM SIZE 5/16 INCHES; AND | NO | - | X | AWS D1.4 ACI 318: 26.6.4 | - | ITA |
| c. INSPECT ALL OTHER WELDS. | NO | X | - | | - | ITA |
| 3. INSPECT ANCHORS TO BE CAST IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE. | YES | - | X | ACI 318: 17.8.2 | - | ITA |
| 4. INSPECT ANCHORS POST-INSTALL IN HARDENED CONCRETE MEMBERS: | | | | | | |
| a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATION TO RESIST SUSTAINED TENSION LOADS. | YES | X | - | ACI 318: 17.8.2.4 | - | ITA |
| b. MECHANICAL ANCHORS OR ADHESIVE ANCHORS NOT DEFINED IN 4A. | YES | - | X | ACI 318: 17.8.2 | - | ITA |
| 5. VERIFYING USE OF REQUIRED DESIGN MIX. | YES | - | X | ACI 318: Ch. 19, 26.4.3, 26.4.4 | 19.4.1, 1904.2, 1908.2, 1908.3 | ITA |
| 6. AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE. | YES | X | - | ASTM C 172 ASTM C 31 ACI 318: 5.6 & 5.8 | 1910.10 | ITA |
| 7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES. | YES | X | - | ACI 318: 26.4.5 | 1910.6 1910.7 1910.8 | ITA |
| 8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES. | YES | - | X | ACI 318: 26.4.7-26.4.9 | 1908.9 | ITA |

STRUCTURAL SPECIAL INSPECTION SCHEDULE: MASONRY CONSTRUCTION

| VERIFICATION AND INSPECTION TASK | APPLICABLE TO THIS PROJECT? | FREQUENCY | | REFERENCED STANDARD | IBC CODE REFERENCE | AGENT |
|--|-----------------------------|------------|----------|--|--------------------|-------|
| | | CONTINUOUS | PERIODIC | | | |
| 1. VERIFY COMPLIANCE WITH THE APPROVED SUBMITTALS | YES | - | X | ACI 530.1: Art. 1.5 | 1705.4 | ITA |
| 2. AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE: | | | | | | |
| a. PROPORTIONS OF SITE-PREPARED MORTAR. | YES | - | X | ACI 530.1 Art. 2.1 & 2.6A | - | ITA |
| b. CONSTRUCTION OF MORTAR JOINTS. | YES | - | X | ACI 530.1 Art. 3.3B | - | ITA |
| c. LOCATION OF REINFORCEMENT, CONNECTORS AND ANCHORAGES. | YES | - | X | ACI 530.1 Article 3.4 & 3.6A | - | ITA |
| 3. PRIOR TO GROUTING, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE: | | | | | | |
| a. GROUT SPACE IS CLEAN. | YES | - | X | ACI 530.1: Art. 3.2D & 3.2F | - | ITA |
| b. GRADE, TYPE AND SIZE OF REINFORCEMENT AND ANCHOR BOLTS. | YES | - | X | ACI 530: Section 1.16, ACI 530.1: Art. 2.4 & 3.4 | - | ITA |
| c. PLACEMENT OF REINFORCEMENT AND CONNECTORS AND PRESTRESSING TENDONS AND ANCHORAGES. | YES | - | X | ACI 530 Section 1.16, ACI 530.1: Art. 3.2E, 3.4 & 3.6A | - | ITA |
| d. PROPORTIONS OF SITE-PREPARED GROUT. | YES | - | X | ACI 530.1: Art. 2.6B & 2.4G.1.b | - | ITA |
| e. CONSTRUCTION OF MORTAR JOINTS. | YES | - | X | ACI 530.1: Art. 3.3B | - | ITA |
| f. GROUT PLACEMENT SHALL BE VERIFIED TO ENSURE COMPLIANCE WITH CODE AND CONSTRUCTION DOCUMENT PROVISIONS. | YES | X | - | ACI 530.1: Art. 3.5 & 3.6C | - | ITA |
| 4. VERIFY DURING CONSTRUCTION: | | | | | | |
| a. SIZE AND LOCATION OF STRUCTURAL ELEMENTS. | YES | - | X | ACI 530.1: Art. 3.3F | - | ITA |
| b. TYPE, SIZE AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION. | YES | - | X | ACI 530: Section 1.16.4.3 & 1.17.1 | - | ITA |
| c. WELDING OF REINFORCEMENT. | NO | X | - | ACI 530: Section 2.1.7.7.2 & 3.3.3.4(c) & 8.3.3.4(b) | - | ITA |
| d. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING: COLD WEATHER (TEMPERATURE BELOW 40°F) OR HOT WEATHER (TEMPERATURE ABOVE 90°F). | YES | - | X | ACI 530.1: Art. 1.8C & 1.8D | - | ITA |
| e. OBSERVE PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS. | YES | - | X | ACI 530.1: Art. 1.4.B.2.a & 1.4B.2.b.3 & 1.4.B.3 & 1.4.B.4 | - | ITA |

STRUCTURAL SPECIAL INSPECTION SCHEDULE: STEEL CONSTRUCTION

| VERIFICATION AND INSPECTION TASK | APPLICABLE TO THIS PROJECT? | FREQUENCY | | REFERENCED STANDARD | IBC CODE REFERENCE | AGENT |
|---|-----------------------------|------------|----------|---|----------------------|-------|
| | | CONTINUOUS | PERIODIC | | | |
| 1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS: | | | | | | |
| a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS. | YES | - | X | Applicable ASTM material specifications; AISC 360, Section A3.3 | - | ITA |
| b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED. | YES | - | X | | - | ITA |
| 2. INSPECTION OF HIGH-STRENGTH BOLTING: | | | | | | |
| a. SNUG TIGHTENED JOINTS. | YES | X | - | | - | ITA |
| b. SLIP-CRITICAL CONNECTIONS. | NO | X | - | AISC 360: Section N5.6 | - | ITA |
| c. PRETENSIONED JOINTS. | NO | X | - | | - | ITA |
| 3. MATERIAL VERIFICATION OF STRUCTURAL STEEL: | | | | | | |
| a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS. | YES | - | X | AISC 360: Section A3.1 | 1705.2.1 | ITA |
| b. MANUFACTURER'S CERTIFIED MILL TEST REPORTS. | YES | - | X | | | ITA |
| 4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS: | | | | | | |
| a. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS. | YES | - | X | AISC 360: Section A3.5 | 1705.2.1 | ITA |
| b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED. | YES | - | - | | | ITA |
| 5. INSPECTION OF WELDING, STRUCTURAL STEEL: | | | | | | |
| a. COMPLETE AND PARTIAL PENETRATION GROOVE WELDS. | NO | X | - | | | ITA |
| b. MULTIPASS FILLET WELDS. | NO | X | - | AISC 360: Section N5.2 AWS D1.1 | 1705.2.1 | ITA |
| c. SINGLE-PASS FILLET WELDS > 5/16" | YES | X | - | | | ITA |
| d. SINGLE-PASS FILLET WELDS ≤ 5/16" | YES | X | - | | | ITA |
| e. FLOOR AND ROOF DECK WELDS. | NO | X | - | AWS D1.3 | - | ITA |
| 6. FIRE-RESISTANT MATERIALS: | | | | | | |
| a. SPECIAL INSPECTIONS ARE REQUIRED PER IBC SECTIONS 1705.13 THROUGH 1705.17. | YES | X | - | | 1705.13 THRU 1705.17 | ITA |

STRUCTURAL SPECIAL INSPECTION SCHEDULE: WOOD CONSTRUCTION

| VERIFICATION AND INSPECTION TASK | APPLICABLE TO THIS PROJECT? | FREQUENCY | | REFERENCED STANDARD | IBC CODE REFERENCE | AGENT |
|---|-----------------------------|------------|----------|---------------------|------------------------|-------|
| | | CONTINUOUS | PERIODIC | | | |
| 1. FABRICATED WOOD STRUCTURAL ELEMENTS AND ASSEMBLIES: | | | | | | |
| a. VERIFICATION THAT THE FABRICATOR MAINTAINS DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES THAT PROVIDE THE BASIS FOR INSPECTION CONTROL OF THE WORKMANSHIP AND THE FABRICATOR'S ABILITY TO CONFORM TO APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS. | YES | - | X | | 1704.2.5 1704.2.5.1 | ITA |

INSPECTION AGENTS

| NAME OF AGENT | FIRM NAME, ADDRESS, TELEPHONE NUMBER, CONTACT NAME (LICENSE NUMBER IF APPLICABLE) |
|---|---|
| 1. SPECIAL INSPECTOR ENGINEER OF RECORD: (SIER) (Note 2) | |
| 2. GEOTECHNICAL ENGINEER OF RECORD: (GEOR) | |
| 3. STRUCTURAL ENGINEER OF RECORD: (SER) (Note 1) | |
| 4. INSPECTION AND TESTING AGENCY: (ITA) (Note 2) | |
| NOTES: | |
| (1) THE STRUCTURAL ENGINEER OF RECORD IS RESPONSIBLE FOR CONDUCTING STRUCTURAL OBSERVATIONS ONLY. STRUCTURAL OBSERVATIONS INCLUDE THE VISUAL OBSERVATION OF THE STRUCTURAL SYSTEM BY THE REGISTERED DESIGN PROFESSIONAL OR A DESIGNATED REPRESENTATIVE, FOR GENERAL CONFORMANCE TO THE APPROVED CONSTRUCTION DOCUMENTS AT SIGNIFICANT CONSTRUCTION STAGES AND AT COMPLETION OF THE STRUCTURAL SYSTEM. THE STRUCTURAL ENGINEER OF RECORD IS NOT RESPONSIBLE FOR INSPECTIONS, SPECIAL OR OTHERWISE. | |
| (2) THE INSPECTION AND TESTING AGENT(S) SHALL BE ENGAGED BY THE OWNER OR THE OWNER'S AGENT, AND NOT BY THE CONTRACTOR WHOSE WORK IS TO BE INSPECTED OR TESTED. ANY CONFLICT OF INTEREST MUST BE DISCLOSED TO THE CONTRACTING OFFICER PRIOR TO COMMENCING WORK. THE QUALIFICATIONS OF THE INSPECTION AGENT(S) MAY BE SUBJECT TO THE APPROVAL OF THE BUILDING OFFICIAL. | |
| (3) "C" INDICATES CONTINUOUS INSPECTION DURING TASK AND "P" INDICATES PERIODIC INSPECTION DURING TASK. | |
| (4) SEE SECTION 1705.3 FOR CONCRETE ELEMENTS THAT DO NOT REQUIRE SPECIAL INSPECTION. | |
| (5) SEE SECTION 1705.4 FOR MASONRY ELEMENTS THAT DO NOT REQUIRE SPECIAL INSPECTION. | |

SEAL

KEY PLAN

REVISIONS

| MARK | DATE | ISSUE |
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ISSUANCES

| DATE | ISSUANCE |
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| 10/20/2023 | PERMIT |
| 3/20/2024 | BID SET |

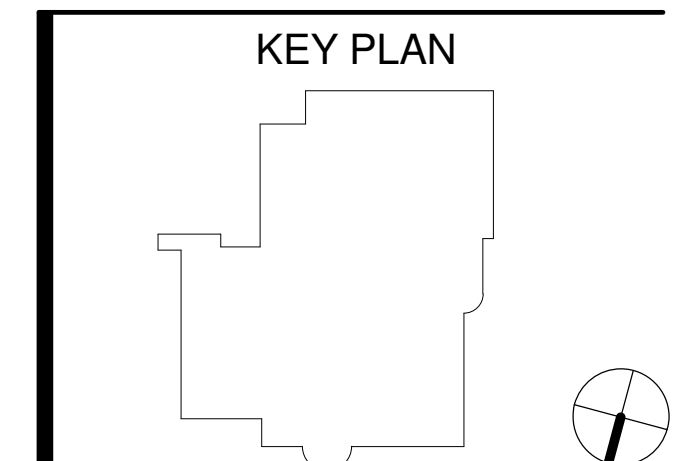
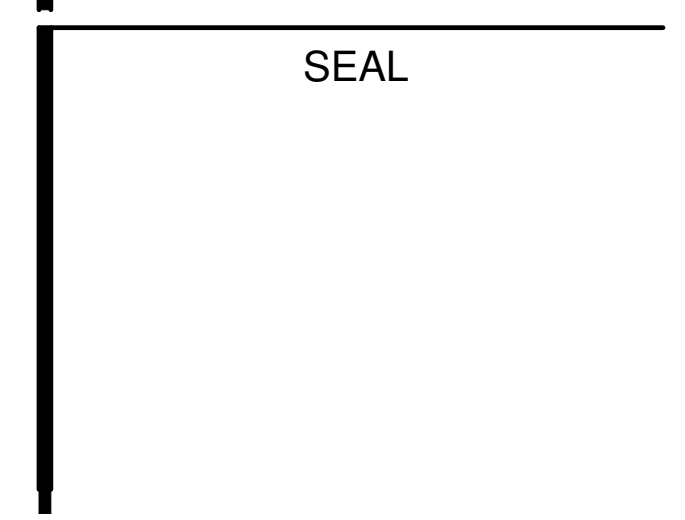
SPECIAL INSPECTION

S-002

CAGLEY & ASSOCIATES
Structural Engineers
Rockville, MD, 20852-3973
Phone (301) 881-9050

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PROJECT No. 2023 017

**LINCOLN PARK COMMUNITY CENTER
 RENOVATION AND ADA IMPROVEMENTS**
 PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850
 OWNER: THE CITY OF ROCKVILLE
 PROJ. NO.: 19/16A



REVISIONS

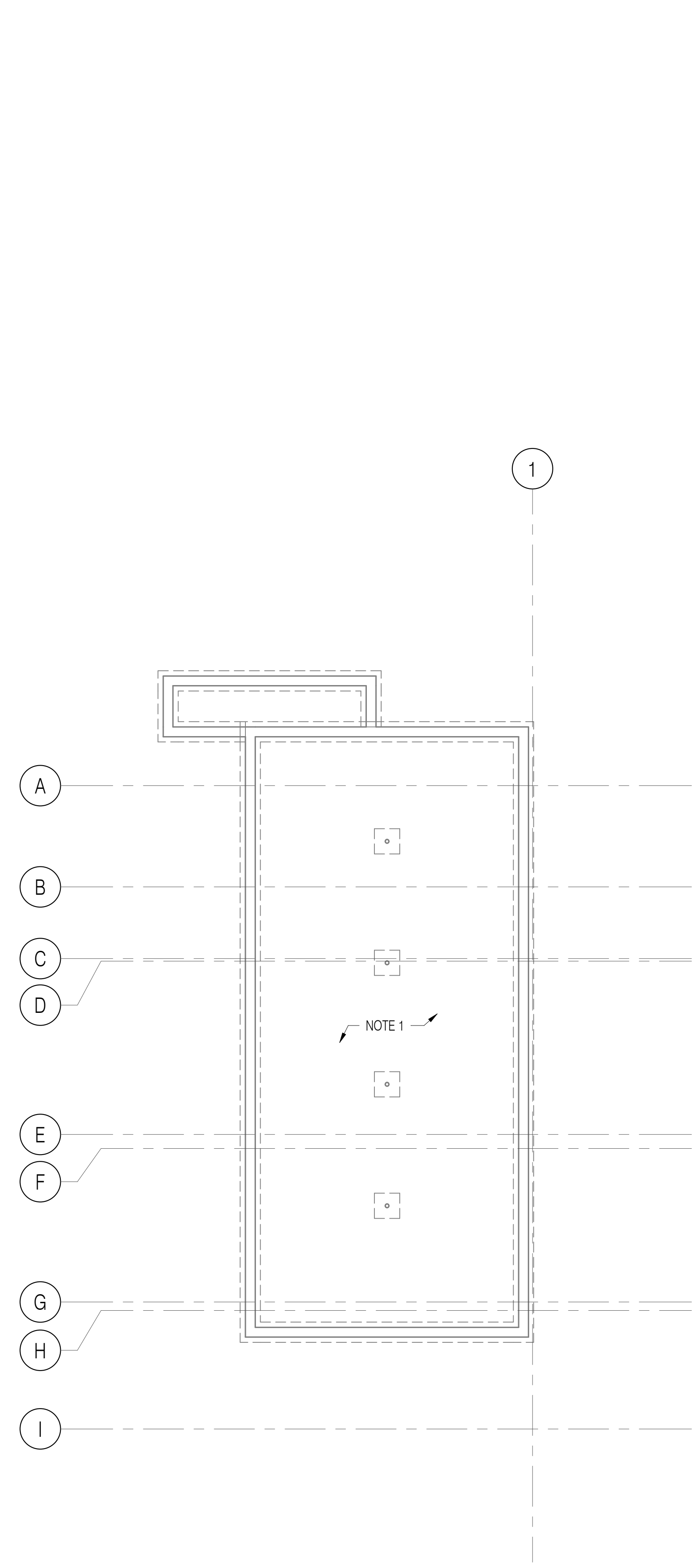
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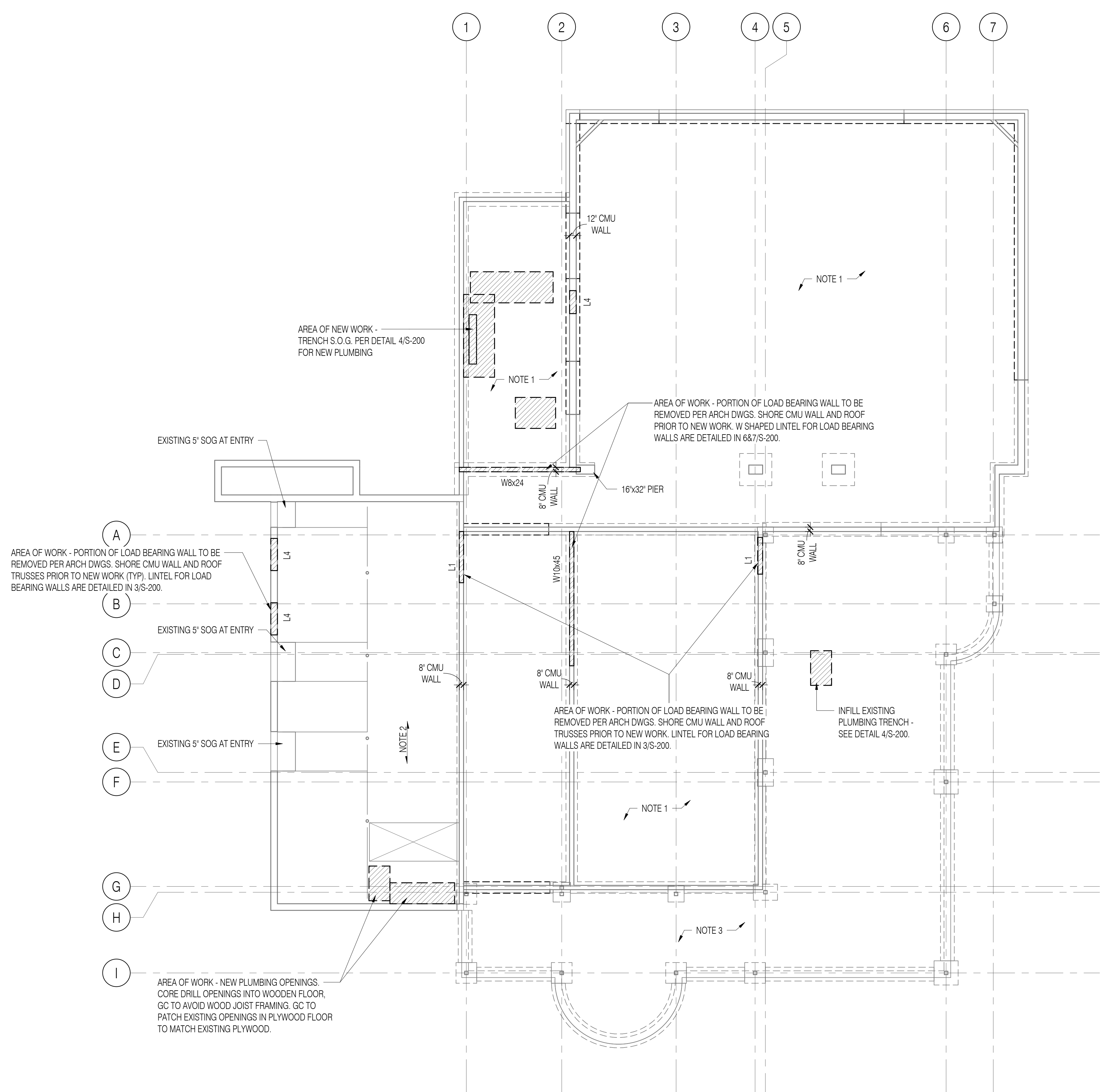
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FOUNDATION & FIRST FLOOR PLANS

S-101



1 BASEMENT PLAN
 PLAN NOTES:
 1. EXISTING 4" SLAB ON GRADE WITH 12" LOAD BEARING MASONRY WALLS AND 4" Ø PIPE COLUMNS FILLED WITH CONCRETE.

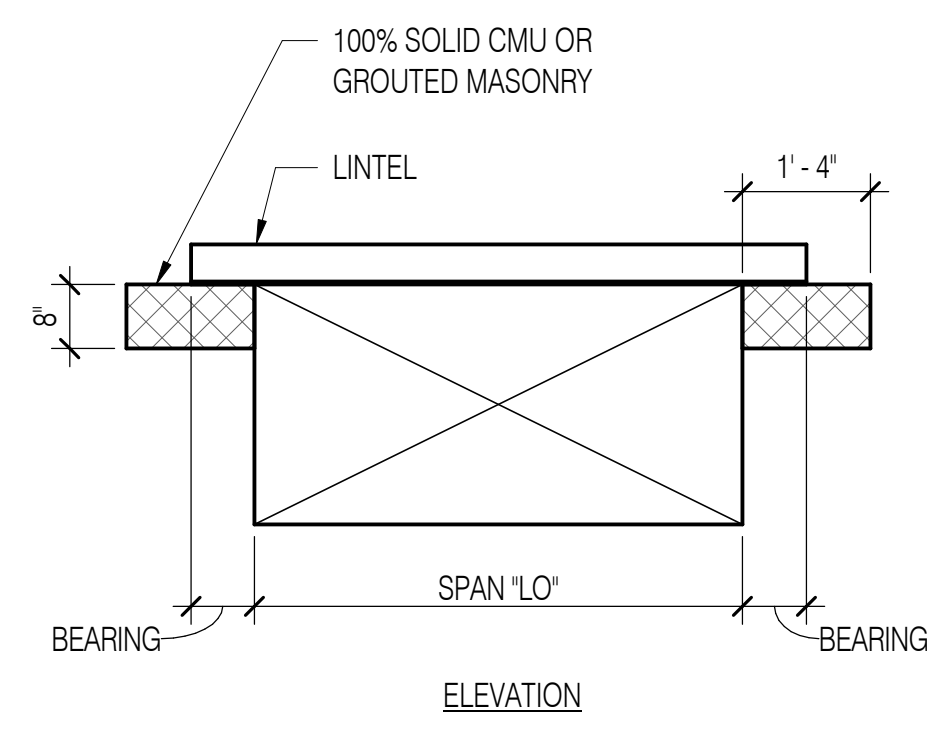


2 FIRST FLOOR PLAN
 PLAN NOTES:
 1. EXISTING 4" SLAB ON GRADE.
 2. EXISTING 1/2" PLYWOOD FLOORING WITH 2X10 WOOD JOISTS AT 12" O.C.
 3. EXISTING 5" SLAB ON GRADE.
 4. NEW NON-LOAD BEARING MASONRY OR COLD-FORM PARTITIONS ARE SHOWN ON ARCHITECTURAL DRAWINGS.
 5. GC TO COORDINATE NEW TRENCH OPENING LOCATIONS WITH ARCHITECTURAL, MECHANICAL AND PLUMBING DRAWINGS.
 6. GC TO COORDINATE EXISTING OPENING INFILL LOCATIONS WITH ARCHITECTURAL, MECHANICAL AND PLUMBING DRAWINGS; INFILL PER DETAIL 8/S-200.
 7. NEW WORK AT EXISTING CMU EXTERIOR WALL OPENING. INSTALL LINTEL L4 FROM DETAIL 3/S-200 PRIOR TO REMOVAL OF LOAD BEARING WALLS AT EXISTING DOOR/ENTRYWAY.

CAGLEY & ASSOCIATES
 Structural Engineers
 Rockville, MD, 20852-3973
 Phone (301) 881-9050

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 PROJ. NO.: 1916A

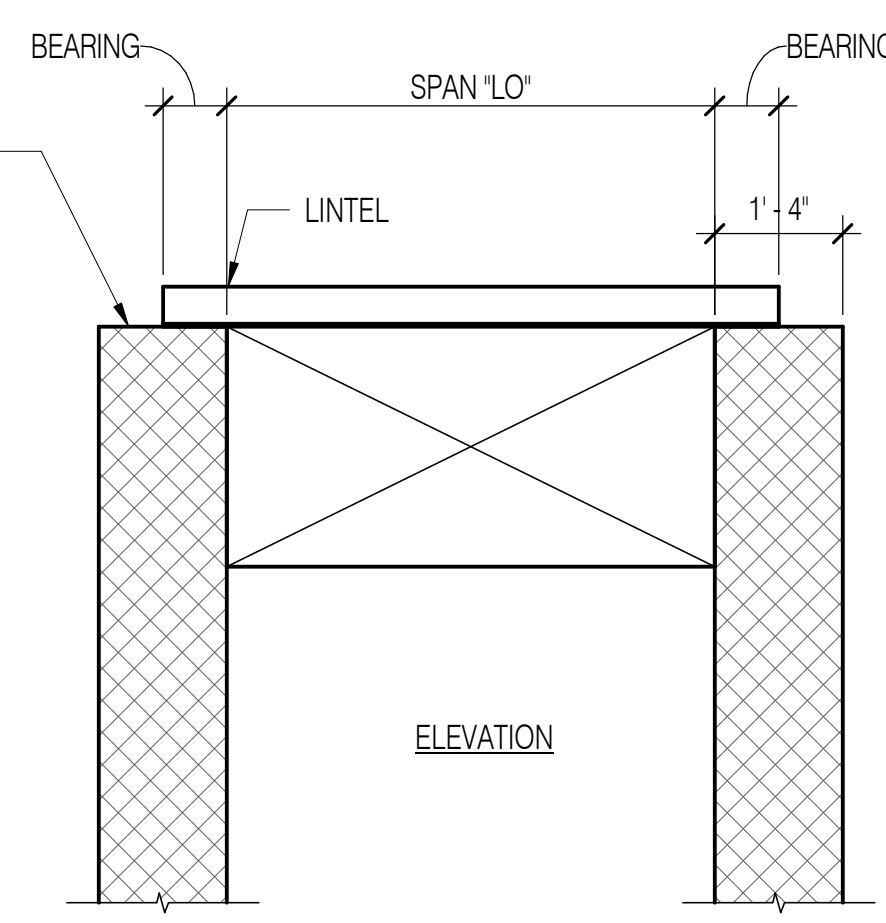


| CMU OR PRECAST CONCRETE | | | | |
|---------------------------------------|---------------------|-------------|---------|--|
| SPAN | LINTEL BLOCK HEIGHT | REINFORCING | BEARING | |
| 6" THICK CONCRETE MASONRY UNIT WALLS | | | | |
| 8" TO 6'-0" | 8" | 2#3 | 8" | |
| 6'-1" TO 8'-0" | 8" | 2#4 | 8" | |
| 8'-1" TO 10'-0" | 1'-4" | 2#5 | 8" | |
| 8" THICK CONCRETE MASONRY UNIT WALLS | | | | |
| 8" TO 6'-0" | 8" | 2#3 | 8" | |
| 6'-1" TO 8'-0" | 8" | 2#4 | 8" | |
| 8'-1" TO 10'-0" | 1'-4" | 2#5 | 8" | |
| 12" THICK CONCRETE MASONRY UNIT WALLS | | | | |
| 8" TO 6'-0" | 8" | 3#3 | 8" | |
| 6'-1" TO 8'-0" | 8" | 3#4 | 8" | |
| 8'-1" TO 10'-0" | 1'-4" | 3#5 | 8" | |

- NOTES:**
1. LINTELS TO BE REINFORCED CMU OR PRECAST ($f_c = 3$ KSI MIN.) - CONTRACTOR'S OPTION.
 2. PROVIDE LINTEL THICKNESS EQUAL TO WALL THICKNESS.
 3. DETAIL APPLIES TO NON-LOAD BEARING WALLS AND PARTITIONS.
 4. REINFORCE AND GROUT ALL CELLS UNDER LINTEL BEARING.
 5. APPLIES TO MAXIMUM 12" THICK CMU WALLS.
 6. DO NOT PLACE OPENINGS ABOVE ANY LINTEL WITHIN A HEIGHT \leq LO UNLESS SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS.

1 MASONRY LINTEL SCHEDULE: NON-LOAD BEARING WALLS
 1/2" = 1'-0"

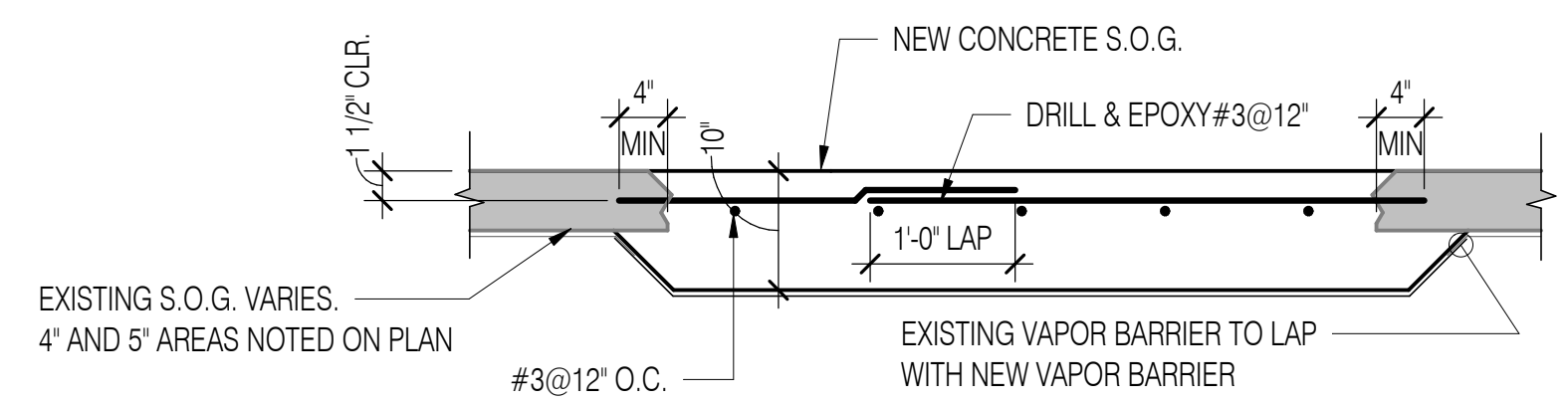
EXISTING CMU WALL DEMOLITION TO EXTEND A COURSING ON EACH SIDE OF THE NEW OPENING. NEW 100% SOLID CMU OR GROUTED MASONRY PIERS MUST BE CONSTRUCTED UNDER BEARING LINTEL LOCATIONS.



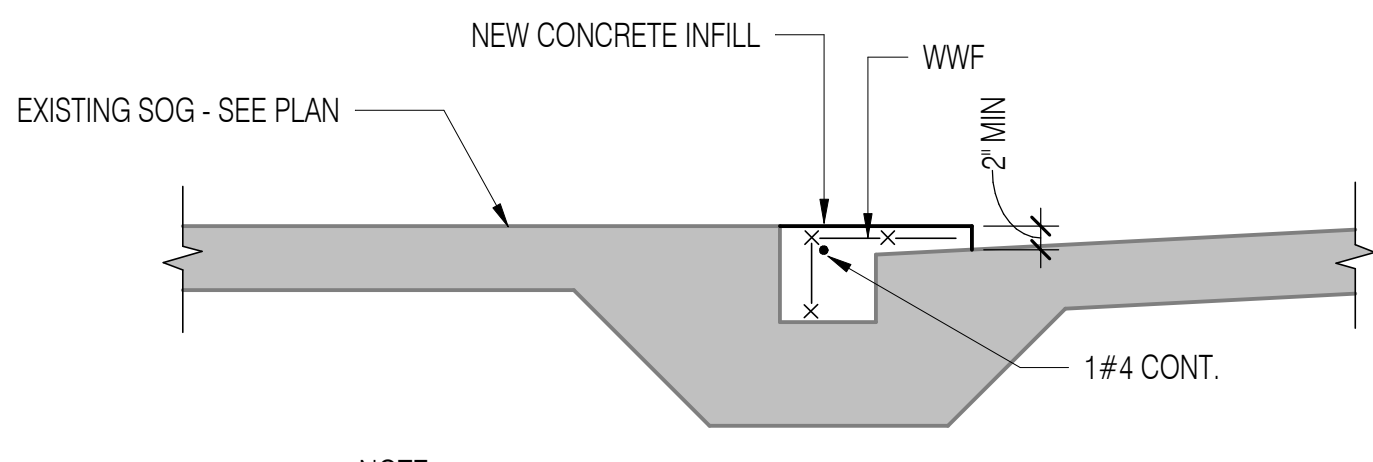
| CMU OR PRECAST CONCRETE | | | | |
|---------------------------------------|-----------------|---------------------|-------------|---------|
| ID | SPAN | LINTEL BLOCK HEIGHT | REINFORCING | BEARING |
| 8" THICK CONCRETE MASONRY UNIT WALLS | | | | |
| L1 | 8" TO 6'-0" | 8" | 2#7 | 8" |
| L2 | 6'-1" TO 8'-0" | 1'-4" | 2#5 | 8" |
| L3 | 8'-1" TO 11'-0" | 1'-4" | 2#7 | 8" |
| 12" THICK CONCRETE MASONRY UNIT WALLS | | | | |
| L4 | 8" TO 6'-0" | 8" | 3#4 | 8" |
| L5 | 6'-1" TO 8'-0" | 1'-4" | 3#5 | 8" |
| L6 | 8'-1" TO 10'-0" | 1'-4" | 3#6 | 8" |

- NOTES:**
1. LINTELS TO BE REINFORCED CMU OR PRECAST ($f_c = 3$ KSI MIN.) - CONTRACTOR'S OPTION.
 2. PROVIDE LINTEL THICKNESS EQUAL TO WALL THICKNESS.
 3. DETAIL APPLIES TO LOAD BEARING WALLS.
 4. REINFORCE AND GROUT ALL CELLS UNDER LINTEL BEARING.
 5. APPLIES TO MAXIMUM 12" THICK CMU WALLS.
 6. DO NOT PLACE OPENINGS ABOVE ANY LINTEL WITHIN A HEIGHT \leq LO UNLESS SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS.

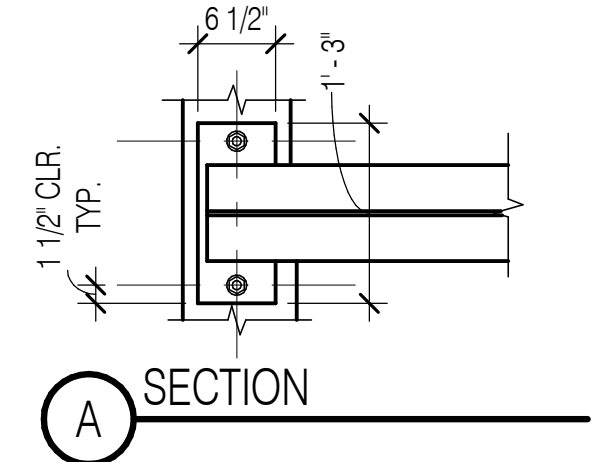
3 MASONRY LINTEL SCHEDULE: LOAD BEARING WALLS
 1/2" = 1'-0"



4 SLAB ON GRADE REPAIR DETAIL
 3/4" = 1'-0"



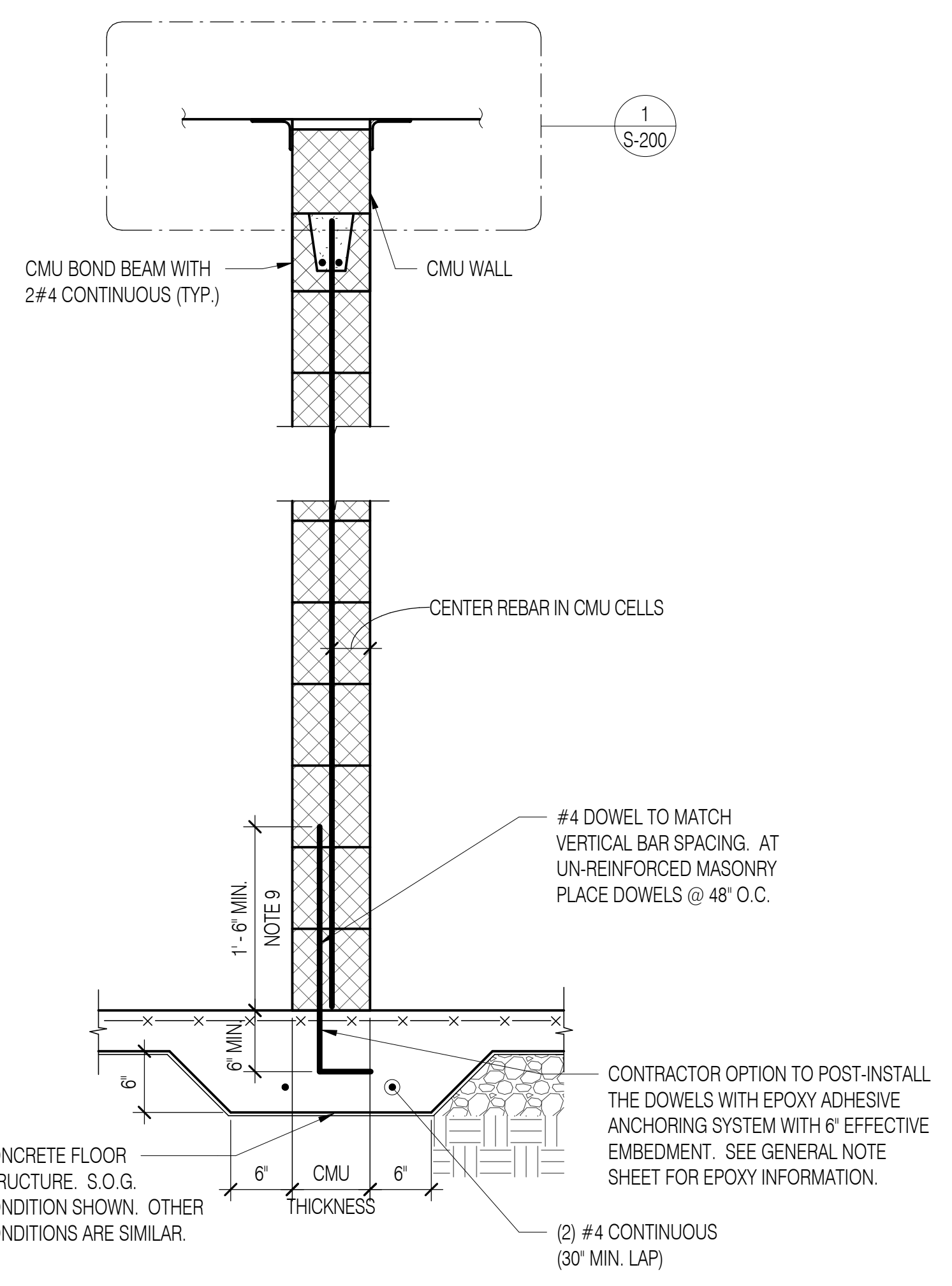
8 CONCRETE INFILL AT EXISTING TRENCH IN S.O.G.
 1" = 1'-0"



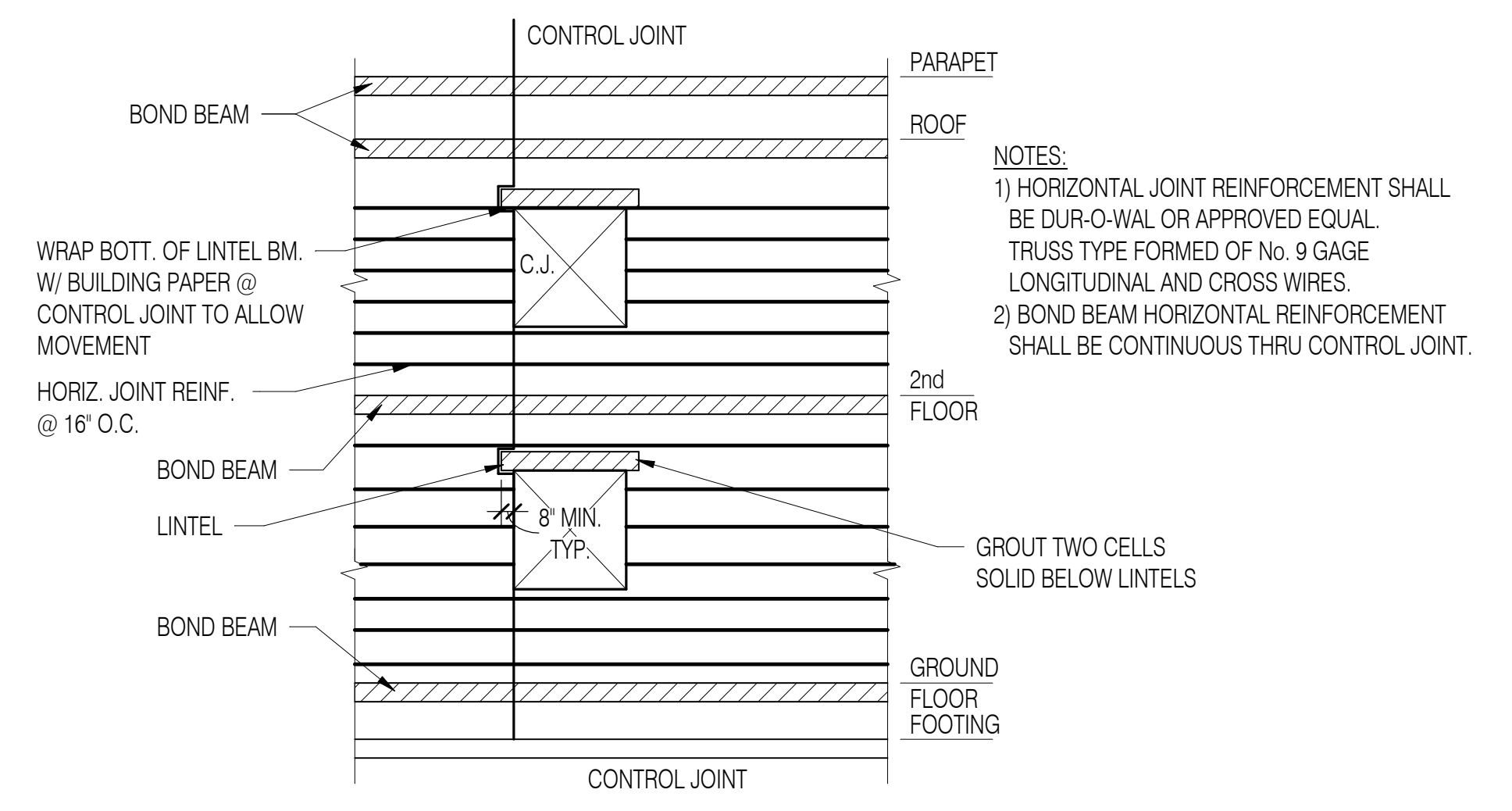
6 BEAM BEARING DETAIL PERPENDICULAR TO WALL
 3/4" = 1'-0"

| NON-LOADBEARING INTERIOR CMU MAXIMUM WALL HEIGHT TABLE | | |
|--|------------------------|---------------------------|
| CMU SIZE (T) | UNREINFORCED CMU | REINFORCED CMU |
| | (#4@48"O.C.) | (#4@48"O.C.) |
| | SEISMIC CATEGORY A & B | SEISMIC CATEGORY A, B & C |
| | MAXIMUM WALL HEIGHT | MAXIMUM WALL HEIGHT |
| 6" THICK | 10 FEET | 20 FEET |
| 8" THICK | 14 FEET | 22 FEET |
| 10" THICK | 16 FEET | 24 FEET |
| 12" THICK | 18 FEET | 24 FEET |

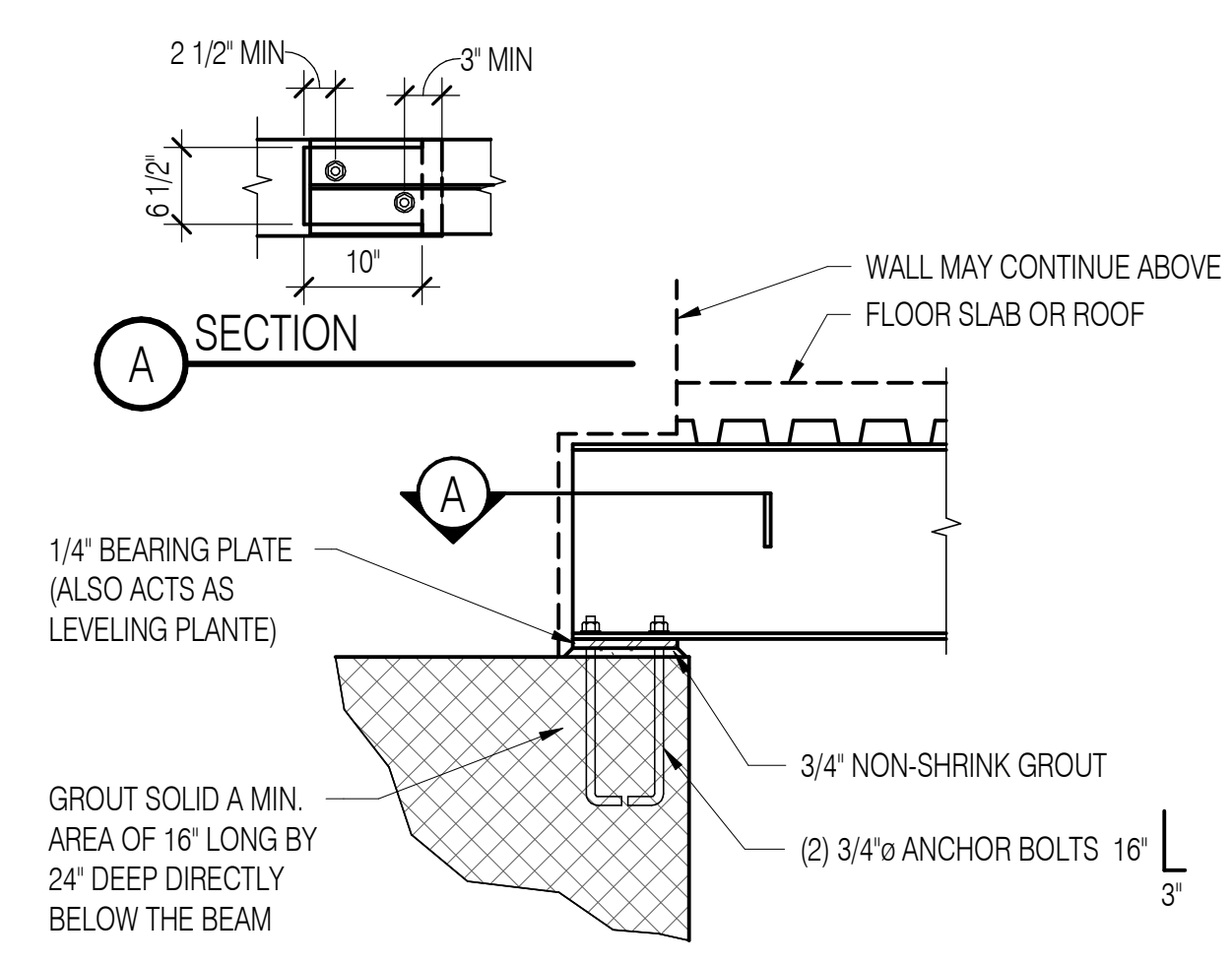
- NOTES:**
1. THIS TABLE & DETAIL IS NOT TO BE USED FOR SEISMIC CATEGORY D.
 2. THIS TABLE & DETAIL IS NOT TO BE USED FOR LOADBEARING WALLS.
 3. THIS TABLE & DETAIL IS NOT TO BE USED FOR EXTERIOR WALLS.
 4. THIS TABLE & DETAIL IS NOT TO BE USED FOR WALLS WITH OPENINGS WITHOUT FOLLOWING REQUIREMENTS AND LIMITATIONS PER NOTES 15, 16, & 17.
 5. UNREINFORCED CMU IS NOT PERMITTED FOR SEISMIC CATEGORY C.
 6. REINFORCED CMU IN THIS TABLE & DETAIL CONSISTS OF #4@48"O.C. CELLS TO BE FULLY GROUTED AT REINFORCEMENT LOCATIONS.
 7. SEISMIC LOADING AND INTERIOR PRESSURE OF 5 PSF WAS USED FOR DESIGN.
 8. SEE 5/5-200 FOR TYPICAL UNREINFORCED MASONRY WALL ELEVATION.
 9. WALLS LOCATED IN PARKING GARAGES ARE TO BE FULLY GROUTED (ALL CELLS) FOR A HEIGHT OF 40' ABOVE SLAB.
 10. WALL SECTIONS AND PIERS LESS THAN 2.0 SQUARE FEET IN CROSS-SECTIONAL AREA TO BE FULLY GROUTED.
 11. LAP SPLICES FOR DEFORMED REINFORCING BARS USED IN MASONRY CONSTRUCTION TO BE 50 BAR DIAMETERS.
 12. PROVIDE STANDARD WEIGHT GALVANIZED HORIZONTAL JOINT REINFORCEMENT IN ALL WALLS AND PARTITIONS AT 16" O.C. UNLESS OTHERWISE NOTED. PROVIDE ONE PIECE PREFABRICATED UNITS AT 8" O.C. AT ALL WALL CORNERS AND INTERSECTIONS.
 13. REFER TO SPECIFICATIONS AND DETAILS FOR GENERAL EXPANSION JOINT, CONTRACTION JOINT AND FIRE RATING REQUIREMENTS FOR ALL WALLS.
 14. T¹ = THICKNESS OF CMU WALL.
 15. UNREINFORCED WALL OPENING REQUIREMENTS:
 - OPENING 3'-0" AND LESS WITH A MINIMUM 6T BETWEEN OPENINGS; NO ADDITIONAL REINFORCEMENT REQUIRED.
 - OPENING 3'-1" TO 9'-0" SHALL HAVE REINFORCED JAMBS. INSTALL (1)#4 EACH SIDE OF OPENING. REBAR TO EXTEND FULL HEIGHT OF WALL.
 16. REINFORCED WALL OPENING REQUIREMENTS:
 - PLACE HALF OF THE INTERRUPTED REBAR ON EACH SIDE OF OPENING. INSTALL MINIMUM (1)#4 REBAR AT ALL JAMBS.
 - MAXIMUM OPENING WIDTH IS 9'-0".
 17. DO NOT PLACE OPENINGS ABOVE LINTEL WITHIN A HEIGHT EQUAL TO THE WIDTH OF THE OPENING BELOW THE LINTEL.



2 MASONRY INTERIOR NON-LOADBEARING WALL DETAIL
 1" = 1'-0"



5 TYPICAL MASONRY WALL ELEVATION (UNREINFORCED)
 N.T.S.



7 BEAM BEARING DETAIL PARALLEL TO WALL
 3/4" = 1'-0"

CAGLEY & ASSOCIATES
 Structural Engineers
 Rockville, MD, 20852-3973
 Phone (301) 881-9050

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 "USE OF DRAWING AS A BASE SHEET FOR SHOP OR ERECTION DRAWINGS IS ILLEGAL."
 PROJECT No. 2023 017

REVISIONS

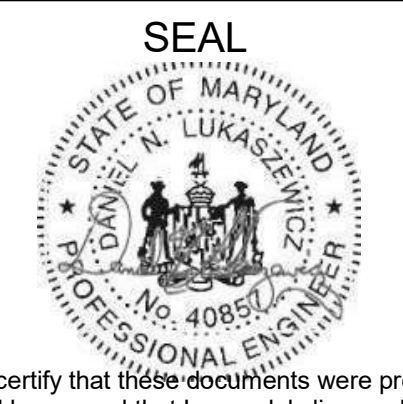
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ISSUANCES

| DATE | ISSUANCE |
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| 10/20/2023 | PERMIT |
| 3/20/2024 | BID SET |

TYPICAL DETAILS

S-200



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KEY PLAN

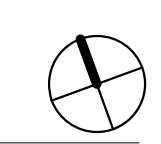


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Table with 2 columns: DATE, ISSUANCE. Includes a row for 'ISSUANCES' with dates 03/12/2024 and 03/20/2024.

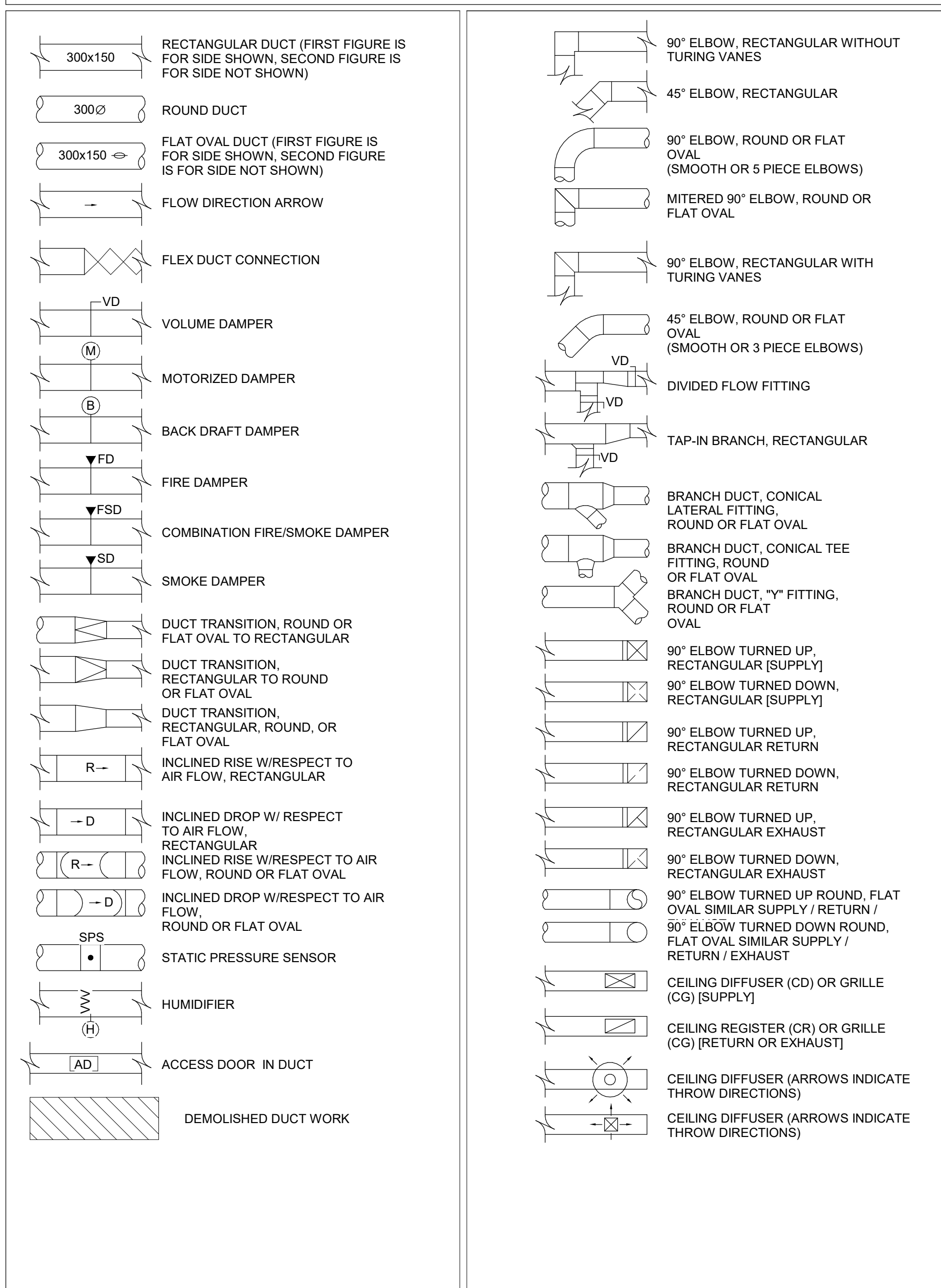
MECHANICAL COVER SHEET

M-001

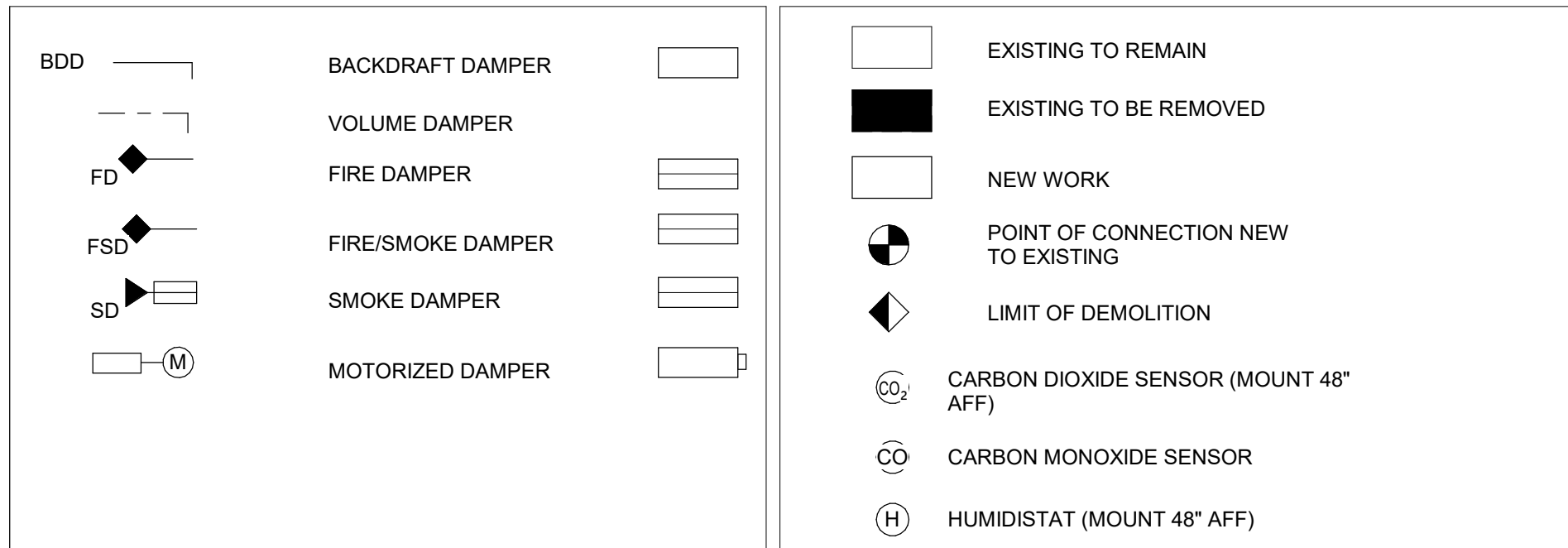
MECHANICAL GENERAL NOTES

- 1. THE INTENT OF THESE DRAWINGS IS TO PROVIDE COMPLETE AND PROPERLY FUNCTIONING HVAC SYSTEMS... 2. THE ELECTRICAL CONTRACTOR IS REQUIRED TO PROVIDE POWER FOR ALL MECHANICAL EQUIPMENT... 3. ALL WORK ON THIS PROJECT SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST APPLICABLE CODES AND REGULATIONS...

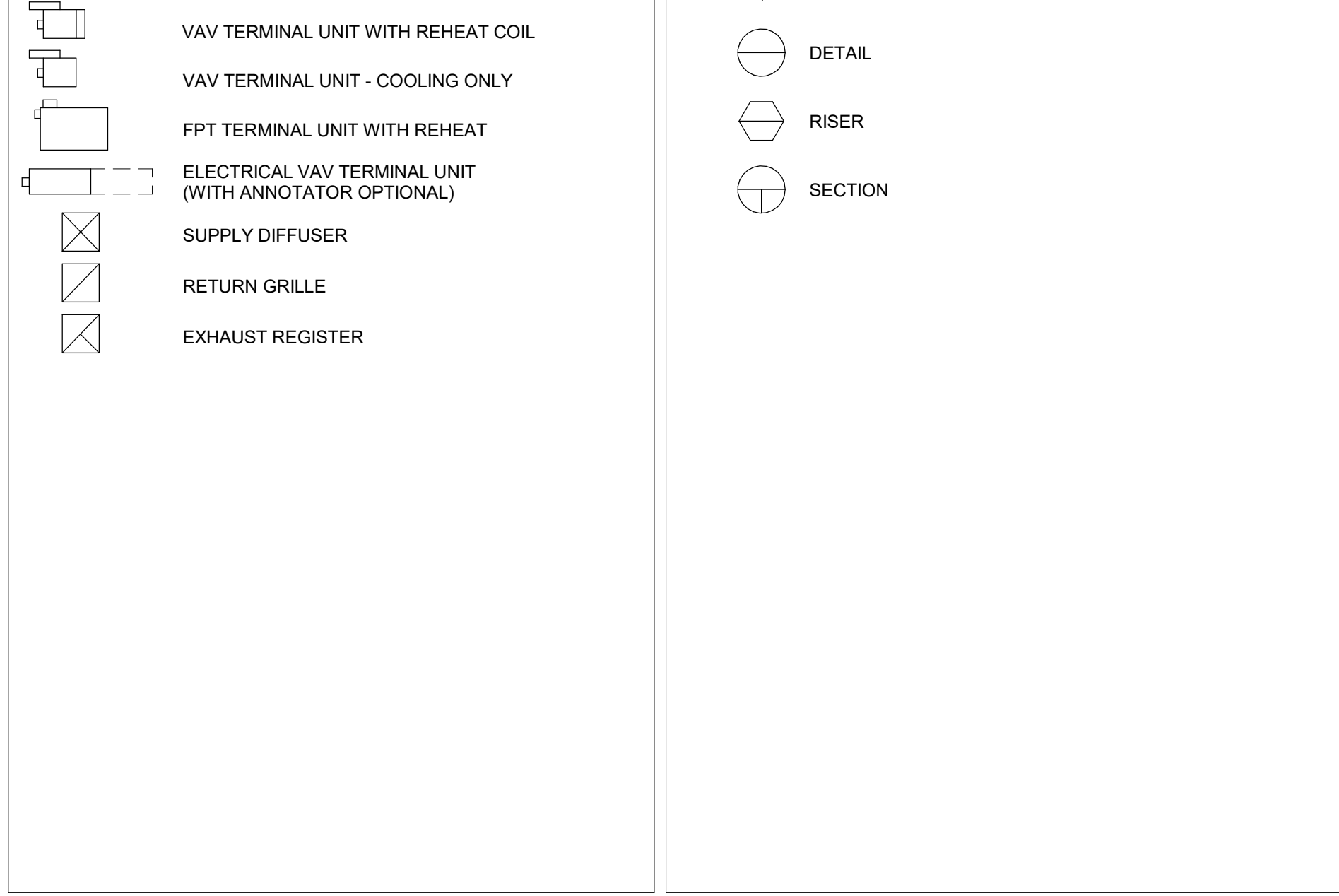
DOUBLE LINE DUCTWORK



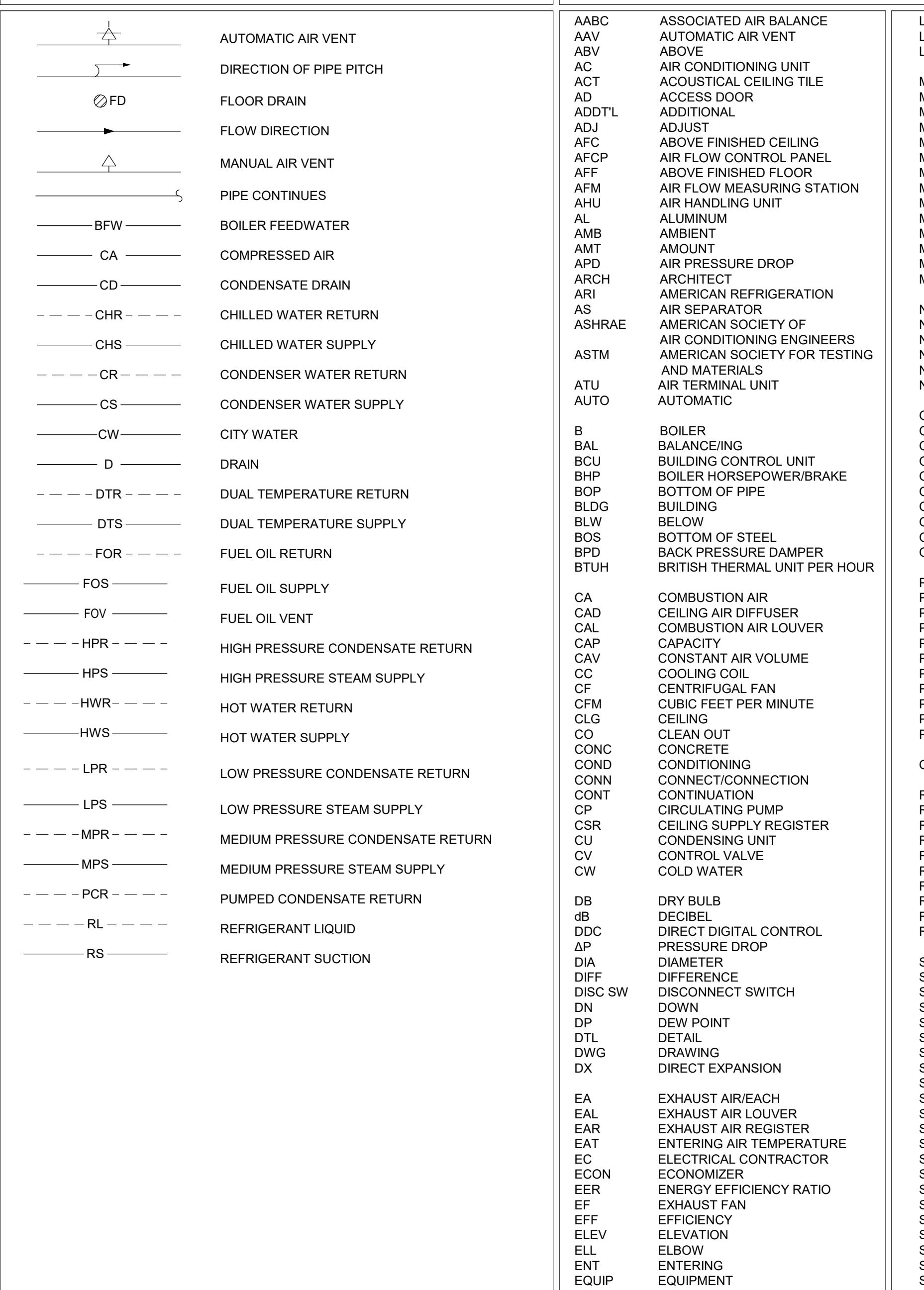
DUCTWORK ACCESSORIES



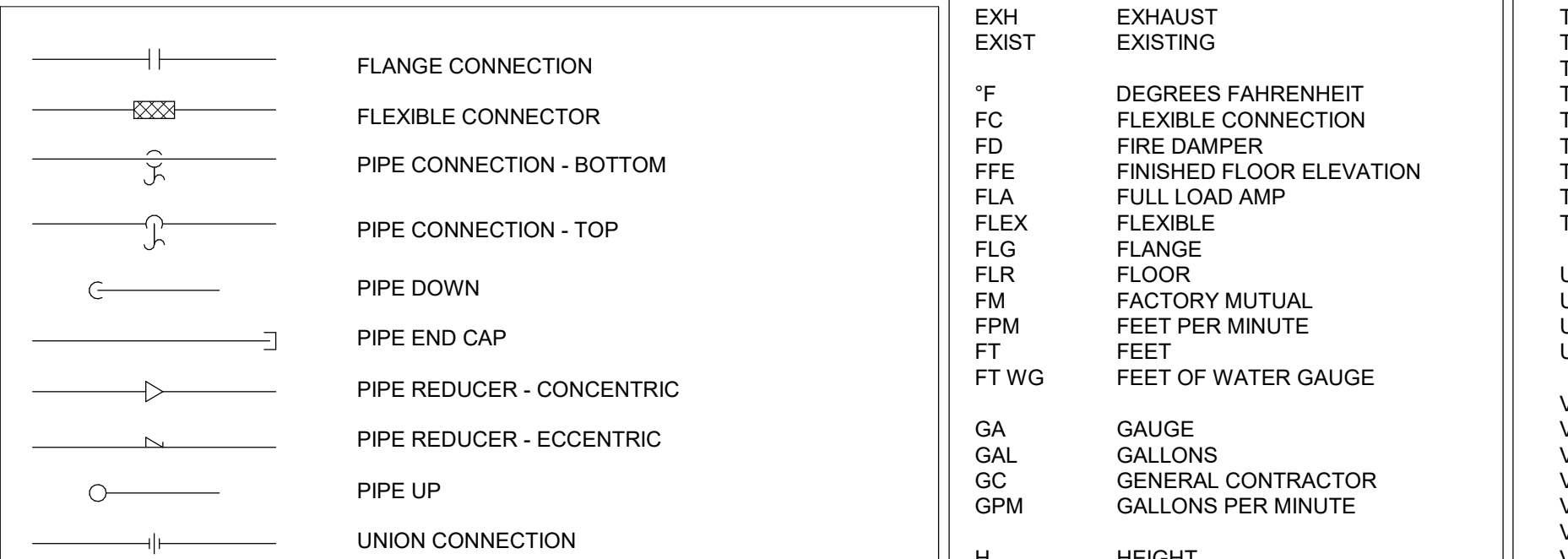
EQUIPMENT



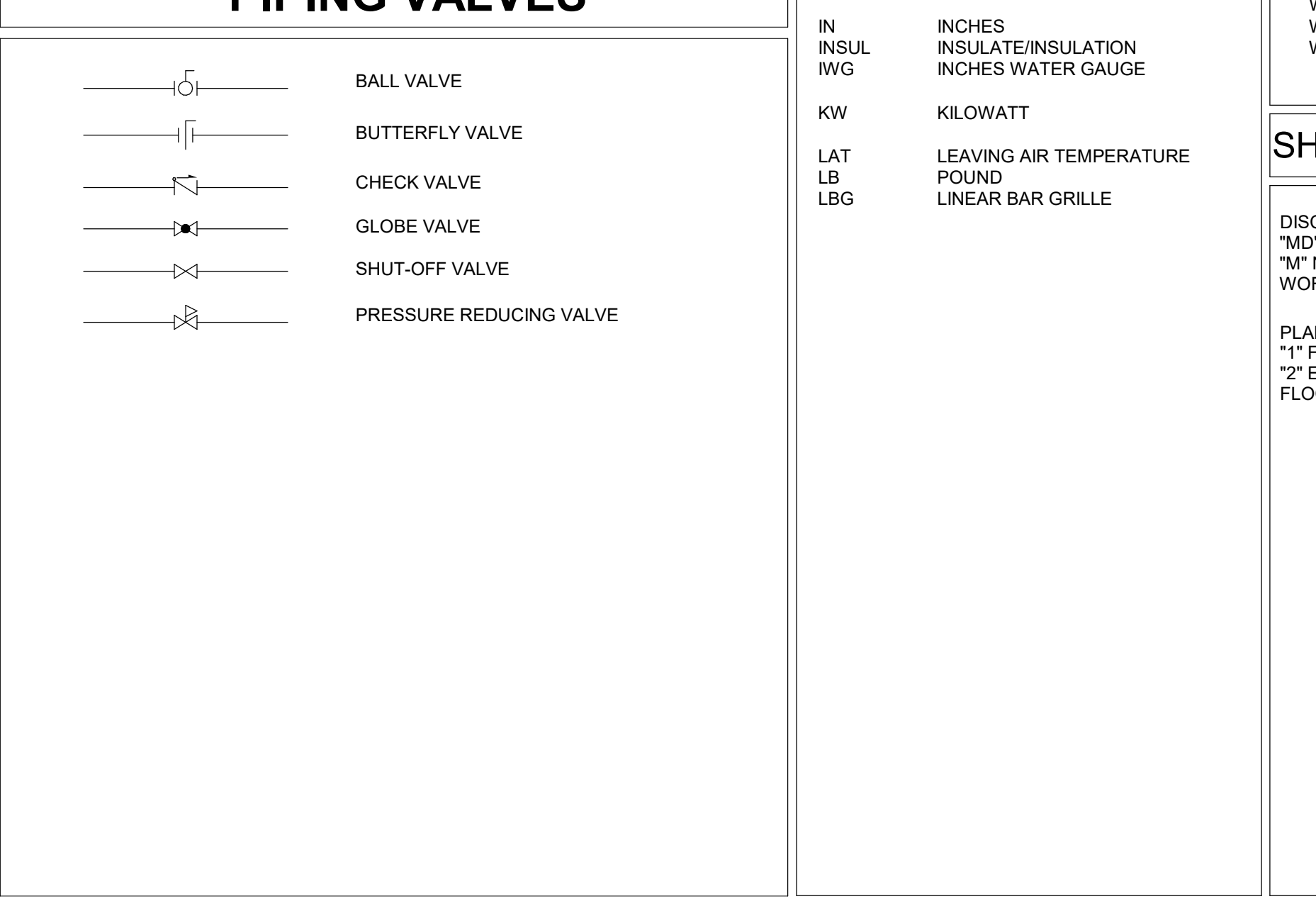
GENERAL PIPING



PIPE FITTINGS/CONNECTIONS



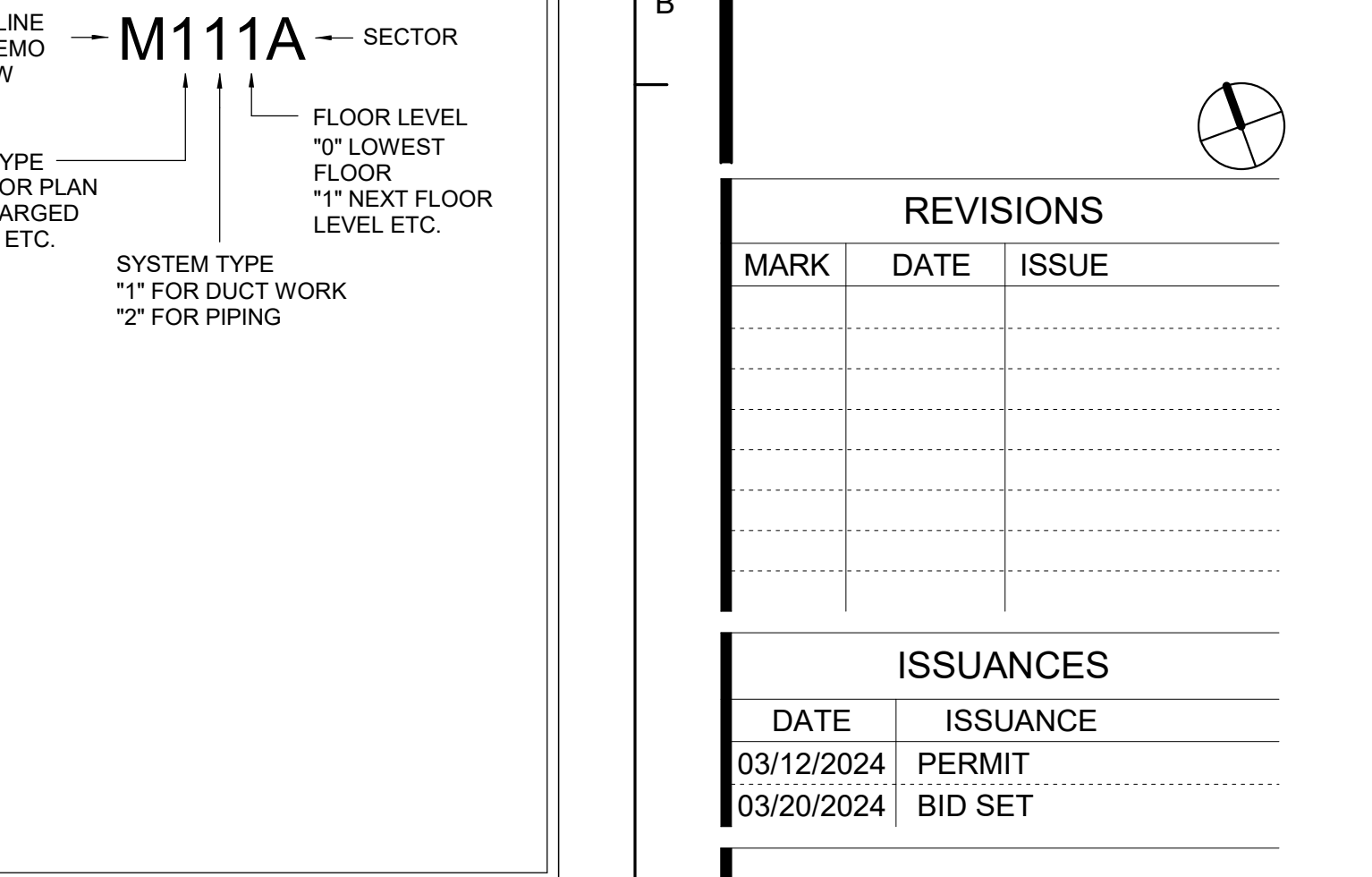
PIPING VALVES



ABBREVIATIONS

Table listing abbreviations and their corresponding full names, such as AABC ASSOCIATED AIR BALANCE, AV AUTOMATIC AIR VENT, AVB ABOVE, AC AIR CONDITIONING UNIT, etc.

SHEET NUMBERING LEGEND



LEGEND

NOT IN CONTRACT AREA

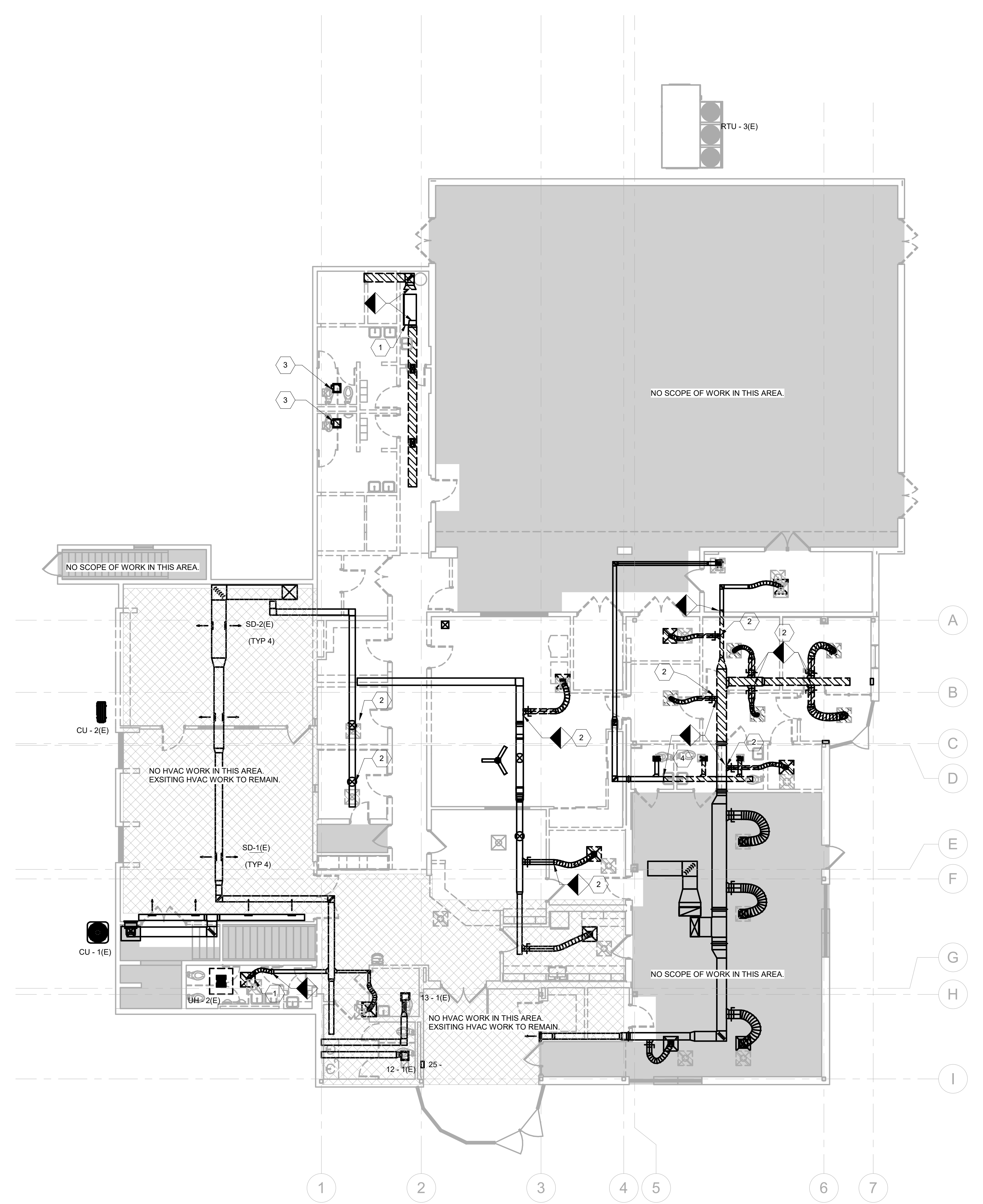
NO HVAC WORK AREA

GENERAL NOTES

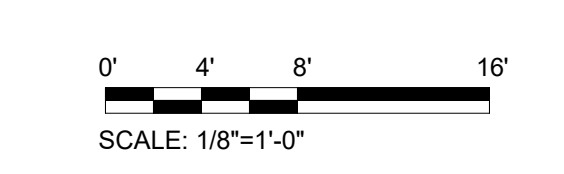
- REFER TO M001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.
- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING AND EQUIPMENT INSTALLATION.
- ALL EQUIPMENT SHALL BE INSTALLED AT MINIMUM 10'-0" FROM ROOF EDGES.

KEYED NOTES

- DEMOLISH DIFFUSERS, DUCTS AND ASSOCIATED APPURTENANCES AFTER THIS POINT BACK TO THE AIR HANDLING UNIT.
- DEMOLISH DIFFUSERS, DUCTS AND ASSOCIATED APPURTENANCES AFTER THIS POINT BACK TO MAIN TRUNK. CAP THE OPENING FOR RECONNECTION UP ON THE NEW WORK.
- DEMOLISH EXHAUST FAN AND DUCT AFTER THIS POINT.
- DEMOLISH EXHAUST DUCTWORK TO POINT SHOWN AND CAP END.



2 FIRST FLOOR MECHANICAL PLAN - DEMOLITION
1/8" = 1'-0"

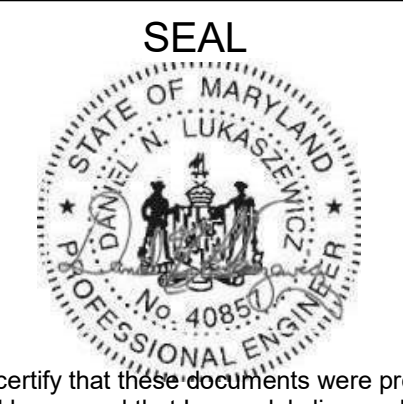


LINCOLN PARK COMMUNITY CENTER

PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850

OWNER: THE CITY OF ROCKVILLE

PROJ. NO.: 19/6A



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KEY PLAN

REVISIONS

| MARK | DATE | ISSUE |
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| 03/12/2024 | PERMIT |
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FIRST FLOOR MECHANICAL PLAN - DEMOLITION

MD-111

LEGEND

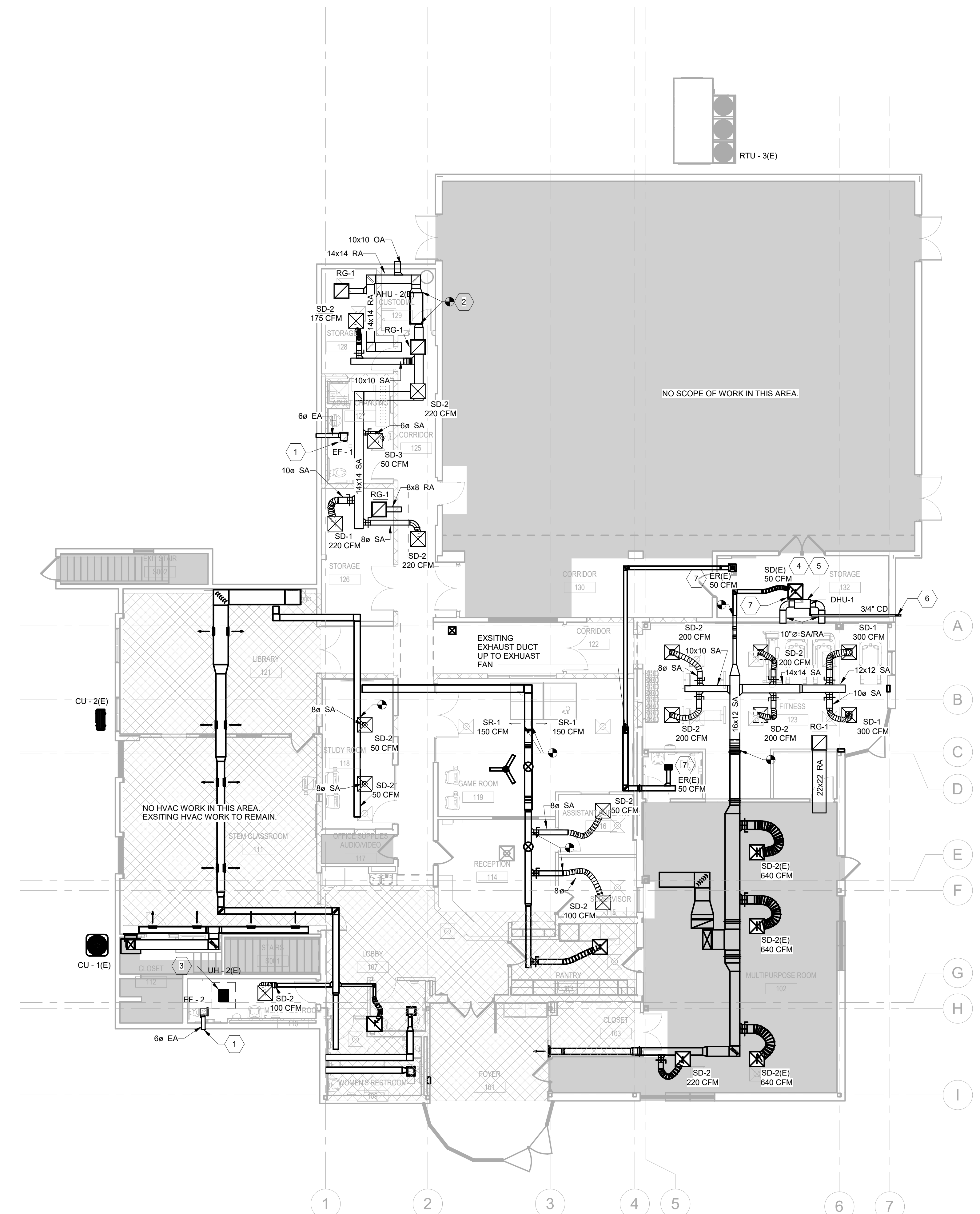
- [Solid Grey Box] NOT IN CONTRACT AREA
- [Cross-hatched Box] NO HVAC WORK AREA

GENERAL NOTES

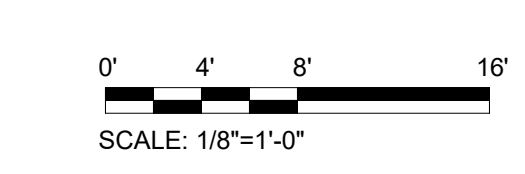
- REFER TO M001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.
- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING AND EQUIPMENT INSTALLATION.
- ALL EQUIPMENT SHALL BE INSTALLED AT MINIMUM 10'-0" FROM ROOF EDGES.

KEYED NOTES

- PROVIDE EXHAUST FAN. EXTEND THE DUCT AND TERMINATE WITH VENT CAP THROUGH WALL.
- CONNECT DUCT TO THE EXISTING AHU. REFURBISH, CLEAN AND SERVICE AHU AS REQUIRED TO GOOD WORKING CONDITION.
- REINSTALL UNIT HEATER IN THE NEW CEILING.
- PROVIDE DEHUMIDIFIER APRILAIRE E080 OR APPROVED EQUAL WITH 120V PLUG-IN CONNECTION.
- THE UNIT WILL BE INSTALLED BELOW THE CEILING AROUND ±8 FEET AFF. AND SUPPORTED FROM THE FLOOR. CONTRACTOR TO PROVIDE THE CLEARANCES IN COMPLIANCE WITH MANUFACTURERS REQUIREMENTS. PROVIDE DUCTED INLET AND DISCHARGE TERMINATED WITH STAINLESS STEEL WIRE MESH FLASH WITH THE WALL AT THE GYM SPACE SIDE. ALL ELBOWS SHALL BE LONG RADIUS ELBOWS.
- 3/4" CD SCHEDULE 80 PVC OR CPVC DN. TERMINATE WITH SPLASH BLOCK ON GRASS AREA.
- BALANCE SUPPLY/EXHAUST AIR DEVICE TO CFM SHOWN.



1 FIRST FLOOR MECHANICAL PLAN - NEW WORK
1/8" = 1'-0"

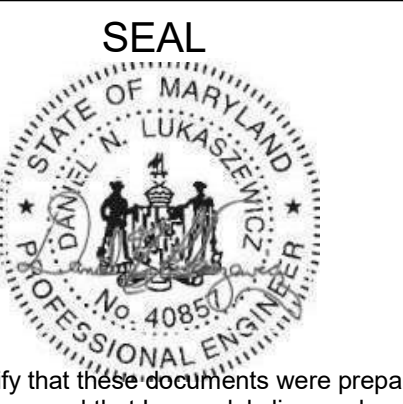


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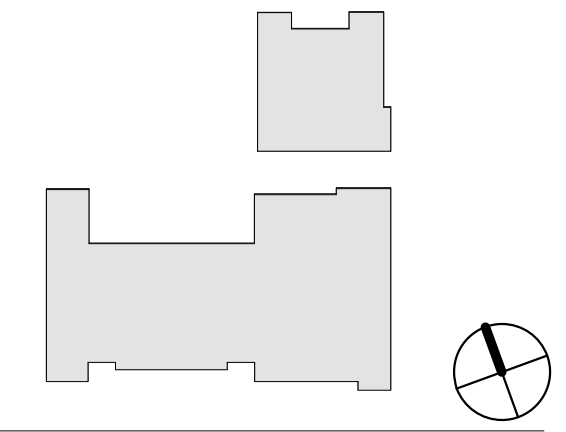
OWNER: THE CITY OF ROCKVILLE

PROJ. NO.: 19/16A



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KEY PLAN



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ISSUANCES

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FIRST FLOOR HVAC PLAN - NEW WORK

M-111

LEGEND

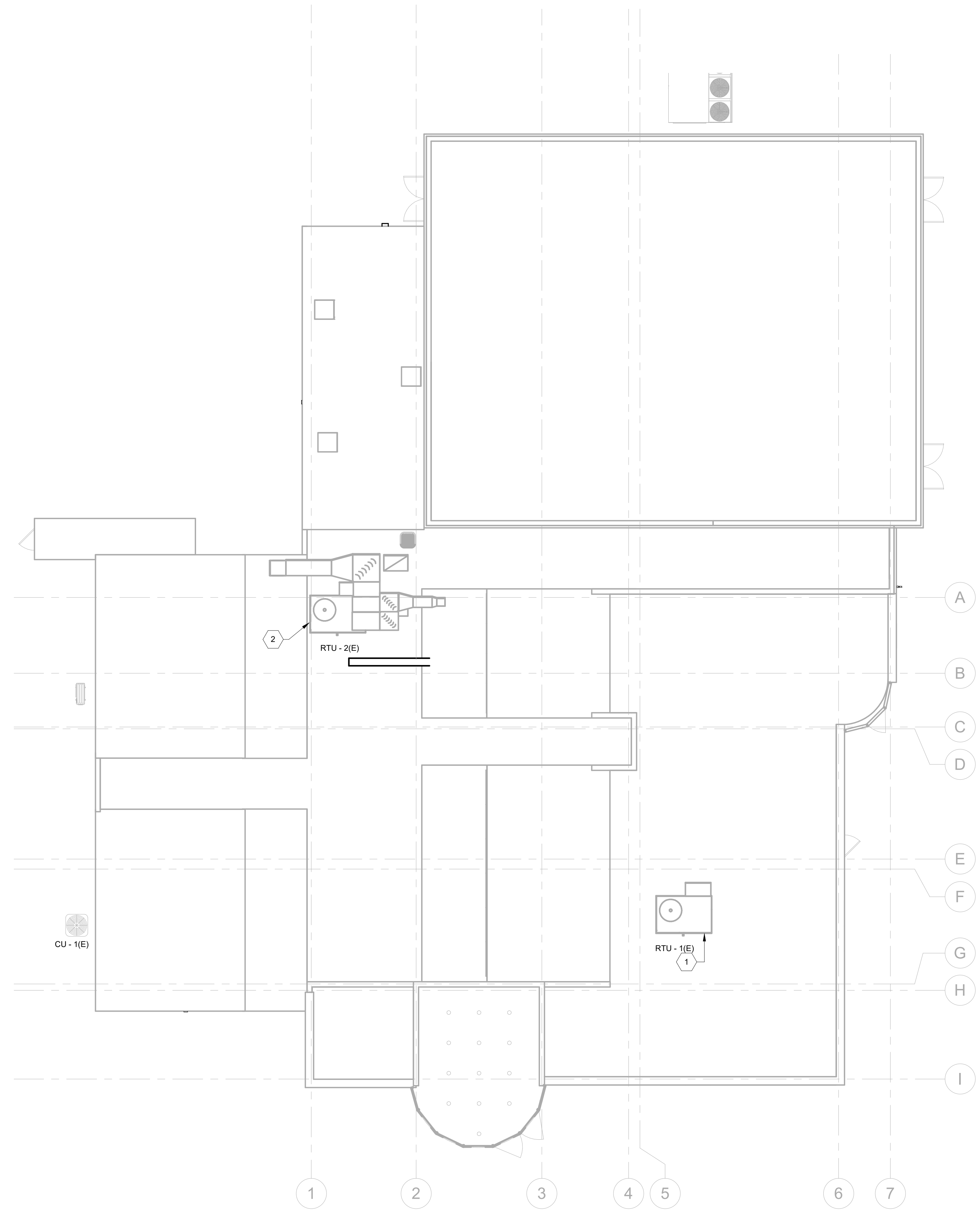
-  NOT IN CONTRACT AREA
-  NO HVAC WORK AREA

GENERAL NOTES

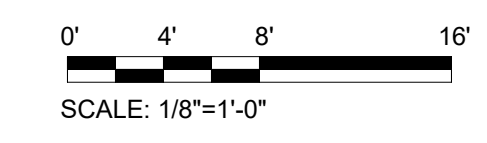
- REFER TO M001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.
- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING AND EQUIPMENT INSTALLATION.
- ALL EQUIPMENT SHALL BE INSTALLED AT MINIMUM 10'-0" FROM ROOF EDGES.

KEYED NOTES

- RE-BALANCE EXISTING RTU TO 4000 CFM SUPPLY AIR WITH A MINIMUM 855 OUTDOOR AIR.
- RE-BALANCE EXISTING RTU TO NEW CFM REQUIREMENT.



2 ROOF PLAN HVAC PLAN - NEW WORK
1/8" = 1'-0"



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| 03/20/2024 | BID SET |

ROOF HVAC PLAN - NEW WORK

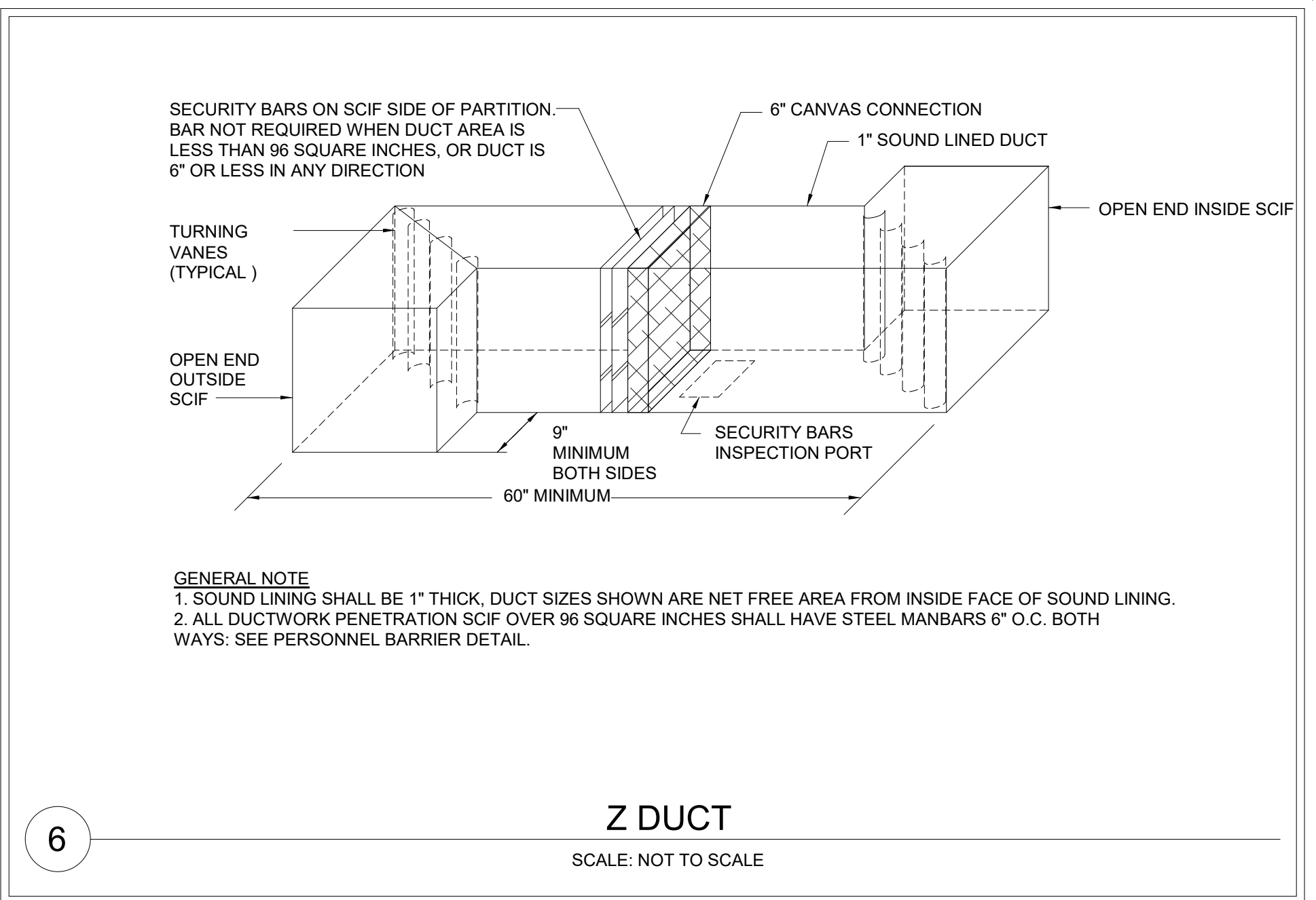
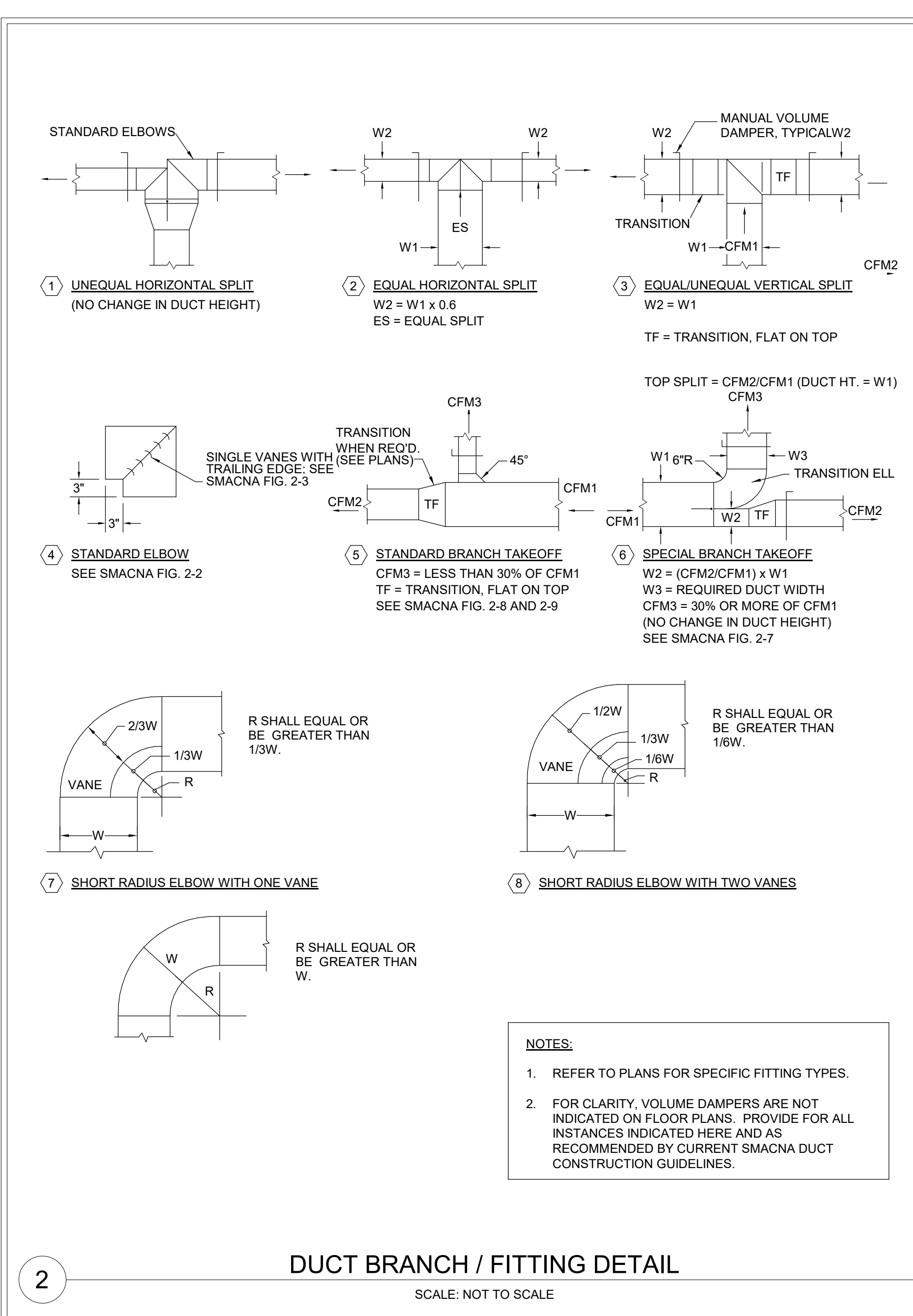
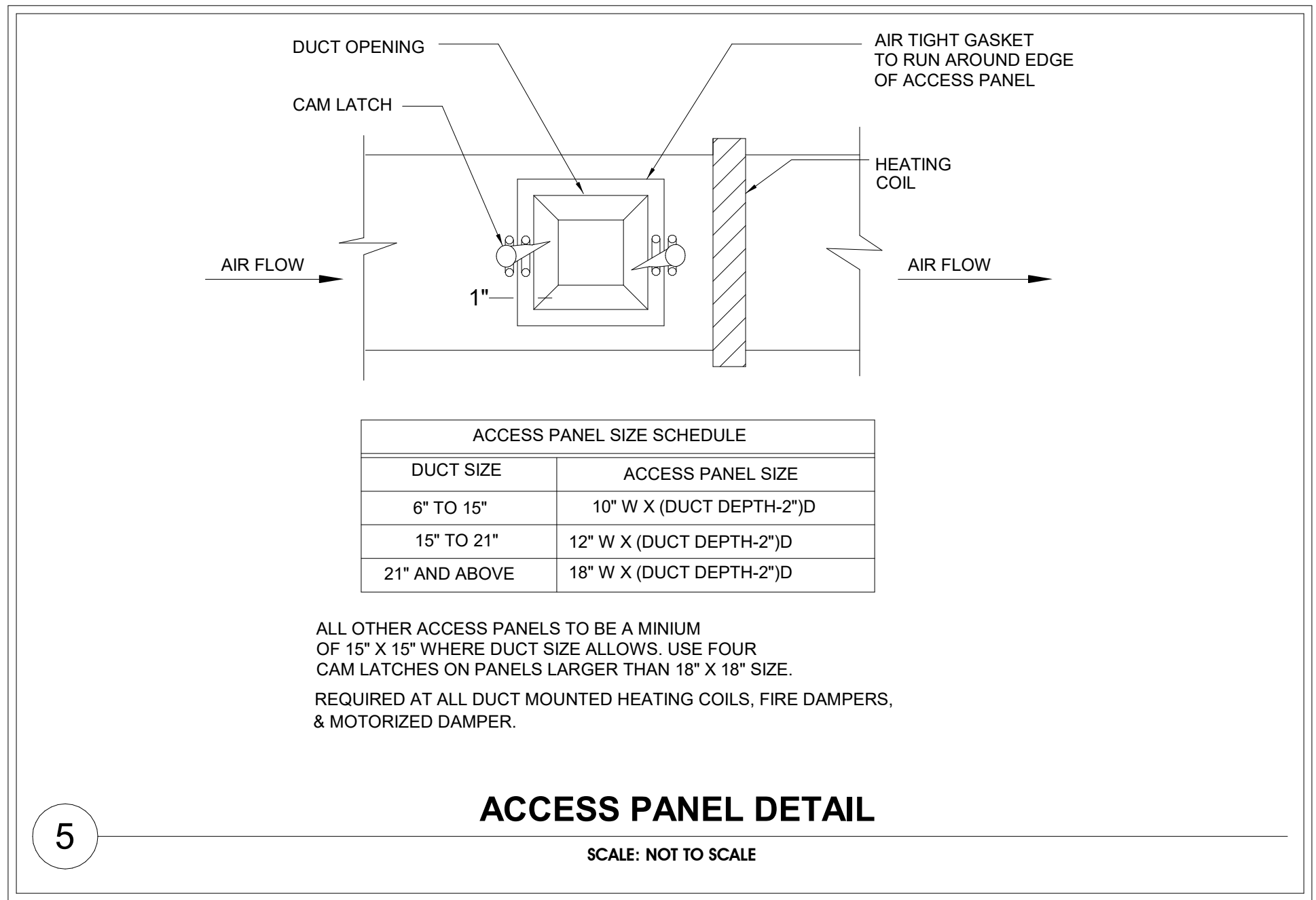
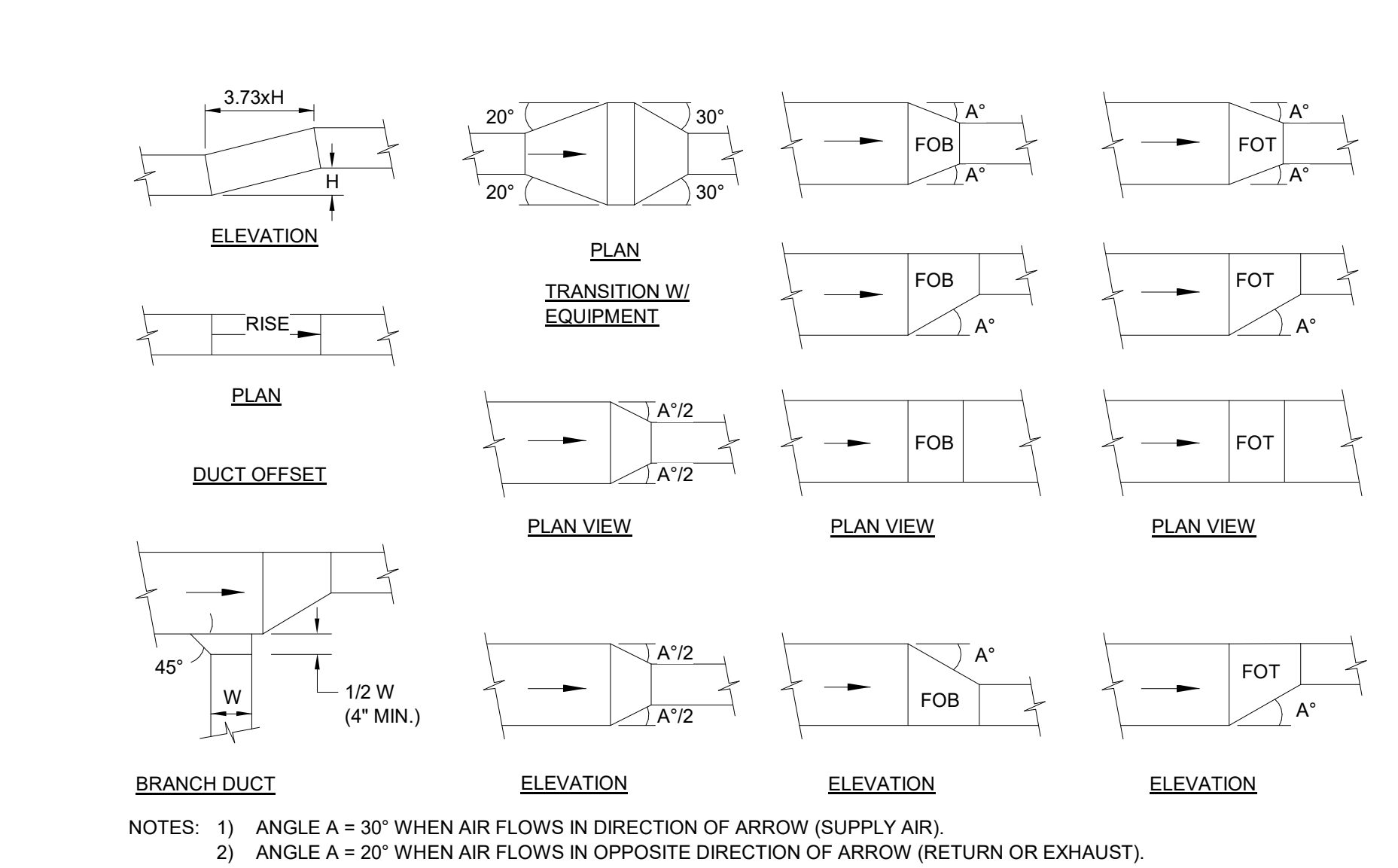
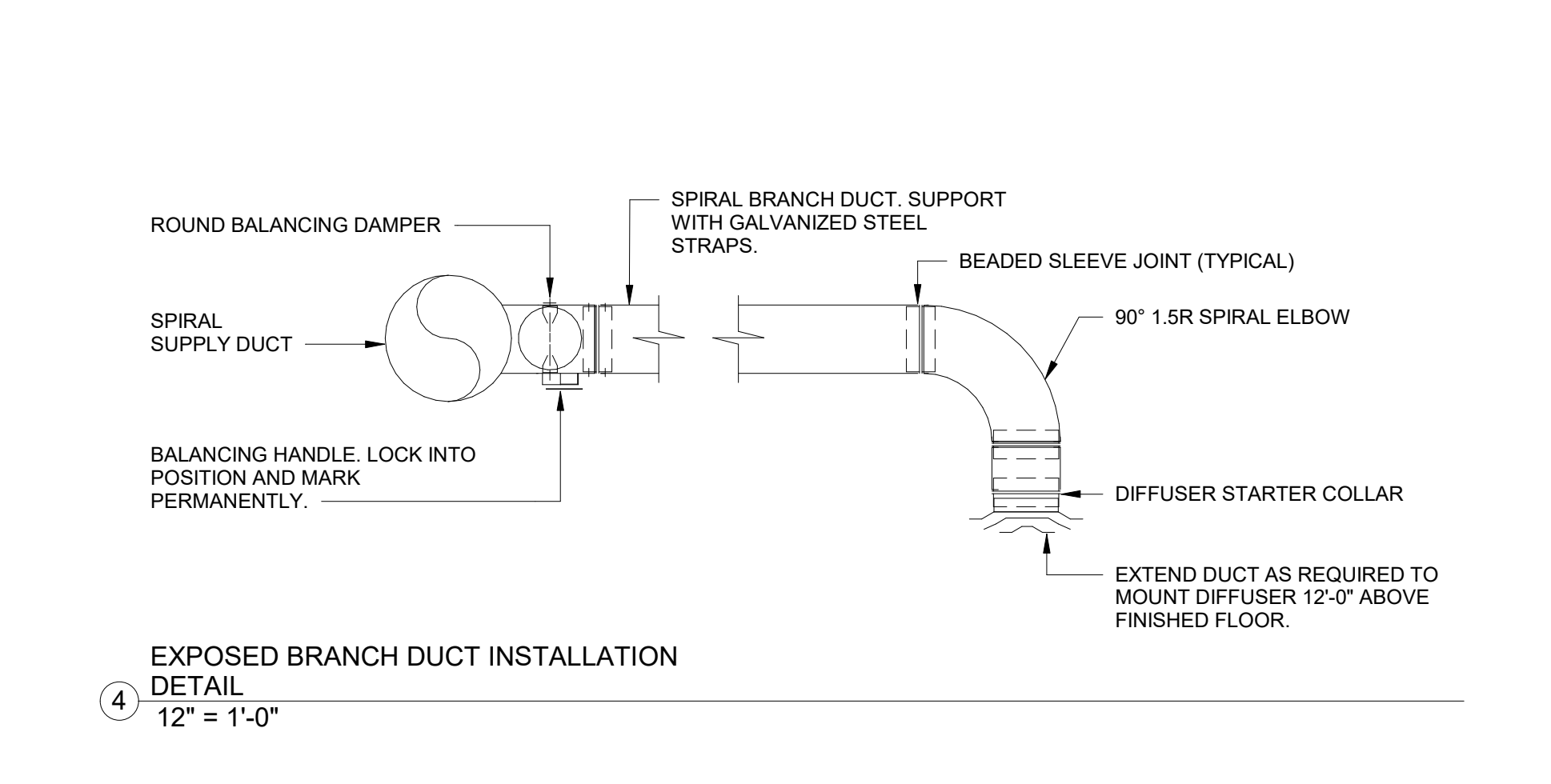
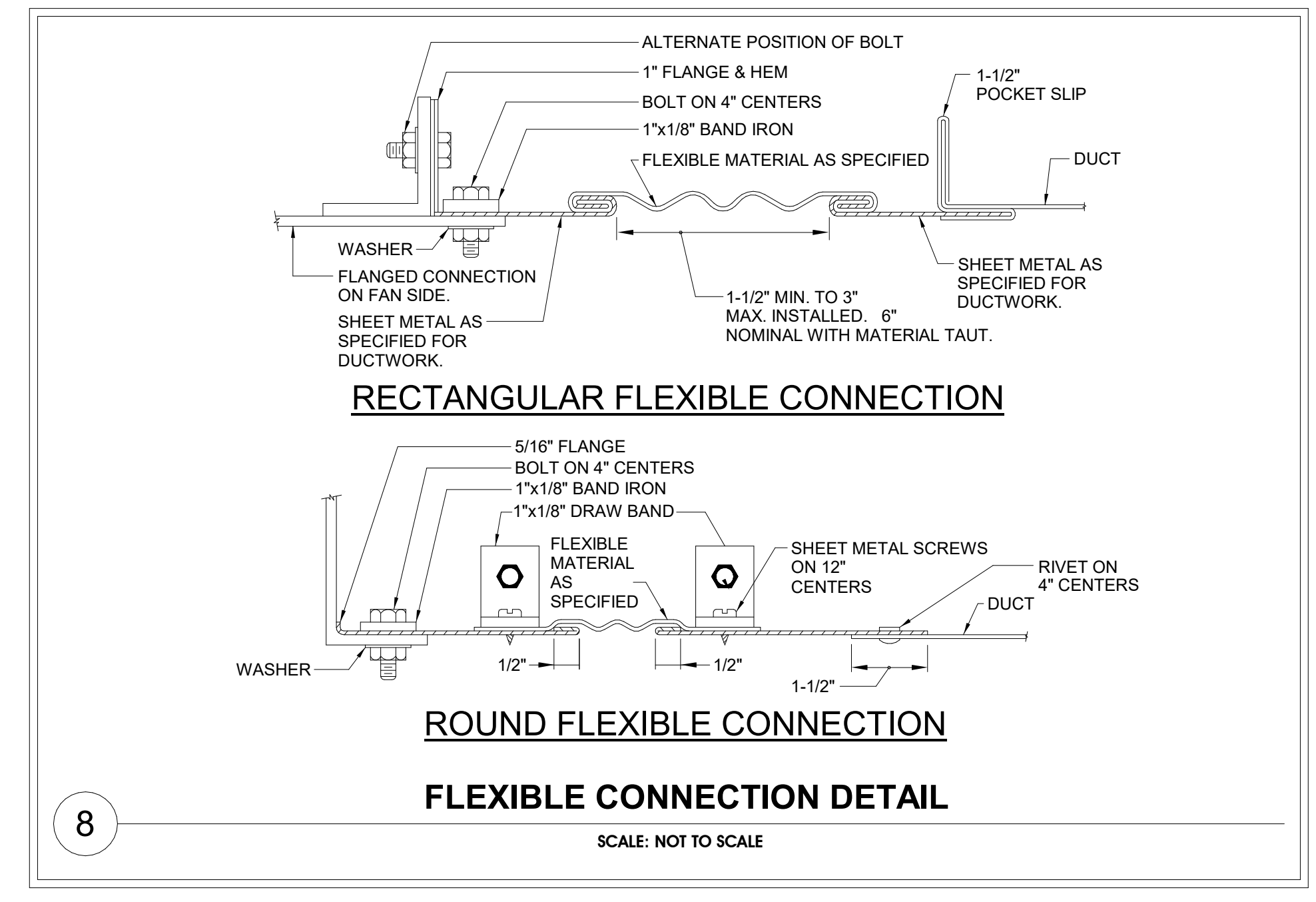
M-112

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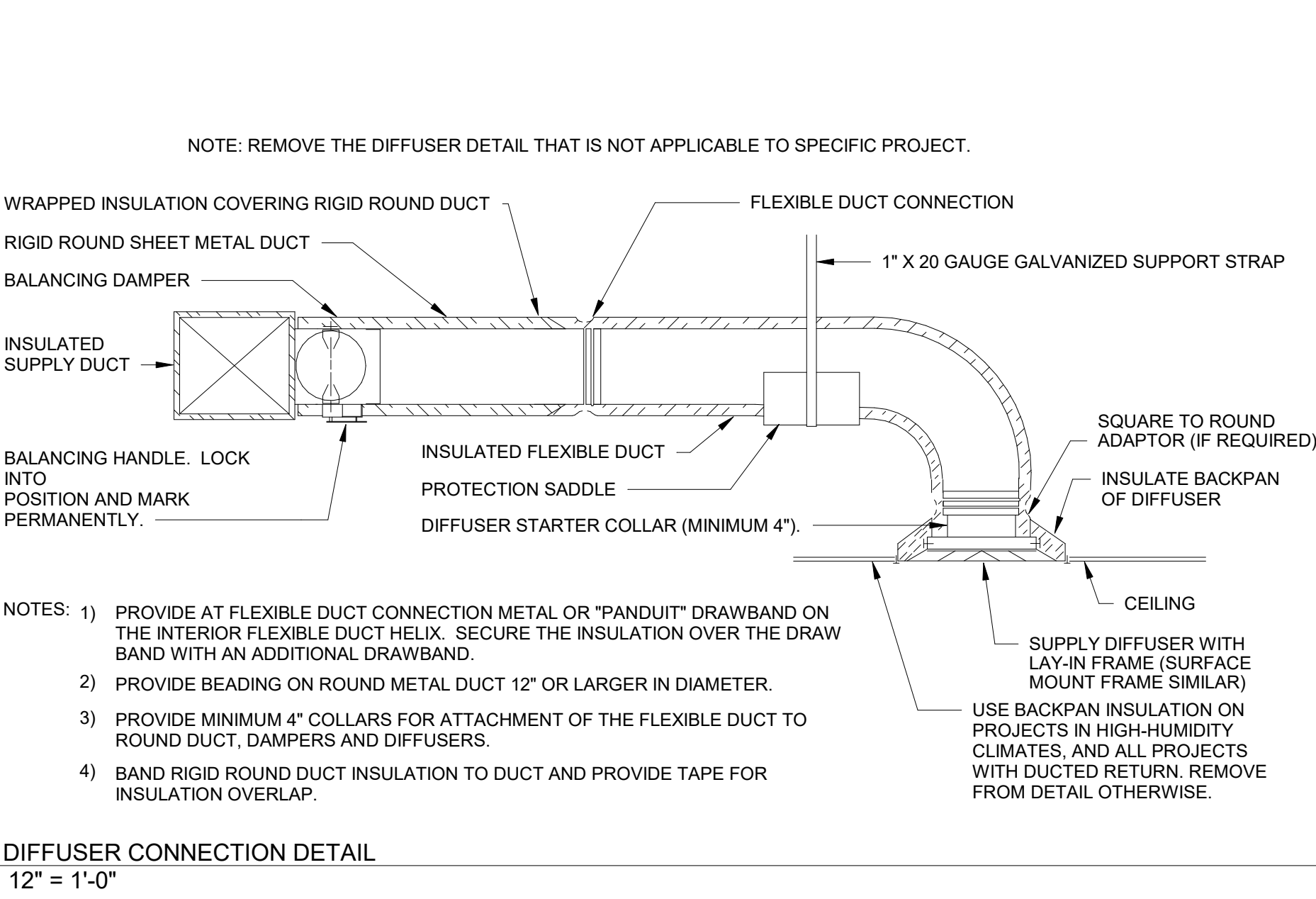
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DUCT CONSTRUCTION AND LEAKAGE CLASS TABLE
 SCALE: NOT TO SCALE

| DUCT INVOLVED | DUCT PRESSURE CLASS TABLE | MINIMUM PRESSURE CLASS (W.G. IN.) | DUCTWORK | | | REMARKS | |
|---|---------------------------|-----------------------------------|--------------------------------------|-------------------------------------|-------|---------|-------|
| | | | ROUND/OVAL DUCT SEAL/DUCT LEAK CLASS | RECTANGLE DUCT SEAL/DUCT LEAK CLASS | | | |
| | | | | CLASS | CLASS | | CLASS |
| FROM OUTSIDE AIR LOUVER TO AHU | N | 2 | A | 6 | A | 8 | 1.4 |
| FROM AHU TO TERMINAL BOXES IN FL CEILINGS | P | 4 | A | 3 | A | 6 | 1.2 |
| FROM TERMINAL BOXES TO ROOM OUTLETS | P | 2 | A | 6 | A | 8 | 1.3 |
| FROM CEILING REGISTER TO RETURN FAN | N | 2 | A | 3 | A | 6 | 1.5 |
| FROM CEILING REGISTER TO EXHAUST FAN | N | 2 | A | 6 | A | 8 | 1.6 |
| FROM EXHAUST FAN TO LOUVER | P | 2 | A | 6 | A | 8 | 1.7 |
| MAIN SA DUCT IN MER AND INSIDE SHAFTS | P | 6 | A | 3 | A | 6 | 1.8 |

NOTES:
 1. TEST IN ACCORDANCE WITH SPEC SECTION 23 05 83, "HVAC TESTING, ADJUSTING, AND BALANCING FOR HVAC"
 2. INCLUDES DUCTWORK FROM FAN DISCHARGE TO UPSTREAM SIDE OF AIR TERMINAL UNITS.
 3. INCLUDES DUCTWORK DOWNSTREAM OF AIR TERMINAL UNITS ONLY.
 4. INCLUDES LOUVER PLENUM AND DUCTWORK TO AHU OUTDOOR AIR INTAKE CONNECTION.
 5. INCLUDES DUCTWORK FROM FURTHEST REGISTER/GRILLE CONNECTION TO AHU RETURN AIR CONNECTION.
 6. INCLUDES DUCTWORK FROM FURTHEST REGISTER/GRILLE CONNECTION TO EXHAUST FAN THROAT.
 7. INCLUDES DUCTWORK FROM RETURN FAN DISCHARGE TO OUTDOOR EXHAUST PLENUM/LOUVER CONNECTION.
 8. INCLUDES MAIN SA DUCT INSIDE SHAFTS WITH CONNECTION TO MAIN BRANCHES AT EACH FLOOR.



AIR DEVICES SCHEDULE

| MARK | MANUFACTURER | MODEL NO. | SERVICE | TYPE | NECK SIZE | GRD-FACE SIZE | NC | REMARKS |
|------|--------------|-----------|---------|------------------------|-----------|---------------|----|---------|
| RG-1 | TITUS HVAC | 350RL | RETURN | PERFORATED FACE RETURN | 22"X22" | 24"X24" | 28 | ALL |
| SD-1 | TITUS HVAC | PAS | SUPPLY | PERFORATED FACE SUPPLY | 10" Ø | 24"X24" | 28 | ALL |
| SD-2 | TITUS HVAC | PAS | SUPPLY | PERFORATED FACE SUPPLY | 8" Ø | 24"X24" | 28 | ALL |
| SD-3 | TITUS HVAC | PAS | SUPPLY | PERFORATED FACE SUPPLY | 6" Ø | 24"X24" | 28 | ALL |
| SR-1 | TITUS | 300RS | | | | | | |

REMARKS

- 1) FINISH AS PER ARCHITECT.
- 2) PROVIDE WITH OPPOSED BLADE DAMPER.
- 3) PROVIDE WITH INSULATED PLENUM BOX.
- 4) PROVIDE FRAME TYPE AS PER CEILING TYPE.

EXHAUST FAN SCHEDULE

| EQUIP ID | EQUIPMENT NUMBER | BASIS OF DESIGN | | SERVICE | AIRFLOW | DRIVE TYPE | ESP | FAN SPEED | FAN TYPE | POWER | VOLTAGE | PHASE | Hz | MCA | MOCP | WEIGHT | REMARKS |
|----------|------------------|-----------------|------------|--------------------|---------|------------|------------|--------------|-------------|---------|---------|-------|-------|-----|------|--------|---------|
| | | MANUFACTURER | MODEL | | | | | | | | | | | | | | |
| EF | 1 | GREENHECK | SP-A200-VG | MENS 110 | 125 CFM | DIRECT | 0.25 in-wg | 1750.000 RPM | CENTRIFUGAL | 100.0 W | 277 V | 1 | 60 Hz | 4 A | 15 A | | |
| EF | 2 | GREENHECK | SP-A200-VG | ADULT CHANGING 127 | 225 CFM | DIRECT | 0.25 in-wg | 1750.000 RPM | CENTRIFUGAL | 100.0 W | 277 V | 1 | 60 Hz | 4 A | 15 A | | |

REMARKS

- 1) PROVIDE WITH FACTORY PRE-WIRED PLUG-STYLE DISCONNECT SWITCH.
- 2) PROVIDE WITH UNIT MOUNTED AND WIRED FAN SPEED CONTROLLER.
- 3) PROVIDE WITH WHITE ANNOZZED ALUMINUM GRILLE.
- 4) PROVIDE WITH INTEGRAL BACKDRAFT DAMPER.
- 5) EXHAUST FAN SHALL BE POWERED THROUGH THE ROOM'S LIGHTING CONTROL SWITCH. FAN TO OPERATE WHEN LIGHTS ARE ON DISENGAGE WHEN LIGHTS TURN OFF.

VENTILATION CALCULATION

RTU-1(E)

| System Name and Number | Condition Analyzed (impacts Ez) | Occupancy Category | Zone Floor Area Az (sq ft) | Are you using default value for zone population? | Zone Population Pz people | People Outdoor Air Rate Rp (cfm per person) | Area Outdoor Air Rate Ra (cfm per sq ft) | Breathing Zone Outdoor Airflow Vbz (cfm) | Zone Air Distribution Effectiveness Ez | Zone Outdoor Airflow Voz (cfm) | Outdoor air intake flow provided (measured or design) (cfm) | Rp Pz + Ra Az | |
|------------------------|---------------------------------|------------------------|----------------------------------|--|---------------------------------|---|--|--|---|--------------------------------------|--|---------------|----------|
| | | | | | | | | | | | | Vbz / Ez | Vbz / Ez |
| 132 STORAGE | Cooling | Storage rooms | 194 | Yes | 0.00 | 0.00 | 0.12 | 0.00 | 1.00 | 0 | 25 | | |
| 123 FITNESS | Cooling | Health club / aerobics | 618 | No | 14.00 | 20.00 | 0.06 | 317.08 | 1.00 | 317 | 320 | | |
| 122 CORRIDOR | Cooling | Corridors | 190 | Yes | 0.00 | 0.00 | 0.06 | 11.40 | 1.00 | 11 | 12 | | |
| 106 STORE | Cooling | Storage rooms | 36 | Yes | 0.00 | 0.00 | 0.12 | 4.32 | 1.00 | 4 | 5 | | |
| 105 ALL GENDER | Cooling | Storage rooms | 36 | Yes | 0.00 | 0.00 | 0.12 | 4.32 | 1.00 | 4 | 5 | | |
| 103 CLOSET | Cooling | Storage rooms | 85 | Yes | 0.00 | 0.00 | 0.12 | 10.20 | 1.00 | 10 | 10 | | |
| 102 MULTIPURPOSE ROOM | Cooling | Multi-purpose assembly | 1,094 | No | 73.00 | 5.00 | 0.06 | 430.64 | 1.00 | 431 | 435 | | |
| 101 FOYER | Cooling | Storage rooms | 324 | Yes | 0.00 | 0.00 | 0.12 | 38.88 | 1.00 | 39 | 40 | | |

DEHUMIDIFICATION UNIT SCHEDULE

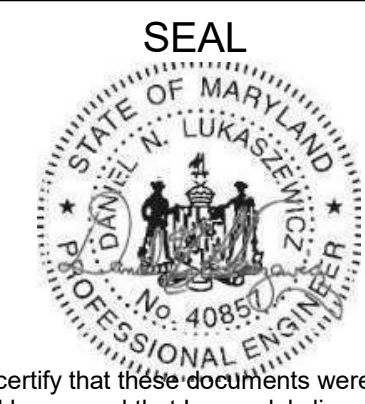
| MARK | MANUFACTURER | SERVICE | AIRFLOW | MOISTURE REMOVAL | FILTER | V/PH/Hz | AMPS | REFRIGERANT | NOISE |
|---------|---|-------------|---------|------------------|--------|----------|------|-------------|--------|
| DHU-1 | APRILAIRE | FITNESS 123 | 185 CFM | 10 GAL/DAY | MERV 8 | 120/1/60 | 5.1 | R410A | 45 DBA |
| REMARKS | | | | | | | | | |
| 1 | BUILT-IN AUTOMATIC DIGITAL CONTROL WITH DISPLAY. | | | | | | | | |
| 2 | CAN BE SET UP FOR DEHUMIDIFICATION AND VENTILATION OR ZONING. | | | | | | | | |
| 3 | 5 YEAR BUILT-IN AUTOMATIC DIGITAL CONTROL WITH DISPLAY AND WARRANTY | | | | | | | | |

LINCOLN PARK COMMUNITY CENTER

PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850

OWNER: THE CITY OF ROCKVILLE

PROJ. NO.: 19/16A



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License number: 40857 Expiration date: 08/09/2025

KEY PLAN

REVISIONS

| MARK | DATE | ISSUE |
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ISSUANCES

| DATE | ISSUANCE |
|------------|----------|
| 03/12/2024 | PERMIT |
| 03/20/2024 | BID SET |

SCHEDULES

M-502

PLUMBING GENERAL CONDITIONS

THE INTENT OF THESE DRAWINGS IS TO PROVIDE COMPLETE AND PROPERLY FUNCTIONING PLUMBING SYSTEMS. PROVIDE ALL LABOR AND MATERIAL NECESSARY TO ACHIEVE SUCH ENDS. CONTRACTOR IS OBLIGATED TO EXAMINE PLANS. ANY OBSERVED FAULTS OR AMBIGUITY IN THESE PLANS SHALL BE CALLED TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE IMMEDIATELY. SO THAT THE MATTER MAY BE RESOLVED PRIOR TO SUBMISSION OF BIDS. BY SUBMISSION OF BID, THE CONTRACTOR SHALL ACKNOWLEDGE ACCEPTANCE OF THESE PLANS AS AN ADEQUATE DEFINITION OF THE SCOPE OF WORK AND EXTRA COST CLAIMS BASED ON INADEQUACY OF PLANS WILL NOT BE CONSIDERED.

ALL WORK ON THIS PROJECT SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS.

THE PLUMBING CONTRACTOR SHALL COORDINATE THE INSTALLATION OF PLUMBING WORK WITH OTHER TRADES. MINOR DEVIATIONS FROM THE PLANS MAY BE MADE TO AVOID MINOR CONFLICTS. WHEN MAJOR CONFLICTS ARE APPARENT, THE ENGINEER SHALL BE ADVISED IMMEDIATELY, AND AFFECTED WORK SHALL NOT BE INSTALLED UNTIL THE CONFLICT HAS BEEN RESOLVED.

CONTRACTOR SHALL OBTAIN AND PAY FOR PERMITS AND ARRANGE FOR INSPECTIONS BY LOCAL AUTHORITIES HAVING JURISDICTION.

PROVIDE OPENINGS IN BUILDING CONSTRUCTION FOR PASSAGE OF PIPING. DO NOT PENETRATE STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL OF ARCHITECT AND STRUCTURAL ENGINEER. VERIFY SLAB PENETRATION LOCATIONS PRIOR TO PROCEEDING WITH WORK IN ORDER TO LOCATE OBSTRUCTIONS EMBEDDED IN SLAB.

ALL NECESSARY ALLOWANCES AND PROVISIONS SHALL BE MADE BY THIS CONTRACTOR FOR BEAMS, COLUMNS OR OTHER OBSTRUCTIONS OF THE BUILDING OR THE WORK OF OTHER CONTRACTORS, WHETHER OR NOT SAME IS INDICATED. WHERE NECESSARY TO AVOID OBSTRUCTIONS THE DUCTS SHALL BE TRANSFORMED, DIVIDED, OFFSET, RAISED OR LOWERED WITH THE REQUIRED FREE AREA BEING MAINTAINED WHILE MAINTAINING DESIGNED CEILING HEIGHTS.

ALL ROTATING PLUMBING EQUIPMENT SHALL BE MOUNTED ON VIBRATION ISOLATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

CONTROLS AND ACCESSORIES FOR EQUIPMENT SHALL BE PROVIDED BY EQUIPMENT MANUFACTURER.

PLUMBING CONTRACTOR SHALL THOROUGHLY CLEAN HIS WORK AREA DAILY AND SHALL ALSO REMOVE ALL TRASH AFTER WORK COMPLETION.

THE WORK DETAILED ON THESE PLANS IS BASED ON PREVIOUSLY PREPARED BASE BUILDING DRAWINGS. IF EXISTING FIELD CONDITIONS ARE DIFFERENT THAN SHOWN, THE CONTRACTOR SHALL ADVISE THE ENGINEER OF DISCREPANCIES WHICH WILL AFFECT THE PROPOSED WORK PRIOR TO BEGINNING WORK.

SYMBOLS SHOWN ON SCHEDULES DEFINE TYPE OF EQUIPMENT ONLY. CONTRACTOR IS RESPONSIBLE FOR RESEARCHING DRAWINGS FOR EXACT QUANTITIES REQUIRED OF EACH TYPE.

CONTRACTOR SHALL VERIFY THAT ALL EQUIPMENT, PIPING, ETC., SHALL BE FREE FROM INTERFERENCE WITH OTHER DISCIPLINES. WHERE CONFLICTS OCCUR, CONTRACTOR SHALL IMMEDIATELY CONTACT THE CONSTRUCTION MANAGER. WHERE THE WORK OF VARIOUS TRADES WILL BE INSTALLED IN CLOSE PROXIMITY TO ONE ANOTHER, OR WHERE THERE IS EVIDENCE THAT THE WORK OF ONE TRADE WILL INTERFERE WITH WORK OF OTHER TRADES, THE CONTRACTOR SHALL ASSIST IN WORKING OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT. IF THE CONTRACTOR ALLOWS ONE TRADE TO INSTALL HIS WORK BEFORE COORDINATING WITH WORK OF OTHER TRADES, THE CONTRACTOR SHALL MAKE NECESSARY CHANGES TO CORRECT THE CONDITION WITHOUT EXTRA CHARGE.

THE CONTRACTOR SHALL LOCATE ALL EQUIPMENT WHICH MUST BE SERVICED, OPERATED, MAINTAINED IN FULLY ACCESSIBLE POSITION. EQUIPMENT SHALL INCLUDE, BUT NOT BE LIMITED TO, VALVES, TRAPS, CLEANOUTS, MOTORS, CONTROLLERS, DRAIN POINTS, ETC. IF REQUIRED FOR ACCESSIBILITY, FURNISH ACCESS DOORS FOR THIS PURPOSE. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE, ALLOW FOR BETTER ACCESSIBILITY, AND ANY CHANGE FOR THAT PURPOSE SHALL BE APPROVED.

ALL EQUIPMENT WHICH REQUIRES INTERFACE WITH THE ELECTRICAL TRADE, SUCH AS CONTROLLING DEVICES, DISCONNECT SWITCHES, MOTORS, ETC., SHALL BE FULLY COORDINATED BETWEEN ALL TRADES.

ALL WORK TO BE GUARANTEED FOR ONE YEAR AGAINST LABOR AND MATERIALS. ANY DEFECTIVE MATERIALS OR WORKMANSHIP, AS WELL AS DAMAGE TO THE WORK OF ALL TRADES RESULTING FROM SAME, SHALL BE REPLACE OR REPAIRED AS DIRECTED FOR THE DURATION OF THE GUARANTEE PERIOD. TIME FOR THIS GUARANTEE SHALL BEGIN FROM THE DATE OF ACCEPTANCE OF THE COMPLETE WORK BY THE OWNER OR HIS APPOINTED REPRESENTATIVE. NOTE: THESE GUANTEES SHALL BE SUBMITTED TO THE CO FOR RECORD PURPOSES.

PROVIDE CUTTING, PATCHING, AND/OR CORE DRILLING OF EXISTING WALLS, FLOORS OR STRUCTURAL MEMBERS AS REQUIRED FOR THE INSTALLATION OF NEW WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING STRUCTURAL ENGINEER'S REVIEW AND APPROVAL AND INFORMING OWNER OR OWNER'S REPRESENTATIVE PRIOR TO PERFORMING THIS WORK. PRIOR TO CORE DRILLING, THE CONTRACTOR SHALL PERFORM X-RAY OF AREA TO BE PENETRATED TO VERIFY PENETRATIONS ARE FREE OF OBSTRUCTIONS IN SLAB.

AS USED IN THE DRAWINGS FOR PLUMBING WORK, CERTAIN NON-TECHNICAL WORDS SHALL BE UNDERSTOOD TO HAVE SPECIFIC MEANINGS AS FOLLOWS REGARDLESS OF INDICATIONS TO THE CONTRARY IN THE GENERAL CONDITION OR OTHER DOCUMENTS GOVERNING THE MECHANICAL WORK.

"FURNISH" - PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY NECESSARY APPURTENANCE AND SUPPORT. ALL AS PART OF THE MECHANICAL WORK. PURCHASING SHALL INCLUDE PAYMENT OF ALL SALES TAXES AND OTHER SURCHARGES AS MAY BE REQUIRED TO ASSURE THAT PURCHASED ITEMS ARE FREE OF ALL LIENS, CLAIMS OR ENCUMBRANCES.

"INSTALL" - UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT, ALL AS PART OF THE MECHANICAL WORK.

"PROVIDE" - "FURNISH" AND "INSTALL".

"NEW" - MANUFACTURED WITHIN THE PAST TWO YEARS AND NEVER BEFORE USED.

PLUMBING GENERAL DEMOLITION NOTES

ON DEMO DRAWINGS ALL DEMO EQUIPMENT, PIPING, ETC. IS SHOWN DARK & HATCHED. ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC. IS SHOWN LIGHT.

ON NEW WORK DRAWINGS ALL NEW EQUIPMENT, PIPING, ETC. IS SHOWN DARK. ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC. IS SHOWN LIGHT.

EXISTING CONDITIONS WERE TAKEN FROM ORIGINAL DRAWINGS AND SITE VISITS AND MAY NOT REFLECT EXACT AS-BUILT CONDITIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTING FINAL BID. COORDINATE NEW WORK AND DEMOLITION WITH OTHER DISCIPLINES AND EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

OWNER RETAINS THE RIGHTS OF SALVAGE FOR EQUIPMENT AND FIXTURES TO BE REMOVED. COORDINATE WITH OWNER THE EQUIPMENT AND FIXTURES TO BE SALVAGED AND THE LOCATION FOR STORAGE. AVOID DAMAGE TO EQUIPMENT, FIXTURES AND DEVICES DURING DEMOLITION WORK AND DURING TRANSPORT TO OWNERS DESIGNATED STORAGE LOCATION.

VERIFY THAT EXISTING EQUIPMENT TO REMAIN IS OPERATING PROPERLY. NOTIFY THE ARCHITECT, ENGINEER AND/OR OWNER OF ANY DAMAGED AND/OR MALFUNCTIONING COMPONENTS.

ALL EXISTING INSTALLATIONS THAT ARE TO BE REMOVED, ABANDONED, RELOCATED, AND/OR CAPPED SHALL BE EXECUTED BEHIND FINISHED SURFACES. ALL SUCH WORK SHALL BE EXECUTED IN A PERMANENT MANNER, NO EXISTING PIPING TO BE ABANDONED WITHOUT WRITTEN AUTHORIZATION FROM THE OWNER.

IN ALL AREAS WHERE DEMOLITION WORK OCCUR, PATCH AND REPAIR TO MATCH NEW FINISH OR EXISTING FINISHES WHICH ARE TO REMAIN.

AVOID DAMAGING EXISTING SURFACES AND EQUIPMENT TO REMAIN FOR NEW INSTALLATION. REPAIR ANY DAMAGE CAUSED DURING WORK AT NO EXTRA COST TO THE OWNER.

ALL DEMOLITION WORK SHALL BE COORDINATED WITH THE ARCHITECTURAL AND OTHER SECTIONS OF THE CONTRACT DOCUMENTS.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING OF ANY DISCOVERED CONFLICTS BETWEEN EXISTING INSTALLATIONS WHICH ARE NOT SCHEDULED FOR DEMOLITION AND THE NEW WORK INDICATED WITHIN THE CONTRACT DOCUMENTS. SUCH NOTIFICATION SHALL BE ACCOMPANIED WITH A DRAWING DELINEATING THE PROPOSED SOLUTION PRIOR TO STARTING ANY WORK IN THE AFFECTED AREA.

THE CONTRACTOR SHALL PROVIDE A PROPOSED SCHEDULE OF DEMOLITION WORK FOR REVIEW BY THE OWNER.

ANY ADDITIONAL DEMOLITION WORK DEEMED NECESSARY AND NOT INCLUDED WITHIN THE SCOPE OF THE CONTRACT DOCUMENTS SHALL BE EXECUTED ONLY UPON RECEIPT OF WRITTEN AUTHORIZATION FROM THE OWNER. ON DEMOLITION DRAWINGS ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC. TO BE REMOVED IS SHOWN DARK AND ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., TO REMAIN IS SHOWN LIGHT.

UNLESS OTHERWISE NOTED ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL REMAIN.

WHERE EXISTING EQUIPMENT IS TO BE REMOVED CONTRACTOR SHALL REMOVE ALL ASSOCIATED PIPING, CONDUIT, POWER, CONTROLS, INSULATION, HANGERS, DUCTWORK, SUPPORTS, HOUSEKEEPING PADS, ETC. PATCH AND REPAIR WALLS/ROOF/FLOOR TO MATCH EXISTING AND/OR NEW FINISHES.

THE CONTRACTOR SHALL PROVIDE NECESSARY PIPING, VALVES, TRAPS, TEMPORARY FEEDS, DRIPS, ETC. AS REQUIRED. DRAIN AND REFILL PIPING SYSTEMS AS OFTEN AS NECESSARY TO ACCOMMODATE PHASING AND TO MINIMIZE TIME LENGTH OF OUTAGES.

REMOVE PIPE HANGERS, PIPE SUPPORTS AND EQUIPMENT SUPPORTS WHERE PIPING OR EQUIPMENT IS REMOVED AND THE EXISTING HANGERS AND SUPPORTS ARE NOT USED FOR THE NEW INSTALLATION.

INSTALL PERMANENT CAPS WHERE PIPING IS REMOVED AND THE EXISTING TAPS ARE NOT USED FOR THE NEW INSTALLATION. INSTALL TEMPORARY CAPS WHERE PIPING IS REMOVED AND THE EXISTING TAPS WILL BE USED FOR THE NEW INSTALLATION TO PROTECT THE INTERIOR SURFACES UNTIL NEW PIPING IS INSTALLED.

SEAL ALL PENETRATIONS THROUGH WALLS, CEILINGS AND ROOFS WHERE PLUMBING COMPONENTS ARE REMOVED AND WHERE THE EXISTING PENETRATION IS NOT USED FOR NEW INSTALLATION. REPAIR SURFACES TO MATCH ADJACENT AREAS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE AND DETERMINING THE EXISTING CONDITIONS IN WHICH THE WORK IS TO BE PERFORMED.

REFER TO PHASING PLANS FOR ADDITIONAL REQUIREMENTS.

WHERE ANY ABANDONED PIPES IN EXISTING FLOORS, WALLS, PIPE TUNNELS, CEILINGS, ETC. CONFLICT WITH NEW WORK, THE CONTRACTOR SHALL REMOVE ABANDONED PIPES AS NECESSARY TO ACCOMMODATE NEW WORK.

THE LOCATION OF ALL EXISTING EQUIPMENT, PIPING, DUCTWORK, ETC. INDICATED IS APPROXIMATE ONLY AND SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR. INSTALL ALL NEW MECHANICAL/PLUMBING/FIRE PROTECTION WORK TO CONNECT TO OR CLEAR EXISTING WORK AS APPLICABLE.

CONTRACTOR SHALL COORDINATE WITH OTHER TRADES TO MAINTAIN A WATER TIGHT FACILITY AT ALL TIMES.

PROVIDE TEMPORARY HEAT TO MAINTAIN 75°F IN OCCUPIED AREAS DURING SHUTDOWNS. TEMPORARY PROVISIONS SHALL BE REVIEWED WITH AND APPROVED BY THE OWNER, ARCHITECT AND AUTHORITY HAVING JURISDICTION.

WORK IS LIMITED TO MAXIMUM OF [TEN CLASSROOMS] AT ANY ONE TIME AND SHALL BE COORDINATED WITH THE OWNER.

MAINTAIN EGRESS AT ALL TIMES. COORDINATE EGRESS REQUIREMENTS WITH THE STATE FIRE MARSHAL, THE OWNER AND THE AUTHORITIES HAVING JURISDICTION.

CONTRACTOR SHALL MAKE PROVISIONS AND INCLUDE IN HIS BID ALL COSTS ASSOCIATED WITH CONFINED ENTRY/SPACE REQUIREMENTS IN [CRAWL SPACES] AND ALL OTHER APPLICABLE OSHA AND MOSHA REGULATIONS.

WHERE REQUIRED TO MAINTAIN THE EXISTING SYSTEMS IN OPERATION, THE CONTRACTOR SHALL TEMPORARILY BACKFEED EXISTING SYSTEMS FROM NEW EQUIPMENT. CONTRACTOR SHALL TEMPORARILY EXTEND EXISTING PIPING SYSTEMS TO NEW PIPING SYSTEMS WITH THE APPROPRIATE SHUT-OFF VALVES.

AT COMPLETION OF PROJECT ALL TEMPORARY PIPING, VALVES, CONTROLS, ETC. SHALL BE REMOVED IN THEIR ENTIRETY.

PLUMBING GENERAL NOTES

BEFORE COMMENCEMENT OF WORK, CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ELEVATIONS AND CHARACTERISTICS OF UTILITIES AND PIPING AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES.

THE ELECTRICAL CONTRACTOR IS REQUIRED TO PROVIDE POWER FOR ALL PLUMBING EQUIPMENT. DURING BID PERIOD AND AGAIN PRIOR TO EQUIPMENT ORDERING, THE (GENERAL CONTRACTOR AND THE) PLUMBING CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR TO VERIFY THAT ALL EQUIPMENT ARE POWERED, AND PROPER VOLTAGE/WIRING CAPACITY IS PROVIDED. IN THE EVENT OF REQUIREMENTS AMBIGUITY OR CONFLICT BETWEEN TRADES, THE CONTRACTOR IS REQUIRED TO GENERATE AN RFQ ADDRESSING THE ISSUE AND REQUESTING CLARIFICATION. FAILURE TO DO SO WILL NEGATE HIS RIGHT FOR A CHANGE ORDER OR REQUEST FOR ADDITIONAL FUNDS DURING CONSTRUCTION RELATING TO THIS ISSUE.

DRAWINGS ARE IN PART DIAGRAMMATIC, INTENDED TO CONVEY SCOPE OF WORK, AND TO INDICATE THE GENERAL LOCATIONS OF EQUIPMENT, PIPING, ETC. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LAYOUT HIS WORK ACCORDING TO THE FOLLOWING GUIDELINES:

CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS FOR EQUIPMENT AND ROUGH INS AND THE EXACT ROUTING OF PIPING PRIOR TO CONSTRUCTION AS TO BEST FIT THE LAYOUT OF THE WORK. COORDINATE FINAL LAYOUT WITH ALL TRADES.

WHERE OFFSETS IN PIPING ARE REQUIRED TO COORDINATE WORK OF OTHER TRADES, STRUCTURE, PIPING, CONDUITS, DUCTWORK, ETC. OR TO MAINTAIN CEILING HEIGHTS, THEY SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

UNLESS OTHERWISE NOTED, ALL PIPING TO BE ROUTED CONCEALED IN WALLS, CHASES OR ABOVE CEILING. WATER PIPING SHALL NOT BE ROUTED IN EXTERIOR WALLS. ROUTE ALL PIPING AS HIGH AS POSSIBLE AND ALONG WALLS TO MAXIMIZE SPACE AVAILABLE FOR OTHER TRADES.

COORDINATE ROUTING OF PIPING TO MAINTAIN ACCESS TO FILTERS, MOTORS, ELECTRICAL EQUIPMENT, AND CONTROLS. IN NO CASE SHALL PIPING PASS DIRECTLY OVER ELECTRICAL PANELS OR DISCONNECTS OR RESTRICT ACCESS TO ANY ELECTRICAL EQUIPMENT INCLUDING JUNCTION BOXES.

ALL EXISTING PIPING SHOWN IS INTENDED TO INDICATE APPROXIMATE SIZE, NUMBER AND LOCATION OF PIPING BRANCHES FOR BIDDING PURPOSES ONLY. CONTRACTOR TO VERIFY EXACT SIZE AND CONFIGURATION PRIOR TO CONSTRUCTION.

VERIFY EXACT SIZE AND LOCATION OF ALL EXISTING SYSTEMS REQUIRING CONNECTION TO NEW PIPING PRIOR TO COMMENCING WORK.

UNLESS OTHERWISE NOTED, SANITARY WASTE PIPING SHOWN IS BELOW FLOOR AND ALL OTHER PIPING IS OVERHEAD, ABOVE CEILING. DOMESTIC HOT, COLD AND RE-CIRC. WATER PIPING SHALL BE INSTALLED ON WARM SIDE OF INSULATION.

ALL PLUMBING WORK SHALL BE DONE IN ACCORDANCE WITH NATIONAL STANDARD PLUMBING CODE NSPC 2009, AS ADOPTED BY THE STATE OF MARYLAND AND AMENDMENTS.

DURING THE PROGRESS OF THE WORK, MAINTAIN AN ACCURATE RECORD OF ALL CHANGES MADE IN THE PLUMBING SYSTEMS. THE RECORD DRAWING SHALL SHOW CHANGES IN MANUFACTURER (WITH NUMBERS AND NAMES), MATERIALS, SIZES, LOCATING AND HOOK-UP POINTS. AS-BUILTS SHALL BE GIVEN TO (OWNER) AT COMPLETION OF JOB.

UPON COMPLETION OF JOB, THIS CONTRACTOR SHALL INSPECT ALL EXPOSED PORTIONS OF THE PLUMBING INSTALLATION AND COMPLETELY REMOVE ALL EXPOSED LABELS, SOIL, MARKING AND FOREIGN MATERIAL. EXPOSED PROTECT LABELS AND THOSE REQUIRED BY LAW TO REMAIN.

ALL INSTALLATION OF ACCESSIBLE PLUMBING FIXTURES SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE STATE ACCESSIBILITY STANDARDS. REFER TO ARCHITECTURAL PLANS FOR SPECIFIC INSTALLATION REQUIREMENTS. LOCATE WATER CLOSET FLUSH VALVE LEVER BETWEEN TOILET AND LAVATORY. COORDINATE LOCATION OF FLUSH VALVE LEVER HANDLE WITH GRAB BAR. COORDINATE WITH ARCHITECTURAL DRAWINGS.

ALL VENT AND FLUE OUTLETS SHALL BE 10'-0" MINIMUM HORIZONTALLY AND 3'-0" MINIMUM VERTICALLY FROM ANY FRESH AIR INTAKES.

PROVIDE WATER HAMMER ARRESTORS AT ALL PLUMBING FIXTURES OR BATTERY OF FIXTURES WITH QUICK-CLOSING VALVES. WATER HAMMER ARRESTORS SHALL BE SIZED & INSTALLED PER PDI STANDARDS. AIR CHAMBERS SHALL NOT BE CONSIDERED AN EQUAL TO WATER HAMMER ARRESTORS AND SHALL NOT BE INSTALLED.

PROVIDE BALANCING VALVES WITH THREADED CONNECTIONS IN HOT WATER RETURN PIPING, AND BALANCE SYSTEM FOR PROPER OPERATION.

COORDINATE WITH ARCHITECTURAL DRAWINGS BEFORE ROUGHING IN PLUMBING.

ALL OPENINGS IN CEILINGS AND PLENUM WALLS FOR PLUMBING SHALL BE SEALED AIR TIGHT AND PROTECTED WITH FIRESTOP.

SEE SITE PLAN FOR EXTENT OF ALL PIPING LEAVING AND ENTERING BUILDING.

ALL HOSE BIBS SHALL BE MOUNTED 18" ABOVE FINISHED FLOOR, UNLESS OTHERWISE SPECIFIED.

ALL WALL HYDRANTS SHALL BE MOUNTED 24" ABOVE FINISHED GRADE UNLESS OTHERWISE SPECIFIED.

MAKE PROPER HW, CW, RE-CIRC., WASTE, AND VENT CONNECTIONS TO ALL FIXTURES AND EQUIPMENT EVEN THOUGH ALL BRANCH MAIN, ELBOWS AND CONNECTIONS ARE NOT SHOWN.

CLEANOUTS SHALL BE PROVIDED NEAR BASE OF EACH VERTICAL WASTE OR SOLID STACK. PROVIDE 18" MINIMUM CLEARANCE FOR ACCESS.

PROVIDE VALVES AND UNIONS WHEN CONNECTING PIPING TO EQUIPMENT. LOCATE VALVES FOR EASY ACCESS AND SERVICING OF EQUIPMENT. PROVIDE ACCESS PANELS TO ALL SHUT-OFF VALVES.

PRESSURE TEST ALL NEW WATER PIPES, MINIMUM OF 4 HOURS BEFORE APPLYING PIPE INSULATION. ALL TESTS SHALL BE IN COMPLIANCE WITH REQUIREMENTS OF THE LOCAL WATER AUTHORITY.

IN THE EVENT OF CONFLICT BETWEEN VARIOUS SECTIONS OF CONSTRUCTION DOCUMENTS, THE MOST STRINGENT OF THE OPTIONS SHALL APPLY FOR BIDDING PURPOSE. AFTER AWARD OF CONTRACT BUT BEFORE STARTING DESIGN/CONSTRUCTION, CONTRACTOR SHALL REQUEST CLARIFICATIONS WITH BID ON ANY CONFLICTING INFORMATION FROM THE OWNER.

PROVIDE DIELECTRIC FITTINGS OTHER THAN DIELECTRIC UNIONS WHEN CONNECTING DISSIMILAR MATERIAL PIPING. DIELECTRIC UNIONS NOT PERMITTED.

ALL CONCRETE FLOORS, SLABS, BRICK AND BLOCK WALL PENETRATIONS SHALL BE SLEEVED AND FIRE STOPPED.

PROVIDE BALL VALVE FOR ALL CW AND HW BRANCH TAKE-OFFS.

ALL EXTERIOR ROOF PENETRATIONS SHALL BE SEALED WEATHERTIGHT.

SLOPES AND INVERT ELEVATIONS OF ALL INTERIOR PIPING SHALL BE ESTABLISHED BEFORE ANY PIPING IS INSTALLED IN ORDER THAT PROPER SLOPES WILL BE MAINTAINED. ALL PIPING SHALL BE LOCATED AND DETERMINED WHERE TO BE RUN TO AVOID CONFLICT WITH OTHER TRADES.

ALL PIPING SHALL BE PROVIDED WITH SECTIONAL SHUT-OFF VALVES AND ACCESS PANELS FOR ALL HIDDEN VALVES. PROVIDE ISOLATION VALVES FOR ALL PLUMBING FIXTURES.

ALL WORK SHALL BE GUARANTEED AGAINST DEFECTS, LEAKS, LACK OF PROPER SYSTEM PERFORMANCE OR NON-OPERATION FOR A PERIOD OF ONE YEAR AFTER DATED OF FINAL ACCEPTANCE OF WORK BY OWNER.

ALL WORK SHALL BE COORDINATED WITH ALL TRADES PRIOR TO INSTALLATION.

ALL EXPOSED PIPING TO FIXTURES SHALL BE HEAVILY CHROME-PLATED.

MAKE FINAL CONNECTIONS AFTER FIXTURES AND EQUIPMENT ARE SET IN PLACE. ALL REQUIRED TRIM, FAUCETS AND MINOR ITEMS NECESSARY FOR A COMPLETE FUNCTIONING INSTALLATION, SUCH AS STRAINERS, TRAPS, TAILPIECES, ESCUTCHEONS, ETC., SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR IN ACCORDANCE WITH EQUIPMENT REQUIREMENTS. ALL FAUCETS TO BE HEAVILY CHROME-PLATED.

SLEEVES THROUGH CMU BLOCKS WALLS AND/OR MASONRY FLOORS SHALL BE SCHEDULE 40 BLACK STEEL PIPE. SLEEVES THRU FLOORS SHALL STAND PROUD OF FLOOR SLAB BY 1/2". SLEEVES THROUGH SHEET ROCK WALL SHALL BE 1/8" GAUGE GALVANIZED SHEET METAL. THE SPACE BETWEEN THE PIPE AND SLEEVE SHALL BE PACKED WITH "3M" EXPANDABLE FOAM FIRE-STOP MATERIAL, TO ASSURE A RATING EQUAL TO THE PENETRATED WALL OR FLOOR.

HANGERS SHALL BE OF SIMILAR MATERIAL AS PIPING TO AVOID GALVANIC ACTION IN ACCORDANCE WITH MSS-SP-89 AND LOCATED AT INTERVALS NOT TO EXCEED 6'-0" O.C. WHERE "HUBLESS" PIPE IS BEING USED, PROVIDE HANGERS ON EITHER SIDE OF THE JOINTS AS RECOMMENDED BY CISPI BULLETIN 310. FOR INSULATED PIPING, INSULATION SHALL EXTEND CONTINUOUSLY THRU HANGER WITH OUT INTERRUPTION. PROVIDE SADDLE TO PROTECT INSULATION FROM COMPRESSION.

SOIL, WASTE AND VENT PIPING SHALL BE INSTALLED IN ACCORDANCE WITH CODE. HORIZONTAL DRAINAGE PIPING SHALL SLOPE NOT LESS THAN 1/4" PER FOOT, UNLESS OTHERWISE INDICATED. DOMESTIC WATER SHALL BE SLOPED TO DRAIN POINTS.

SUBMIT OPERATING AND MAINTENANCE MANUALS AND WARRANTY CERTIFICATES TO OWNER.

THE CONTRACTOR SHALL NOT CORE DRILL CONCRETE SLABS OR PRE-CAST CONCRETE PANELS OR DECK WITHOUT THE KNOWLEDGE AND WRITTEN CONSENT OF THE STRUCTURAL ENGINEER AND THE BUILDING OWNER AND SHALL X-RAY PRIOR TO ANY CORE DRILLING. X-RAYING AND CORE DRILLING SLABS SHALL BE SCHEDULED WITH THE BUILDING OWNER. INCLUDE COSTS OF X-RAYING IN BID.

FINAL ACCEPTANCE OF PLUMBING SYSTEMS BY THE USER/OWNER, SHALL BE CONTINGENT TO COMPLIANCE WITH ALL COMMISSIONING REQUIREMENTS AND TESTS PRESCRIBED IN THE PROJECT DESIGN DOCUMENTS/SPECIFICATIONS AND APPROVAL BY THE CAA AGENT OF THE PROJECT.

PLUMBING INVERTS BASED ON FINISHED FLOOR ELEVATION OF [XX.XX]'

ABBREVIATIONS

- ABV ABOVE
- ARD ARI DRAIN
- AFF ABOVE FINISH FLOOR
- AFG ABOVE FINISH GRADE
- APF APPROXIMATE
- APX APPROXIMATE
- AV ACID VENT
- AW ACID WASTE
- BAS BUILDING AUTOMATION SYSTEM
- BFF BELOW FINISH FLOOR
- BFP BACKFLOW PREVENTER
- BLDG BUILDING
- BT BATHTUB
- CA COMPRESSED AIR
- CD CONDENSATE
- CLG CEILING
- CO COMPANY, CLEANOUT
- CW COLD WATER
- DFU DRAINAGE FIXTURE UNITS
- DIA DIAMETER
- DN DOWN
- DS DOWNSTREAM
- DWG DRAWING
- OW COLD WATER
- DISP DISPOSER
- DWV DRAINAGE WASTE & VENT
- EA EACH
- ECO EXTERIOR CLEANOUT
- EXT EXISTING TO REMAIN
- EYV EMERGENCY YEAWASH
- ES EMERGENCY SHOWER
- EWV ELECTRIC WATER COOLER
- EWHE ELECTRIC WATER HEATER
- EX EXISTING
- FD FLOOR DRAIN
- FEE FINISHED FLOOR ELEVATION
- FIXT FIXTURE
- FLR FLOOR
- FMD FORCED MAIN
- FS FLOOR SINK
- G NATURAL GAS
- GCO GRADE CLEANOUT
- GM GROUNDWATER DRAIN TILE
- GPFF GALLONS PER FLUSH
- GD GPM
- GWH GAS WATER HEATER
- HB HOSE BIBB
- HW HOT WATER
- HWTR HOT WATER RECIRCULATING
- I.E. INVERT ELEVATION
- IW INDIRECT WASTE
- IPC INTERNATIONAL PLUMBING CODE
- LAV LAVATORY
- MAU MAKE-UP AIR UNIT
- MAX MAXIMUM
- MB MOP BASIN
- MBH BRITISH THERMAL UNITS (x1000)
- MINIMUM
- MISC MISCELLANEOUS
- NFWH NON-FREEZE WALL HYDRANT
- NIC NOT IN CONTRACT
- OD OVERFLOW ROOF DRAIN
- OSD OPEN SITE DRAIN
- PM PUMPED DISCHARGE
- PLD PLUMBING & DRAINAGE INSTITUTE
- PRV PRESSURE REDUCING VALVE
- RD ROOF DRAIN
- RM ROOM
- RTU ROOF TOP UNIT
- SAN SANITARY
- SFU SUPPLY FIXTURE UNIT
- ST STORMWATER
- TP TRAP PRIMER VALVE
- TPS TRAP PRIMING STATION
- TW TEMPERED WATER
- TYP TYPICAL
- UNO UNLESS OTHERWISE NOTED
- UR URINAL
- V VENT
- VB VACUUM BREAKER
- VTR VENT THRU ROOF
- W WASTE
- WITH
- WC WATER CLOSET
- WCO WALL CLEANOUT
- WH WALL HYDRANT
- XR EXISTING RELOCATED

LAB/MEDICAL PROJECTS

- O OXYGEN
- MA MEDICAL AIR
- LA LAB AIR
- N NITROGEN
- LN LIQUID NITROGEN
- AR ARGON
- HE HELIUM
- SG SPECIAL GAS
- LV LAB VACUUM
- MV MEDICAL VACUUM
- CO2 CARBON DIOXIDE
- D DEIONIZED WATER
- ROS REVERSE OSMOSIS SUPPLY
- ROR REVERSE OSMOSIS RETURN
- LCW LAB COLD WATER
- LHW LAB HOT WATER
- LHWR LAB HOT WATER RECIRCULATING
- VCW VIVARIUM COLD WATER
- VHW VIVARIUM HOT WATER
- NP NON-POTABLE

PLUMBING SYMBOLS

| SYMBOL | DESCRIPTION |
|--------|---|
| | DEMOLISH AND REMOVE |
| | SOIL OR WASTE PIPING |
| | STORM PIPING |
| | OVERFLOW STORM PIPING |
| | NON-POTABLE WATER PIPING |
| | STORM PIPING BELOW SLAB |
| | VENT PIPING |
| | COLD WATER PIPING |
| | HOT WATER PIPING |
| | HOT WATER RECIRCULATING PIPING |
| | GAS PIPING |
| | FIRE PROTECTION PIPING |
| | PIPE DOWN OR DROP |
| | PIPE UP OR RISE/FLOOR CLEANOUT |
| | CAPPED OR PLUGGED PIPE |
| | UNION |
| | WALL CLEANOUT |
| | GATE VALVE |
| | BALL VALVE |
| | GLOBE VALVE |
| | BUTTERFLY VALVE |
| | GAS COCK |
| | SHUTOFF VALVE IN RISE OR DROP |
| | DOUBLE CHECK BACKFLOW PREVENTER |
| | RPZ BACKFLOW PREVENTER |
| | CHECK VALVE |
| | BALANCING VALVE |
| | OUTSIDE STEM & YOKE VALVE |
| | PRESSURE GAGE W/ NEEDLE VALVE |
| | THERMOMETER |
| | TEMPERATURE & PRESSURE RELIEF VALVE |
| | VACUUM BREAKER |
| | WATER HAMMER ARRESTER, LETTER INDICATES PDI |
| | HOSE BIBB |
| | WALL HYDRANT |
| | SOLENOID VALVE |
| | STRAINER |
| | PIPE GUIDE/SLEEVE |
| | PIPE ANCHOR |
| | FLEXIBLE CONNECTION |
| | FLOW DIRECTION |
| | RISER/DETAIL DESIGNATION |
| | FLOOR SINK |
| | CALL OUT DESIGNATION |
| | METER (GAS/WATER/FIRE) |
| | PUMP |
| | PUMP |
| | KEYNOTE TAG |
| | LIMIT OF DEMOLITION |
| | CONNECT TO EXISTING |

DOUBLE LINE SYMBOLS

| | |
|--|--------------------------|
| | GATE VALVE |
| | BUTTERFLY VALVE |
| | 3-WAY VALVE |
| | GAS COCK VALVE |
| | BALL VALVE |
| | BALANCE VALVE |
| | SHUT-OFF VALVE |
| | BACKFLOW PREVENTER VALVE |

SHEET NUMBERING LEGEND

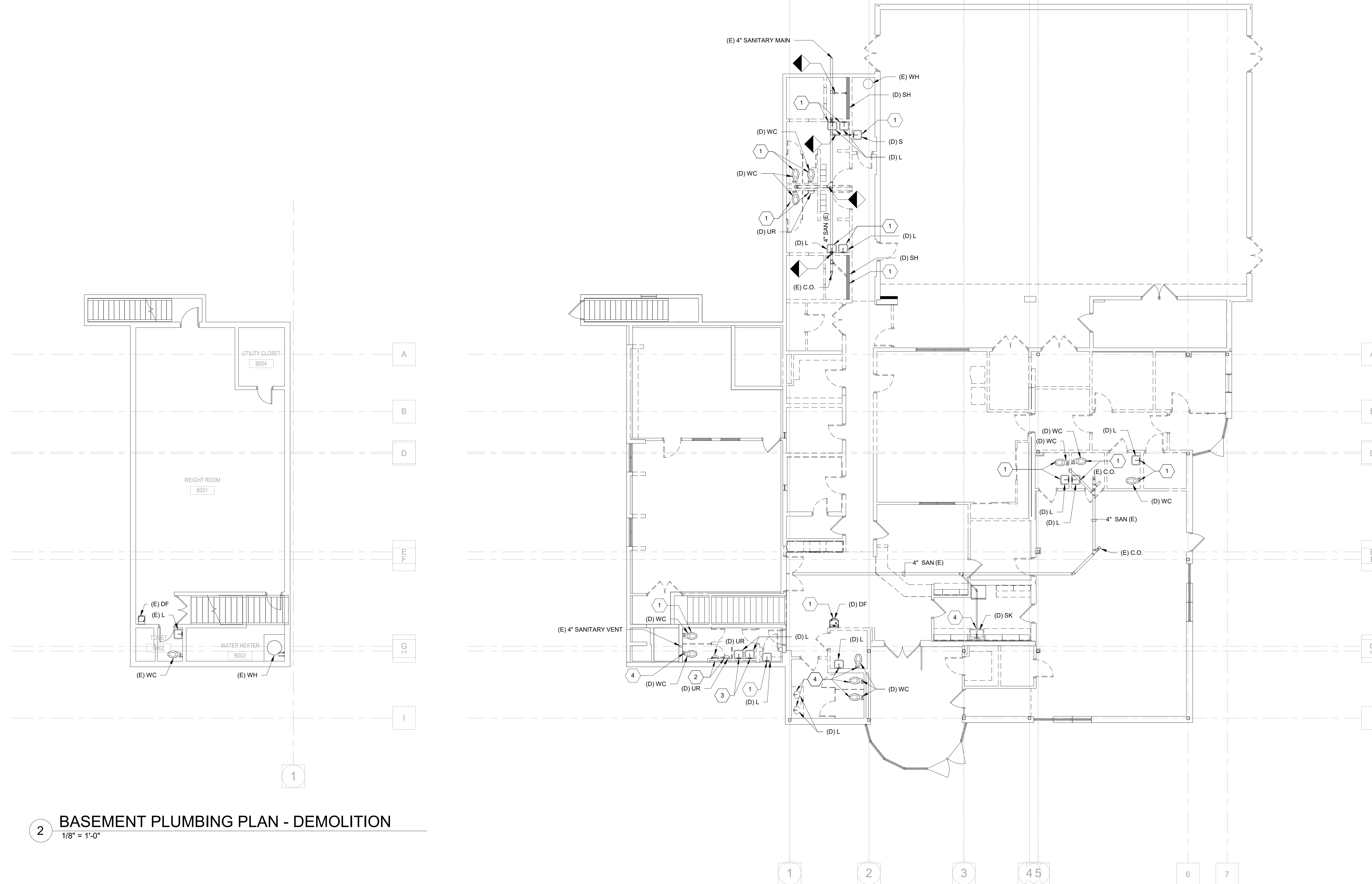
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GENERAL NOTES

- REFER TO P001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.
- EXISTING BELOW SLAB SANITARY LINES WERE TAKEN FROM THE EXISTING DRAWINGS DATED 05/03/1999. THE CONTRACTOR SHALL FIELD VERIFY THE ACTUAL LOCATION PRIOR TO COMMENCEMENT OF WORK.
- ALL WASTE PIPING SHOWN ON FIRST FLOOR PLANS BELOW SLAB.
- CONTRACTOR SHALL REPAIR ALL FLOOR SLABS DUE TO SAW-CUTTING AND MATCH ARCHITECTURAL FINISH AS REQUIRED.

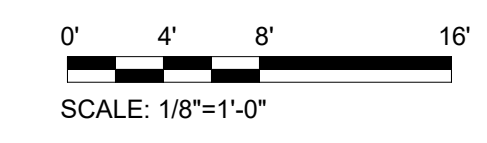
KEYED NOTES

- REMOVE EXISTING PLUMBING FIXTURES AND ASSOCIATED PIPING. PLUG WASTE PIPING AND APPURTENANCES BELOW FLOOR SLAB AND REMOVE ALL DEAD-LEGS IN VENTING SYSTEM. WATER LINE(S) SHALL BE CAPPED BACK TO MAIN(S) REMOVING ALL DEAD-LEGS.
- REMOVE EXISTING URINALS AND ASSOCIATED PIPING/APPURTENANCES. PREPARE/RECONFIGURE DOMESTIC COLD WATER AND SANITARY WASTE/VENT TO RECEIVE URINAL IN NEW LOCATION AS SHOWN ON NEW WORK PLAN.
- REMOVE EXISTING LAVATORIES AND ASSOCIATED PIPING/APPURTENANCES. PREPARE/RECONFIGURE DOMESTIC COLD/HOT WATER AND SANITARY WASTE/VENT TO RECEIVE LAVATORY IN NEW LOCATION AS SHOWN ON NEW WORK PLAN.
- REMOVE EXISTING PLUMBING FIXTURE AND ASSOCIATED APPURTENANCES. PREPARE/RECONFIGURE DOMESTIC COLD/HOT WATER AND SANITARY WASTE/VENT TO RECEIVE FIXTURE IN SAME LOCATION.



2 BASEMENT PLUMBING PLAN - DEMOLITION
1/8" = 1'-0"

1 FIRST FLOOR PLUMBING PLAN - DEMOLITION
1/8" = 1'-0"



LINCOLN PARK COMMUNITY CENTER

PROJECT ADDRESS: **357 FREDERICK AVE, ROCKVILLE, MD 20850**

OWNER: **THE CITY OF ROCKVILLE**

PROJ. NO.: 19/16A



I hereby certify that these documents were prepared or approved by me and that I am a duly licensed engineer under the laws of the State of Maryland. License number: 40857. Expiration date: 06/09/2025

KEY PLAN

REVISIONS

| MARK | DATE | ISSUE |
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BASEMENT AND FIRST FLOOR PLUMBING PLAN - DEMOLITION

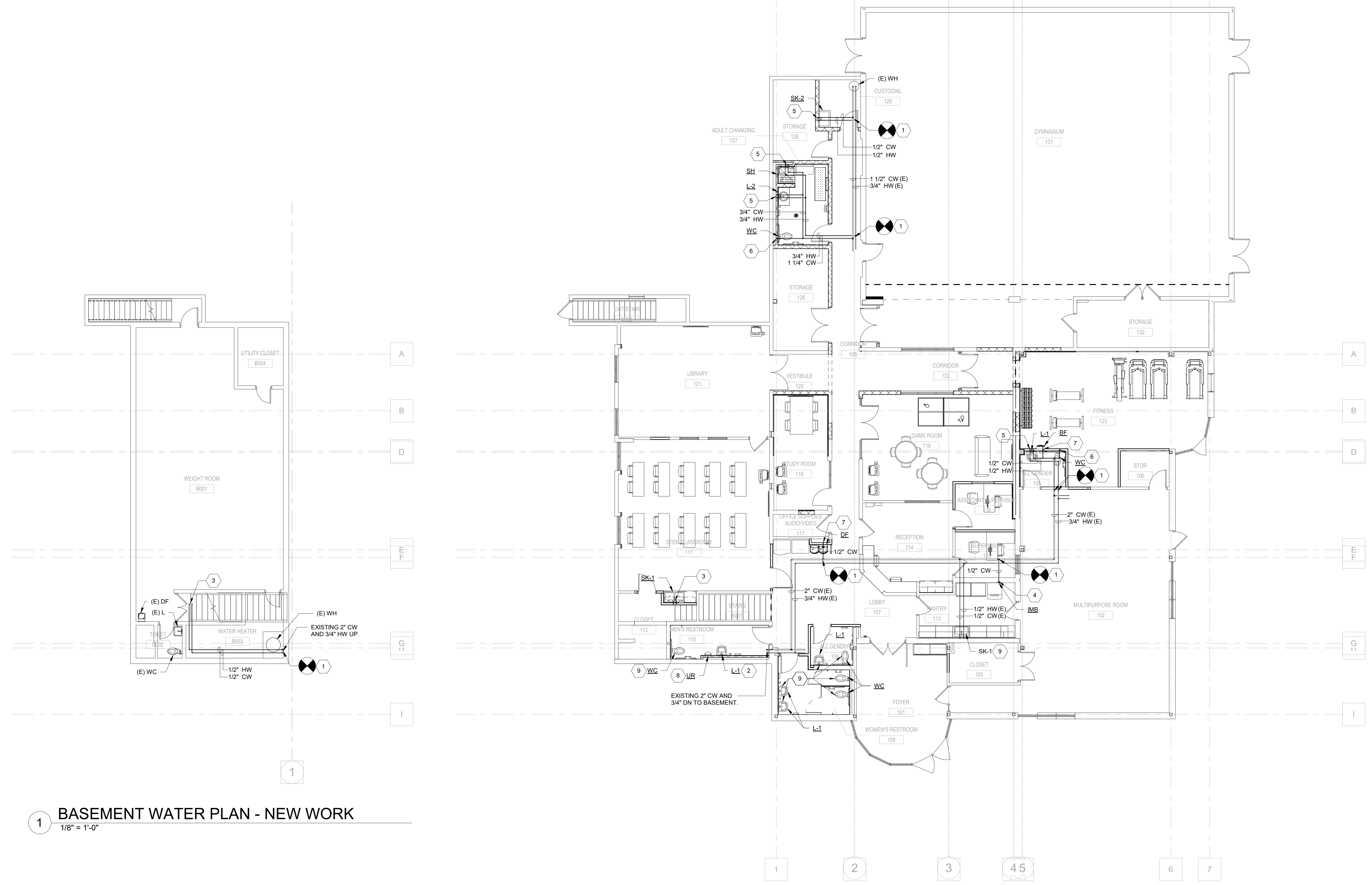
PD-111

GENERAL NOTES

- REFER TO P001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.
- EXISTING BELOW SLAB SANITARY LINES WERE TAKEN FROM THE EXISTING DRAWINGS DATED 05/03/1999. THE CONTRACTOR SHALL FIELD VERIFY THE ACTUAL LOCATION PRIOR TO COMMENCEMENT OF WORK.
- ALL WASTE PIPING SHOWN ON FIRST FLOOR PLANS BELOW SLAB.
- CONTRACTOR SHALL REPAIR ALL FLOOR SLABS DUE TO SAW-CUTTING AND MATCH ARCHITECTURAL FINISH AS REQUIRED.

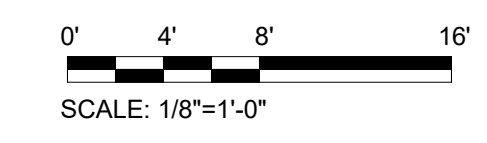
KEYED NOTES

- EXTEND AND CONNECT NEW DOMESTIC WATER PIPING TO EXISTING MAIN IN THIS APPROXIMATE LOCATION. CONTRACTOR SHALL VERIFY EXACT LOCATION AND CONNECTION REQUIREMENTS PRIOR TO COMMENCEMENT OF WORK. PROVIDE ACCESSIBLE SHUT-OFF VALVE.
- EXTEND AND CONNECT 1/2" COLD/HOT WATER PREPARED IN DEMOLITION PHASE TO NEW LAVATORY. PROVIDE ALL REQUIRED PIPING/APPURTENANCES.
- 1/2" CW/HW UP FROM BASEMENT TO SINK.
- 1/2" CW DOWN TO ICE MAKER BOX. PROVIDE 1/2" PIPING FROM IMB TO DCVA (EQUAL TO ZURN 700XL-CH) THEN FULL-SIZE PIPING TO ICE MAKER.
- 1/2" CW/HW WATER DOWN TO PLUMBING FIXTURE.
- 1" CW DOWN TO WATER CLOSET.
- 1/2" CW DOWN TO DRINKING FOUNTAIN/BOTTLE FILLER.
- EXTEND AND CONNECT NEW 3/4" DOMESTIC COLD WATER PREPARED IN DEMOLITION PHASE TO NEW URINAL. PROVIDE ALL REQUIRED PIPING/APPURTENANCES.
- CONNECT NEW PLUMBING FIXTURE TO EXISTING DOMESTIC COLD/HOT WATER ROUGH-INS PREPARED/RECONFIGURED IN DEMOLITION PHASE. PROVIDE ALL REQUIRED PIPING/APPURTENANCES.



1 BASEMENT WATER PLAN - NEW WORK
1/8" = 1'-0"

2 FIRST FLOOR WATER PLAN - NEW WORK
1/8" = 1'-0"

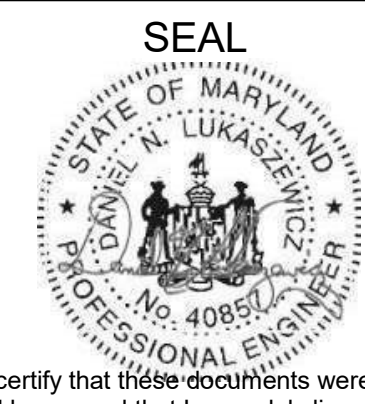


LINCOLN PARK COMMUNITY CENTER

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KEY PLAN

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| 3/20/2024 | BID SET |

BASEMENT AND FIRST FLOOR WATER PLAN - NEW WORK

P-111

GENERAL NOTES

- REFER TO 0001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.
- EXISTING BELOW SLAB SANITARY LINES WERE TAKEN FROM THE EXISTING DRAWINGS DATED 05/03/1999. THE CONTRACTOR SHALL FIELD VERIFY THE ACTUAL LOCATION PRIOR TO COMMENCEMENT OF WORK.
- ALL WASTE PIPING SHOWN ON FIRST FLOOR PLANS BELOW SLAB.
- CONTRACTOR SHALL REPAIR ALL FLOOR SLABS DUE TO SAW-CUTTING AND MATCH ARCHITECTURAL FINISH AS REQUIRED.

KEYED NOTES

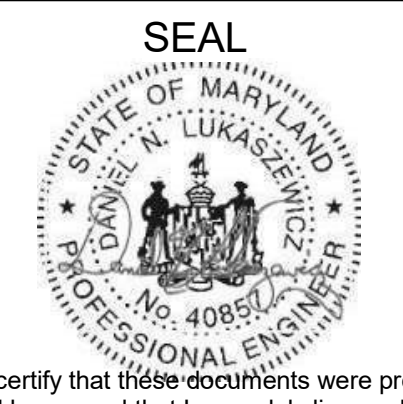
- EXTEND AND CONNECT NEW VENT PIPING TO EXISTING VENT MAIN OF EQUAL OR LARGER SIZE IN THIS GENERAL AREA. CONTRACTOR SHALL VERIFY EXACT LOCATION AND CONNECTION REQUIREMENTS PRIOR TO COMMENCEMENT OF WORK.
- EXTEND AND CONNECT EXISTING WASTE/VENT PREPARED IN DEMOLITION PHASE TO NEW LAVATORY. PROVIDE ALL NECESSARY PIPING AND APPURTENANCES.
- ROUTE NEW 2" SANITARY WASTE DOWN IN WALL AND CONNECT TO EXISTING PIPING SERVING RESTROOM.
- EXTEND AND CONNECT NEW 3" SANITARY WASTE AND 2" VENT TO EXISTING PIPING SERVING KITCHENETTE IN THESE APPROXIMATE LOCATIONS. CONTRACTOR SHALL VERIFY EXACT LOCATIONS AND CONNECTION REQUIREMENTS PRIOR TO COMMENCEMENT OF WORK. PROVIDE CLEAN-OUT(S) AS REQUIRED.
- 3" WASTE UP TO FLOOR DRAIN. PROVIDE LISTED TRAP SEAL DEVICE (EQUAL TO TRAP GUARD).
- 2" VENT DOWN AND 2" WASTE UP TO SINK/LAVATORY.
- 2" WASTE UP TO SHOWER DRAIN.
- 2" VENT DOWN.
- 2" VENT DOWN AND 4" WASTE UP TO WATER CLOSET.
- EXTEND AND CONNECT NEW SANITARY WASTE PIPING TO EXISTING MAIN IN THIS APPROXIMATE LOCATION. CONTRACTOR SHALL VERIFY EXACT LOCATION AND CONNECTION REQUIREMENTS PRIOR TO COMMENCEMENT OF WORK.
- EXTEND AND CONNECT NEW 2" SANITARY WASTE AND 2" VENT TO EXISTING PIPING SERVING DRINKING FOUNTAIN IN THESE APPROXIMATE LOCATIONS. CONTRACTOR SHALL VERIFY EXACT LOCATIONS AND CONNECTION REQUIREMENTS PRIOR TO COMMENCEMENT OF WORK. PROVIDE CLEAN-OUT(S) AS REQUIRED.
- 2" VENT DOWN AND 2" WASTE UP TO DRINKING FOUNTAIN/BOTTLE FILLER.
- EXTEND AND CONNECT EXISTING WASTE/VENT PREPARED IN DEMOLITION PHASE TO NEW LAVATORY. PROVIDE ALL NECESSARY PIPING AND APPURTENANCES.
- CONNECT NEW PLUMBING FIXTURE TO EXISTING SANITARY WASTE ROUGH-INS PREPARED/RECONFIGURED IN DEMOLITION PHASE. PROVIDE ALL REQUIRED PIPING/APPURTENANCES.

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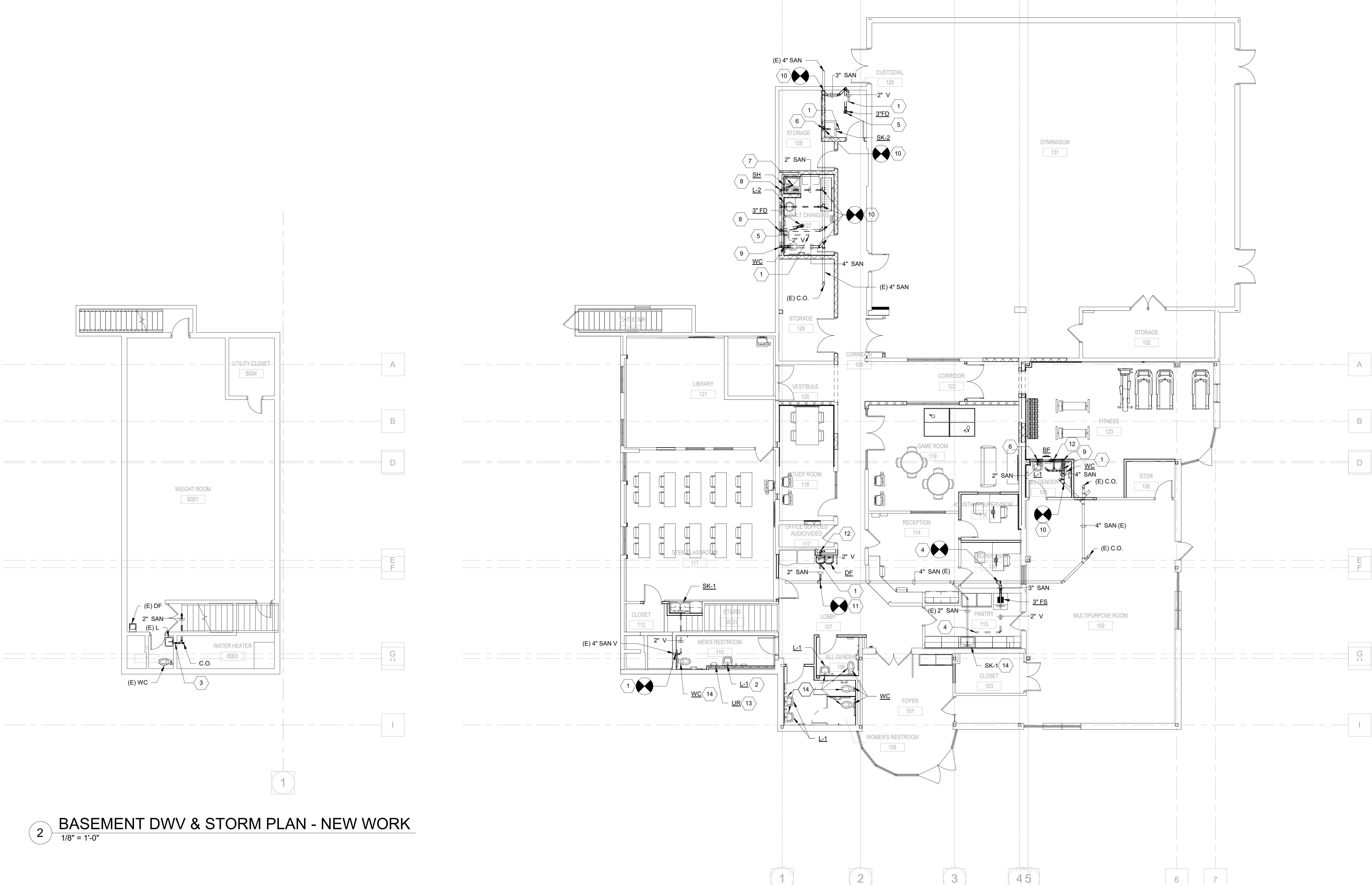
KEY PLAN

| REVISIONS | | |
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| ISSUANCES | |
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| DATE | ISSUANCE |
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| 3/20/2024 | BID SET |

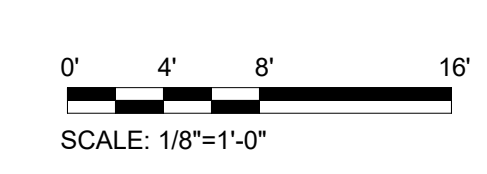
BASEMENT AND FIRST FLOOR DWV PLAN - NEW WORK

P-121



2 BASEMENT DWV & STORM PLAN - NEW WORK
1/8" = 1'-0"

1 FIRST FLOOR DWV & STORM PLAN - NEW WORK
1/8" = 1'-0"



| ID | DESCRIPTION | BASIS OF DESIGN (OR EQUAL) | CONNECTION SIZE | | | | REMARKS |
|------|----------------------------------|---|-----------------|--------|------|------|--|
| | | | WASTE | VENT | DCW | DHW | |
| IMB | ICE MAKER BOX | SIOUX CHIEF 696 SERIES ICE MAKER OUTLET BOX WITH ASSE 1010 ARRESTER. | -- | -- | 1/2" | -- | -- |
| L-1 | LAVATORY | WHITE VITREOUS CHINA, WALL MOUNTED LAVATORY, EVERCLEAN, CONCEALED ARMS, MURRO-AMERICAN STANDARD MODEL 0059.020EO SHROUD WITH SENSOR OPERATED HARDWARE FAUCET SLOAN MODEL ETF-80-4-PLG-TEE-CP, 0.5 MAX FLOW RATE, GPM-MLM-IR-8T-FCT, COORDINATE LAVATORY HOLE WITH FAUCET, PROVIDE THERMOSTATIC MIXING VALVE (TMV) ASSE 1070 (POINT OF USE). | 1 1/2" | 1 1/2" | 1/2" | 1/2" | -- |
| L-2 | LAVATORY | WHITE VITREOUS CHINA, UNDERMOUNT GLAZED UNDERSIDE WITH FRONT OVERFLOW AMERICAN STANDARD MODEL OVALYN 0497300.020 WITH SENSOR OPERATED HARDWARE FAUCET SLOAN MODEL ETF-80-4-PLG-TEE-CP-0.5 MAX FLOW RATE, COORDINATE LAVATORY HOLE WITH FAUCET, PROVIDE THERMOSTATIC MIXING VALVE (TMV) ASSE 1070 (POINT OF USE). | 1 1/2" | 1 1/2" | 1/2" | 1/2" | -- |
| SH | SHOWER | SHOWER SYSTEM W/HAND SPRAY, NON-POSITIVE PUSH BUTTON SHUT-OFF BRAIDED STAINLESS STEEL FLEXIBLE AND EXTENDED OUT FROM 60" TO 84" AND 24" SLIDE BAR, LEONARD 515P 1.5 GPM FLOW RATE. | 2" | 1 1/2" | 1/2" | 1/2" | COORDINATE WITH ARCH FOR MOUNTING DIMENSIONS |
| SK-1 | SINK | DOUBLE COMPARTMENT, STAINLESS STEEL SINK 18 GAUGE, TYPE 304, SELF RIM ELKAY MODEL LR3322EK WITH KOHLER MODEL K-596 FAUCET PULL-DOWN FAUCET. | 2" | 2" | 1/2" | 1/2" | -- |
| SK-2 | SINK | ENAMELED CAST IRON AMERICAN STANDARD MODEL LAKEWELL WITH 8" O.C. AND RIM GUARD, FAUCET 8351.076 8" O.C. WITH VACUUM BREAKER, CAST IRON P-TRAP AND STRAINER. | 2" | 2" | 1/2" | 1/2" | -- |
| WC | WATER CLOSET | WHITE VITREOUS CHINA, FLOOR MOUNTED, ELONGATED BOWL, 16'-1/2" HEIGHT, TOP SPUD SIPHON JET ACTION, AMERICAN STANDARD 3043.001 WITH SENSOR OPERATED HARDWARE FLUSH VALVE SLOAN MODEL 111 ESS-125-TMO-HW, TOILET SEAT BEMIS WHITE ELONGATED OPEN FRONT SEAT W/ SELF SUSTAINING CHECK HINGE LESS COVER, ACCESSIBLE, REFER TO ARCHITECTURAL FOR ADA LOCATIONS AND MOUNTING HEIGHTS. FIXTURES INDICATED AS ADA BY ARCHITECTURAL SHALL BE INSTALLED AS SUCH. | 4" | 2" | 1" | -- | -- |
| DF | DRINKING FOUNTAIN /BOTTLE FILLER | ELKAY EZSTL8WSLK EZH20 BOTTLE FILLING STATION & BI-LEVEL ADA COOLER, NON-FILTERED, REFRIGERATED, STAINLESS STEEL. | 1 1/2" | -- | 1/2" | -- | COORDINATE WITH ARCH FOR MOUNTING DIMENSIONS |
| BF | BOTTLE FILLER | ELKAY LZWSSM EZH20 BOTTLE FILLING STATION, FILTERED, NON-REFRIGERATED, STAINLESS STEEL. | 1 1/2" | -- | 1/2" | -- | COORDINATE WITH ARCH FOR MOUNTING DIMENSIONS |
| UR | URINAL | AMERICAN STANDARD 6002.001 "PINTBROOK" VITREOUS CHINA, WALL-MOUNTED, WALL OUTLET, TOP SPUD URINAL, PROVIDE WITH SLOAN 186 SFSM-0.125-TMO-LT 0.125 GPF, HARDWIRED, SENSOR-OPERATED FLUSHOMETER WITH 3/4" CONTROL STOP AND MECHANICAL OVERRIDE FLUSH BUTTON, ALSO PROVIDE SUPPORT EQUAL TO JAY R. SMITH, REFER TO ARCHITECTURAL FOR ADA MOUNTING HEIGHT, URINAL TO BE ADA COMPLIANT. | 2" | 2" | 3/4" | -- | COORDINATE WITH ARCH FOR MOUNTING DIMENSIONS |

- NOTES:
 1. PROVIDE INSULATION KITS FOR WASTE AND WATER SUPPLY PIPES OF ALL ADA WALL MOUNTED LAVATORIES, TRUEBRO, LAVGUARD OR EQUAL.
 2. SEE ARCHITECTURAL DOCUMENTS FOR EXACT FIXTURE LOCATIONS AND MOUNTING HEIGHTS.
 3. PROVIDE PERFORATED STRAINERS TO ALL LAVATORIES AND SINKS.

| FLOOR DRAIN SCHEDULE | | | | | |
|----------------------|-------------|---------------|--------------|----------------------------|---|
| ID | TYPE | LOCATION/AREA | SIZE | BASIS OF DESIGN (OR EQUAL) | REMARKS |
| FD | FLOOR DRAIN | GENERAL | 6" STRAINER | ZURN #Z415-ZN-VP | NICKEL BRONZE STRAINER, VANDAL PROOF, DRAIN OUTLET SIZE AS SHOWN ON PLANS |
| FS | FLOOR SINK | KITCHEN | 8" x 8" x 6" | ZURN #Z1910 | DEEP CAST IRON BODY & SQUARE, MEDIUM DUTY GRATE WITH SLOTTED OPENINGS, WHITE ACID RESISTANT PORCELAIN ENAMEL INTERIOR & TOP, COMPLETE WITH WHITE ABS ANTI-SPLASH INTERIOR BOTTOM DOME STRAINER. |

LINCOLN PARK COMMUNITY CENTER

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OWNER: THE CITY OF ROCKVILLE

PROJ. NO.: 19/16A

SEAL

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 License number: 40857 Expiration date: 08/09/2025

KEY PLAN

| REVISIONS | | |
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PLUMBING SCHEDULES

P-301

LINCOLN PARK COMMUNITY CENTER

PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE, MD 20850
OWNER: THE CITY OF ROCKVILLE
PROJ. NO.: 1916A



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KEY PLAN

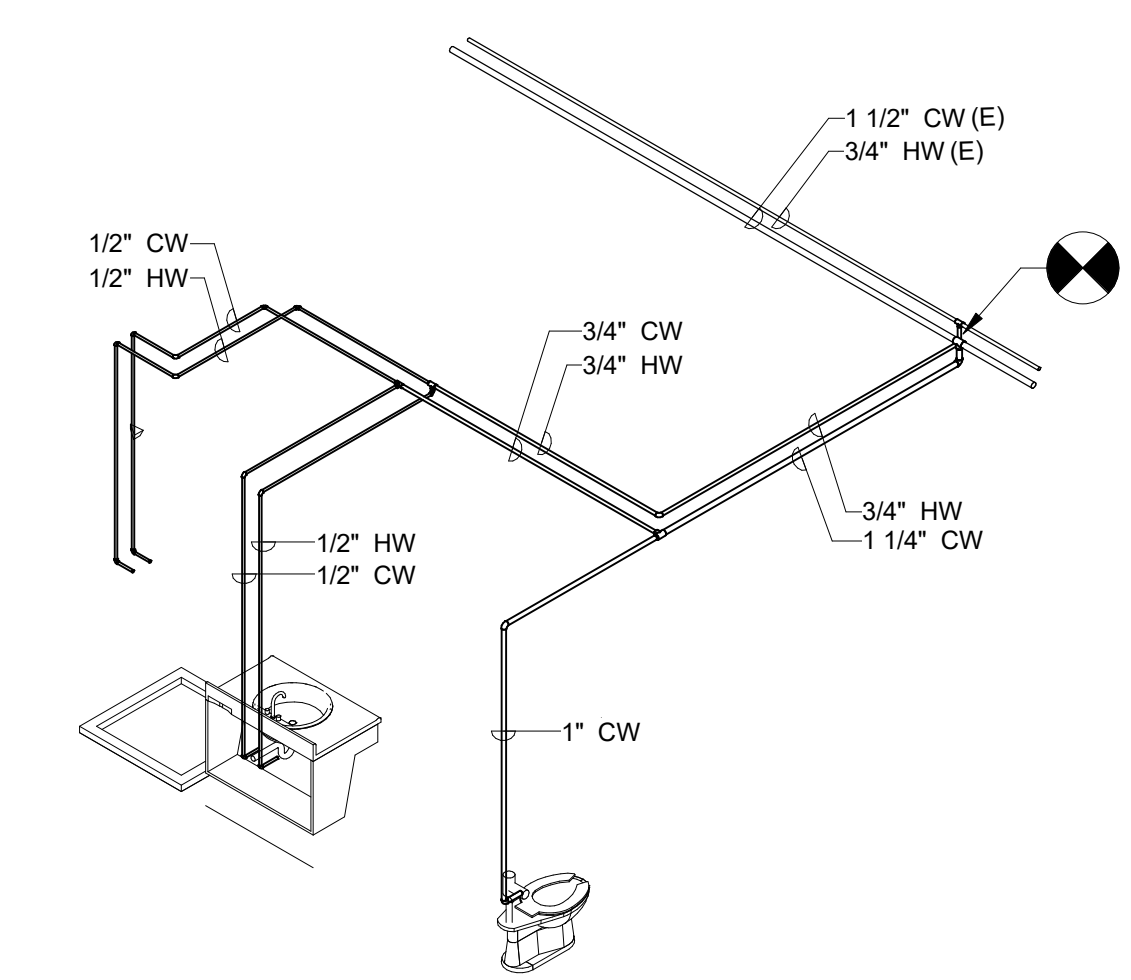
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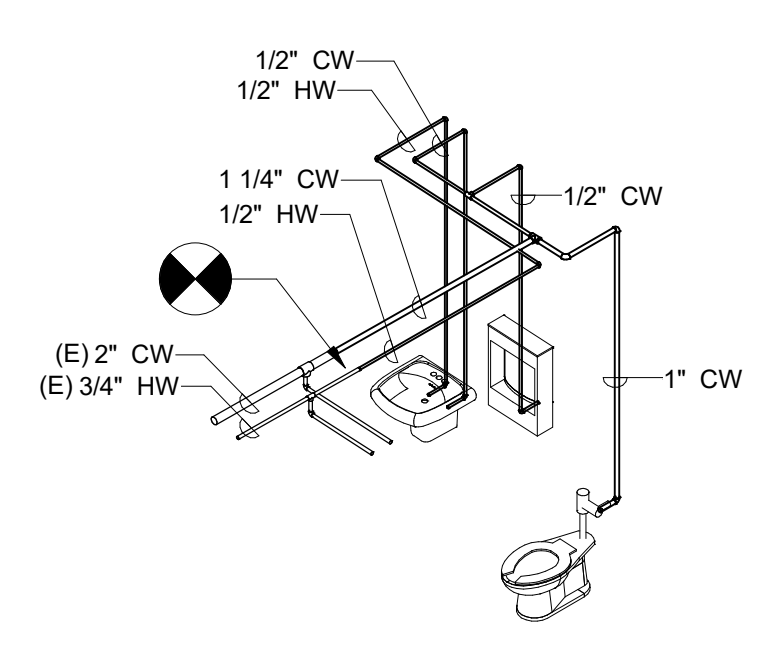
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| 3/20/2024 | BID SET |

PLUMBING RISERS

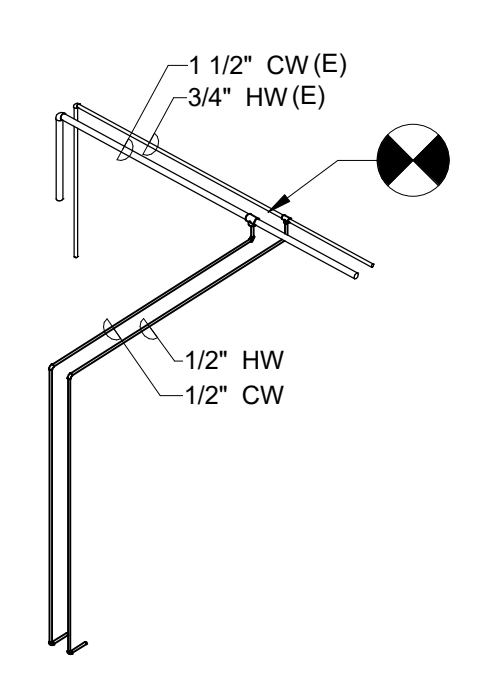
P-401



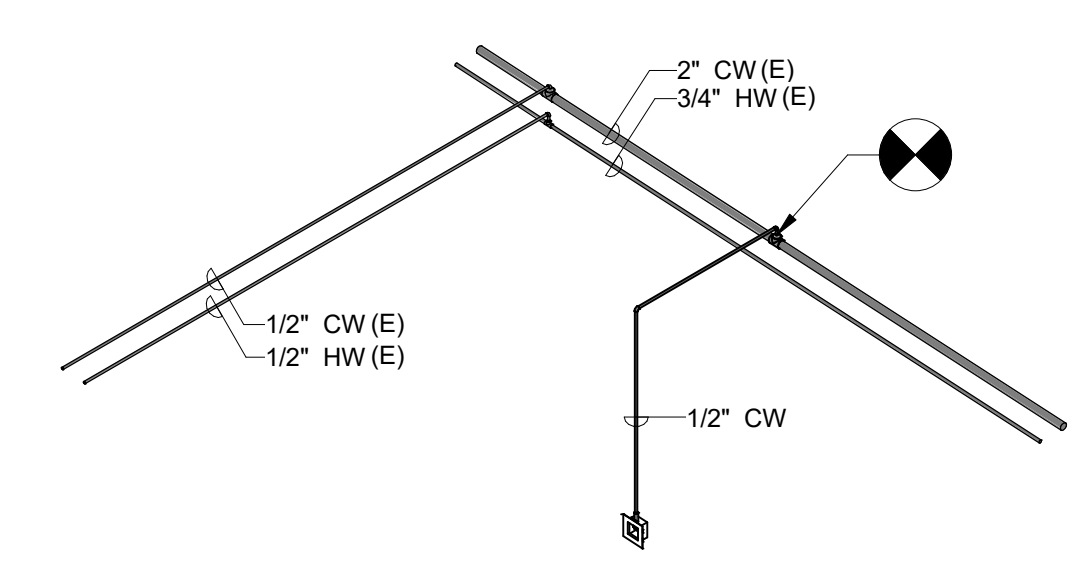
1 WATER RISER - ADULT CHANGING (127)



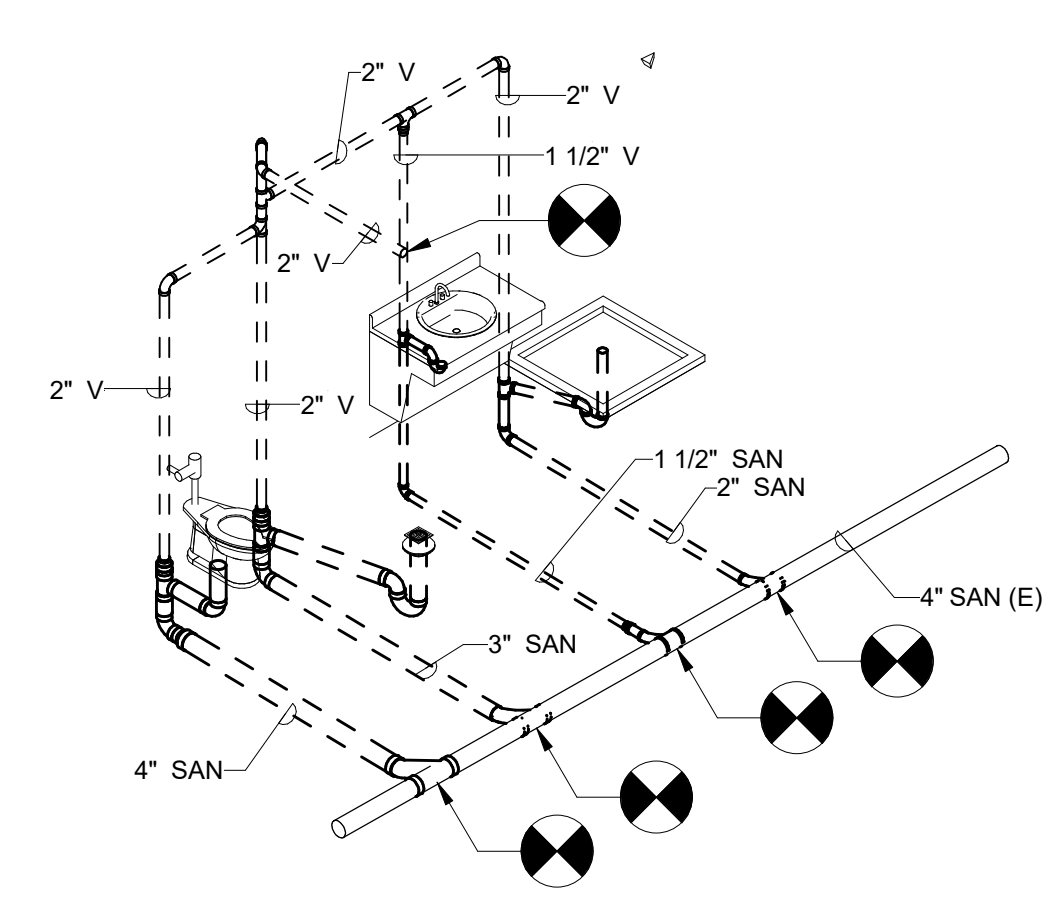
2 WATER RISER - ALL GENDER (105)



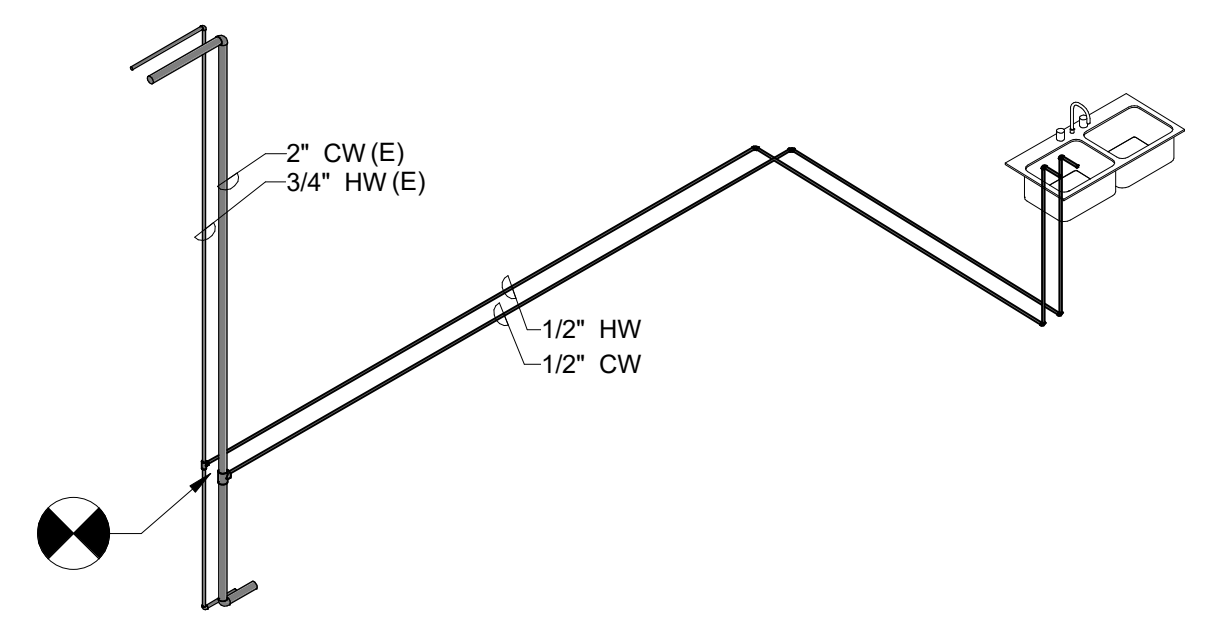
3 WATER RISER - CUSTODIAL (129)



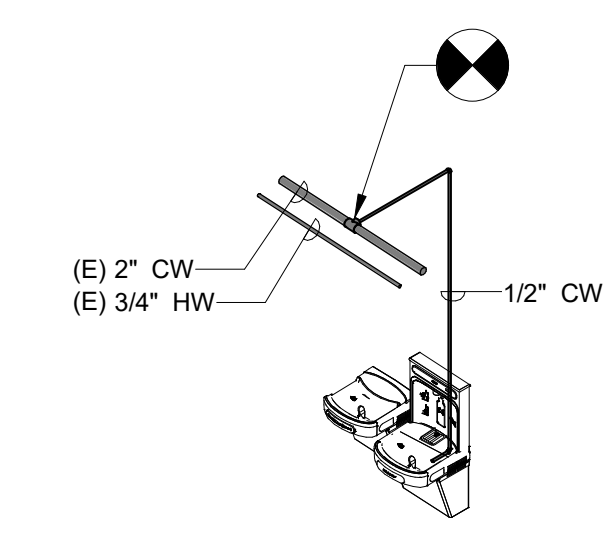
4 WATER RISER - KITCHEN (113)



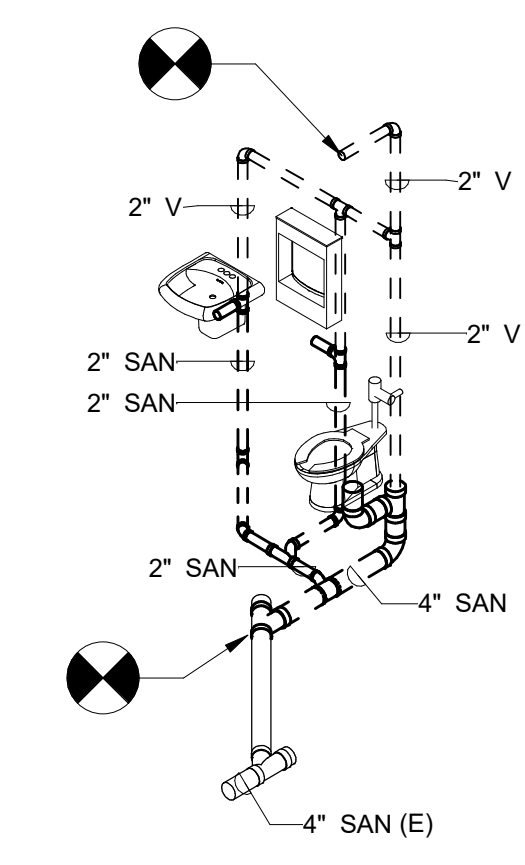
7 WASTE RISER - ADULT CHANGING (127)



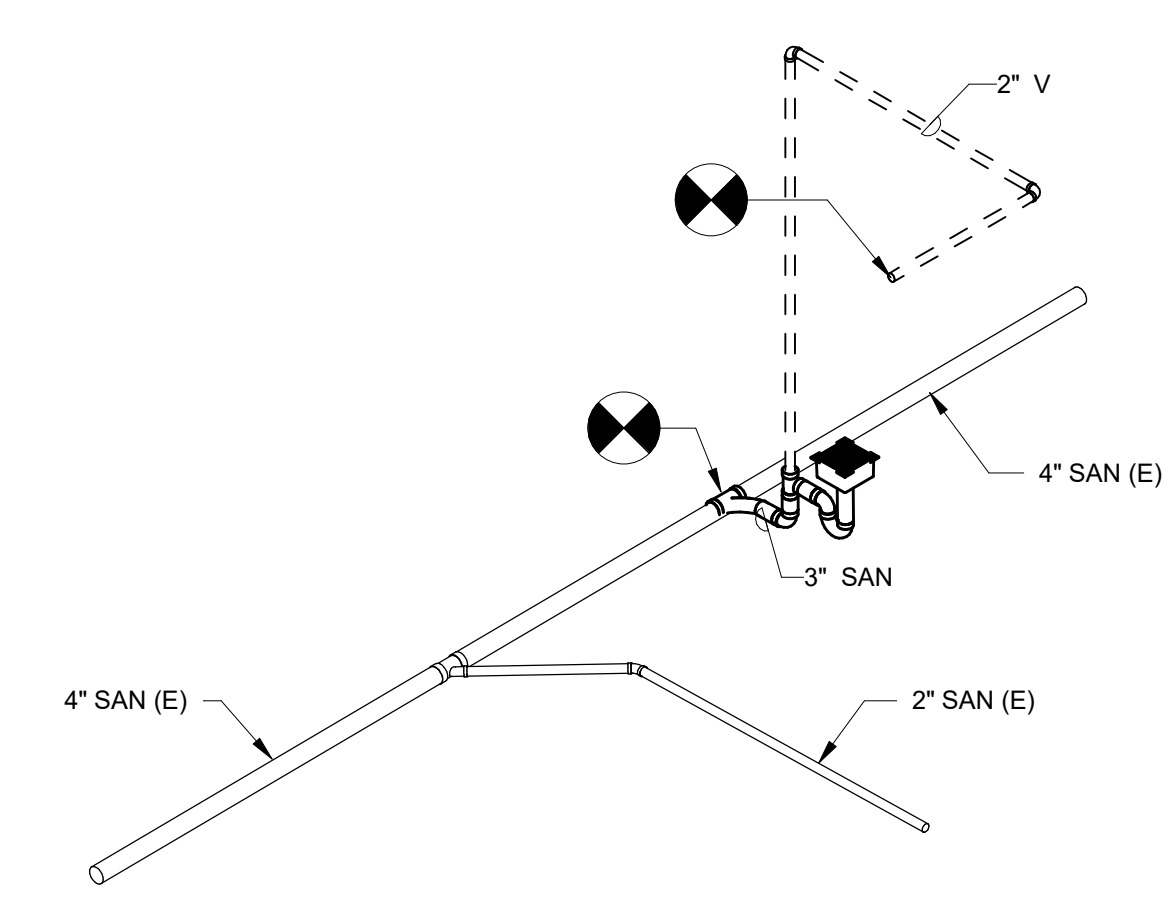
6 WATER RISER - WATER HEATER (B003)



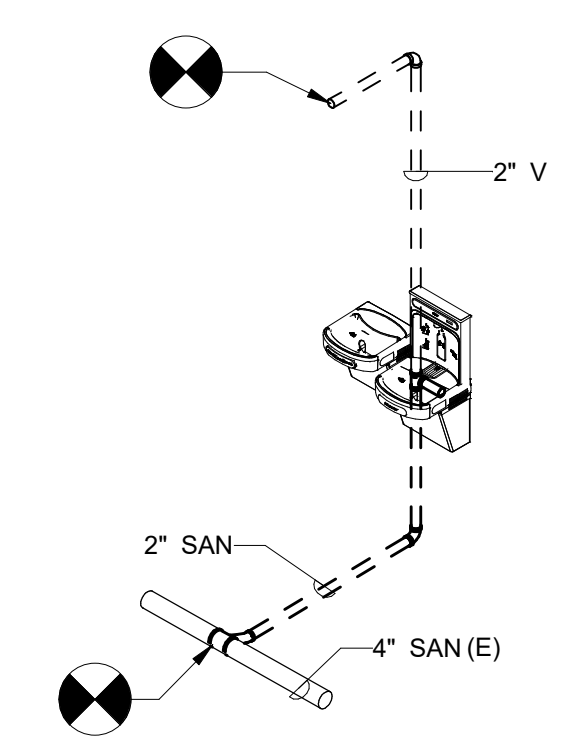
5 WATER RISER - LOBBY (107)



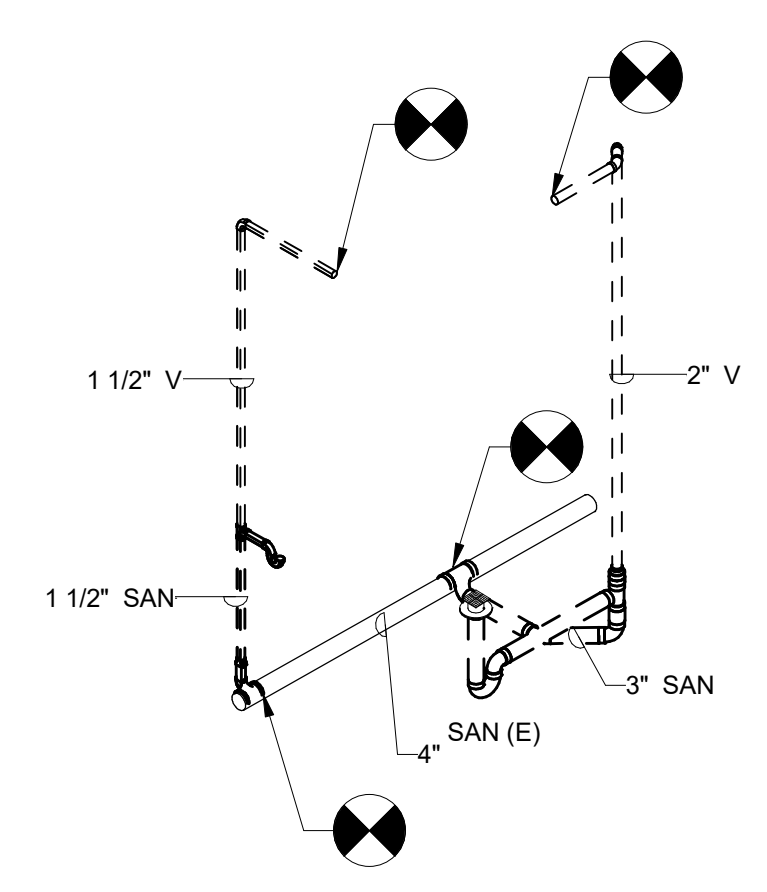
8 WASTE RISER - ALL GENDER (105)



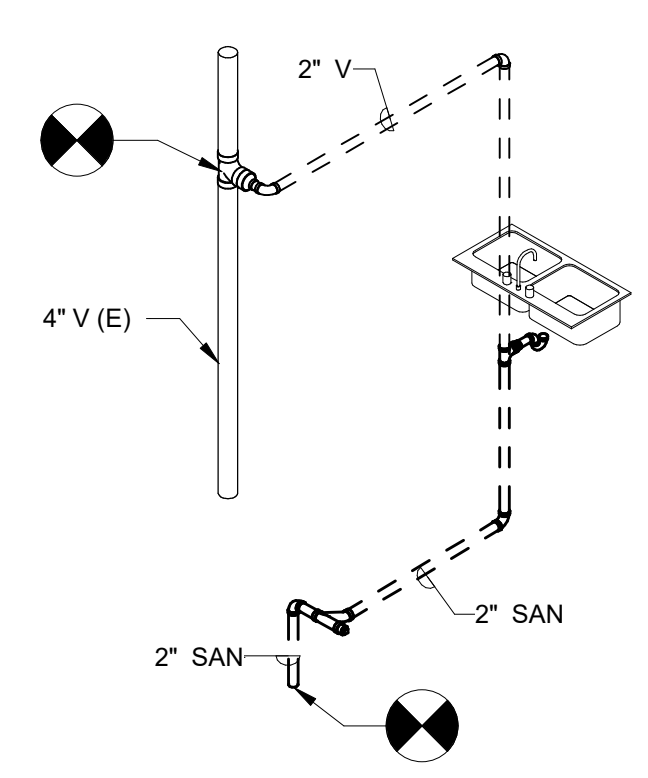
10 WASTE RISER - KITCHEN (113)



11 WASTE RISER - LOBBY (107)



9 WASTE RISER - CUSTODIAL (129)



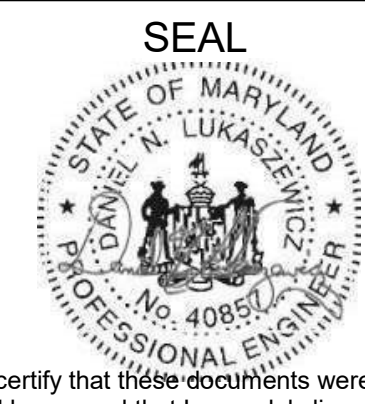
12 WASTE RISER - WATER HEATER (B003)

LINCOLN PARK COMMUNITY CENTER

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License number: 40882 Expiration date: 08/09/2025

KEY PLAN

REVISIONS

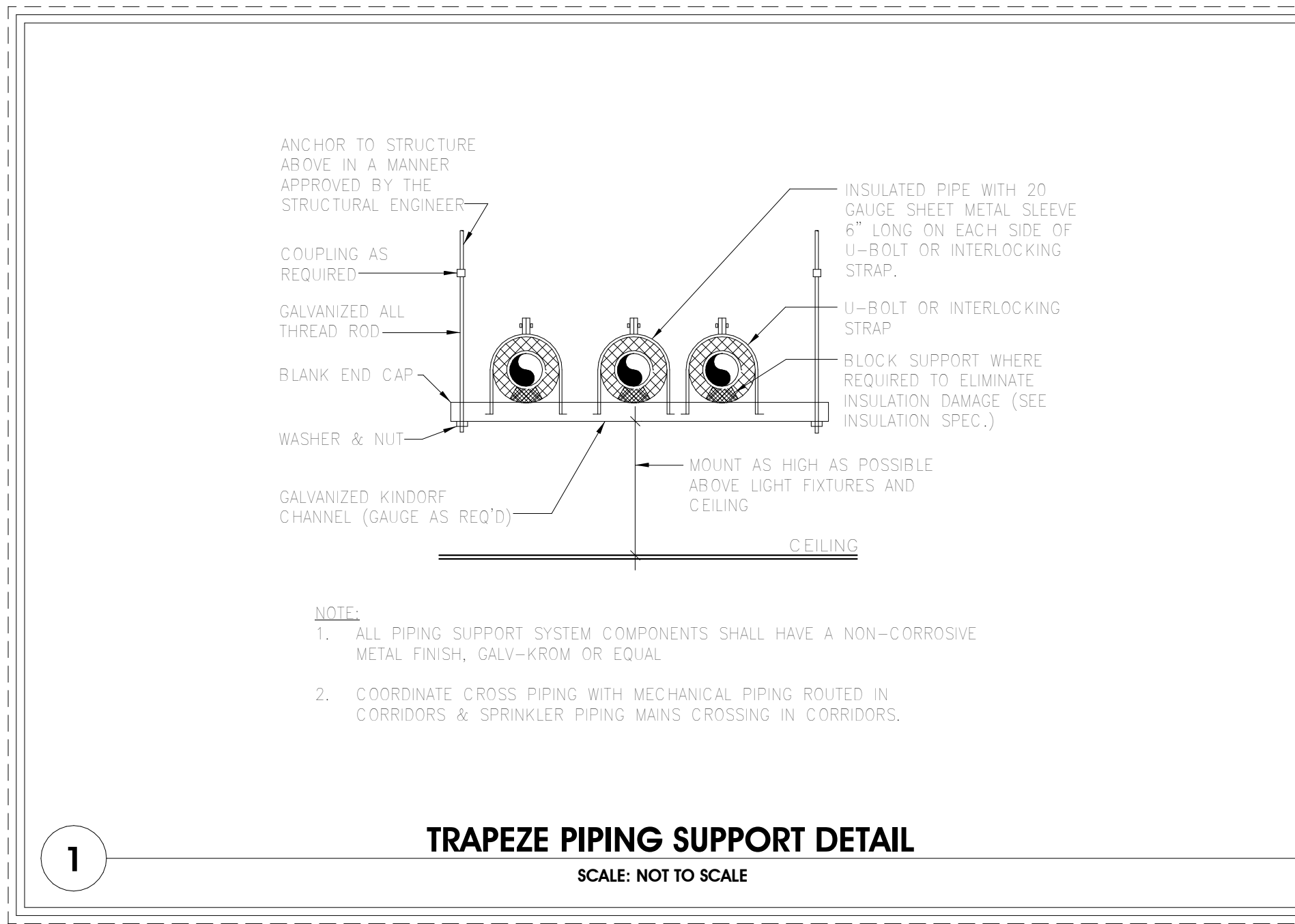
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ISSUANCES

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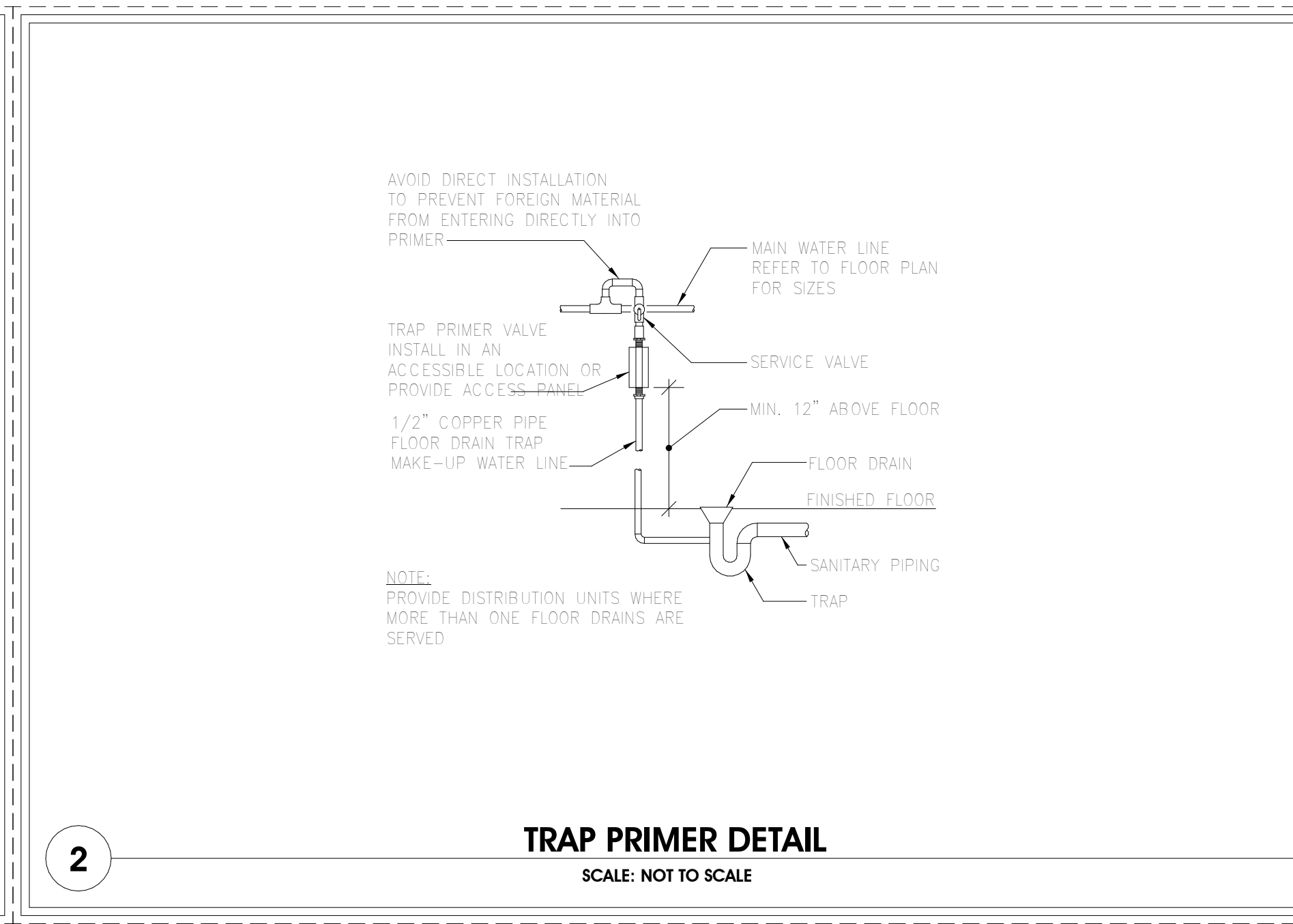
PLUMBING DETAILS

P-501



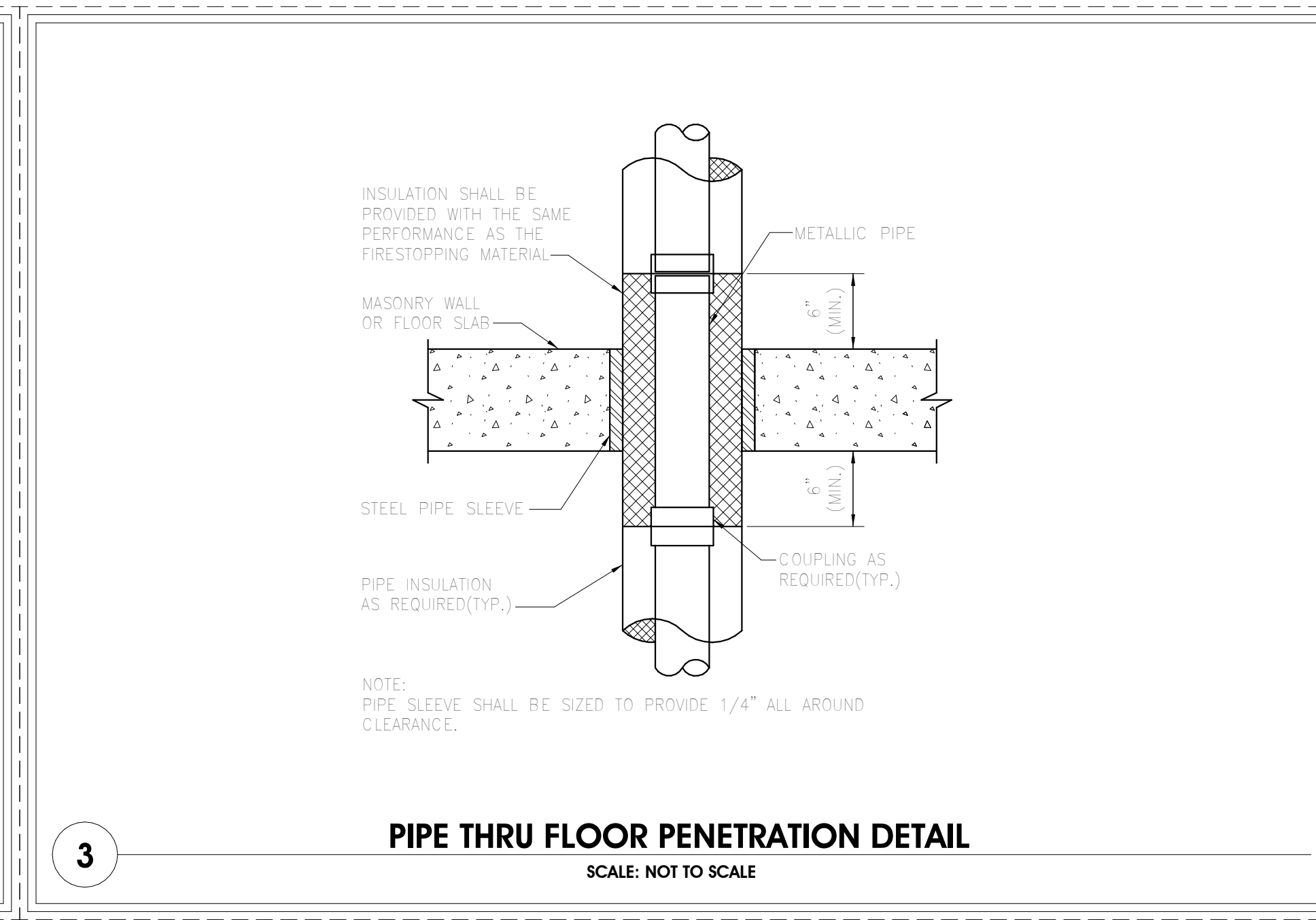
NOTE:
1. ALL PIPING SUPPORT SYSTEM COMPONENTS SHALL HAVE A NON-CORROSIVE METAL FINISH, GALV-KROM OR EQUAL.
2. COORDINATE CROSS PIPING WITH MECHANICAL PIPING ROUTED IN CORRIDORS & SPRINKLER PIPING MARKS CROSSING IN CORRIDORS.

TRAPEZE PIPING SUPPORT DETAIL
SCALE: NOT TO SCALE



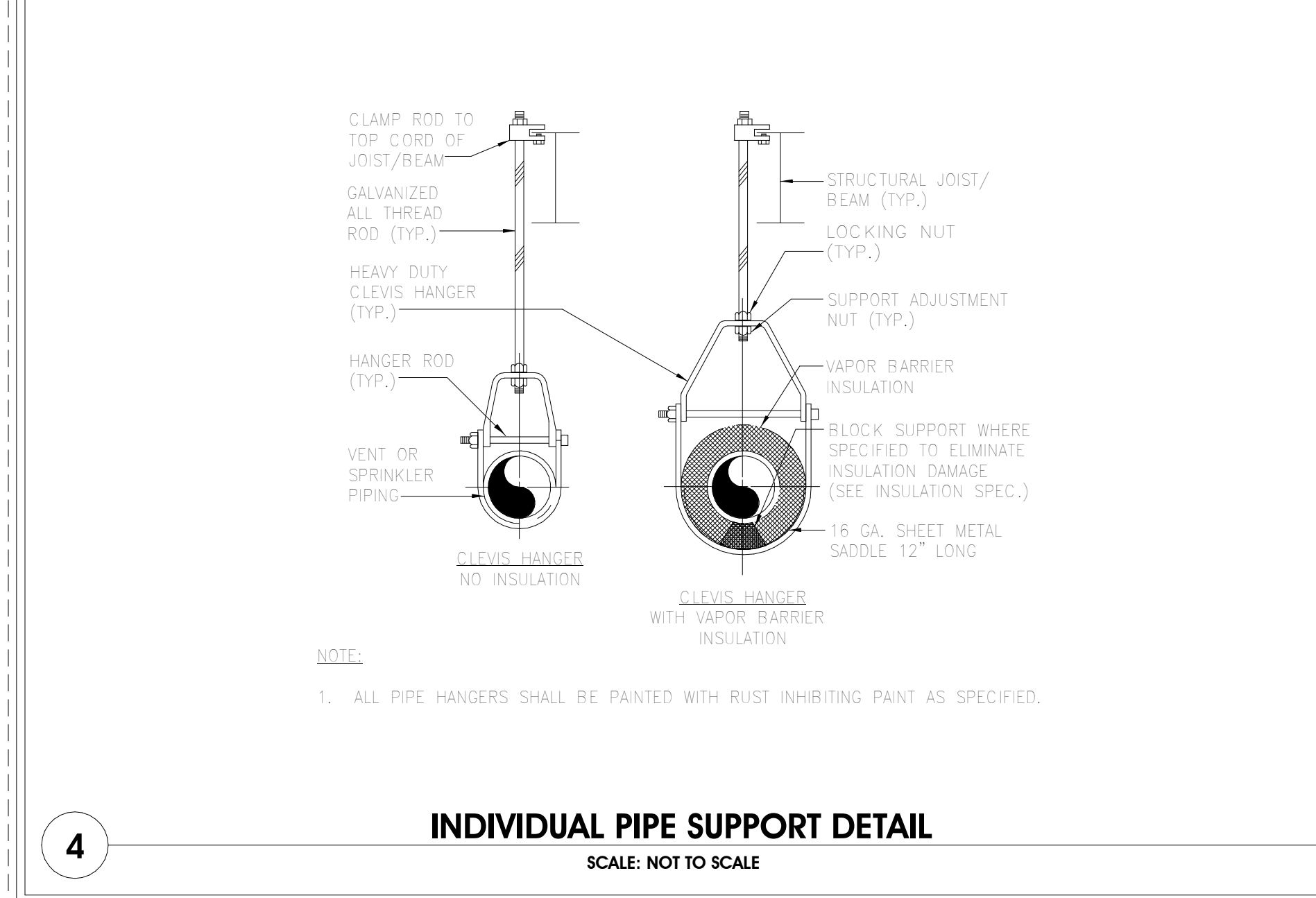
NOTE:
PROVIDE DISTRIBUTION UNITS WHERE MORE THAN ONE FLOOR DRAIN ARE SERVED

TRAP PRIMER DETAIL
SCALE: NOT TO SCALE



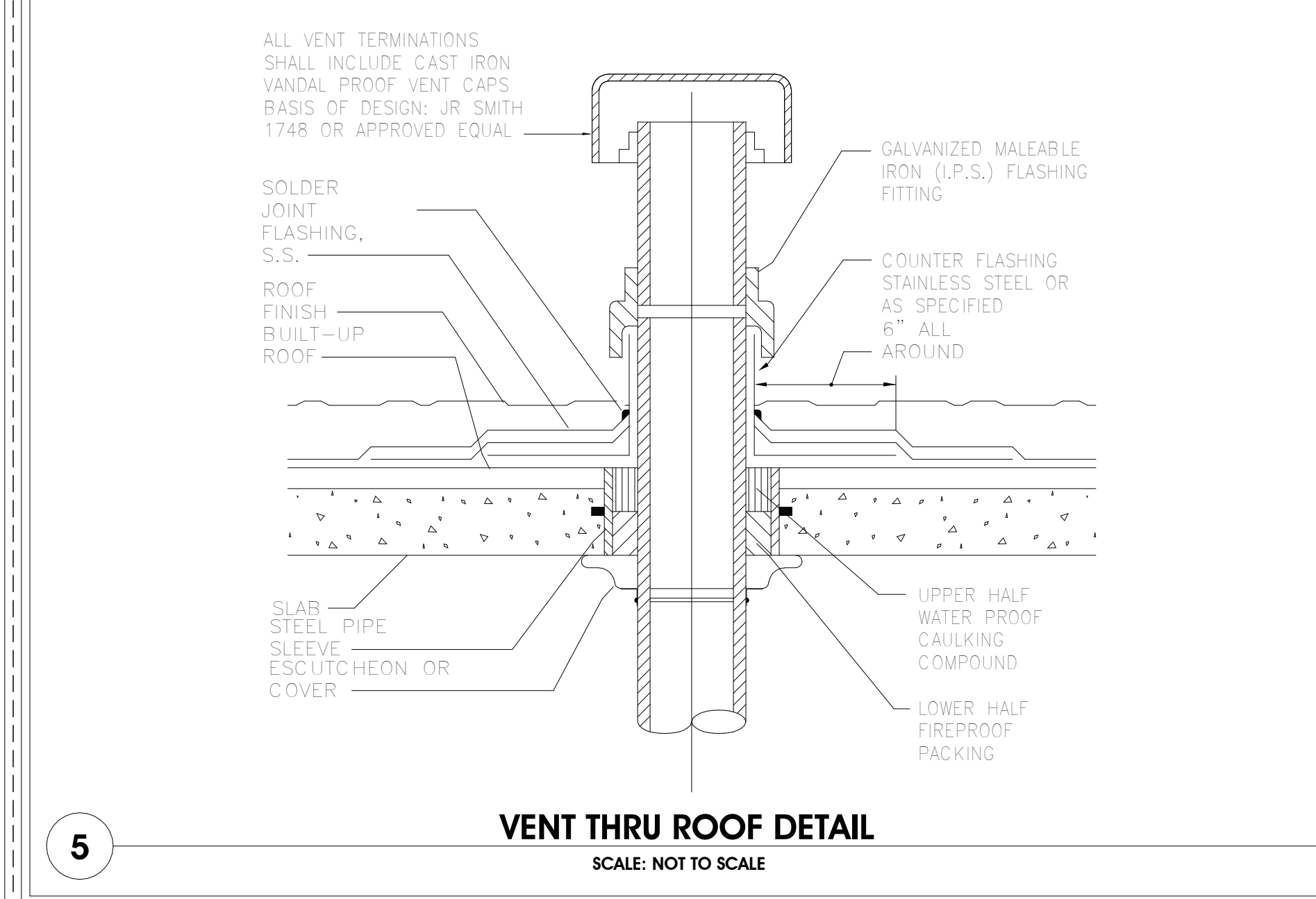
NOTE:
PIPE SLEEVE SHALL BE SIZED TO PROVIDE 1/4\"/>

PIPE THRU FLOOR PENETRATION DETAIL
SCALE: NOT TO SCALE

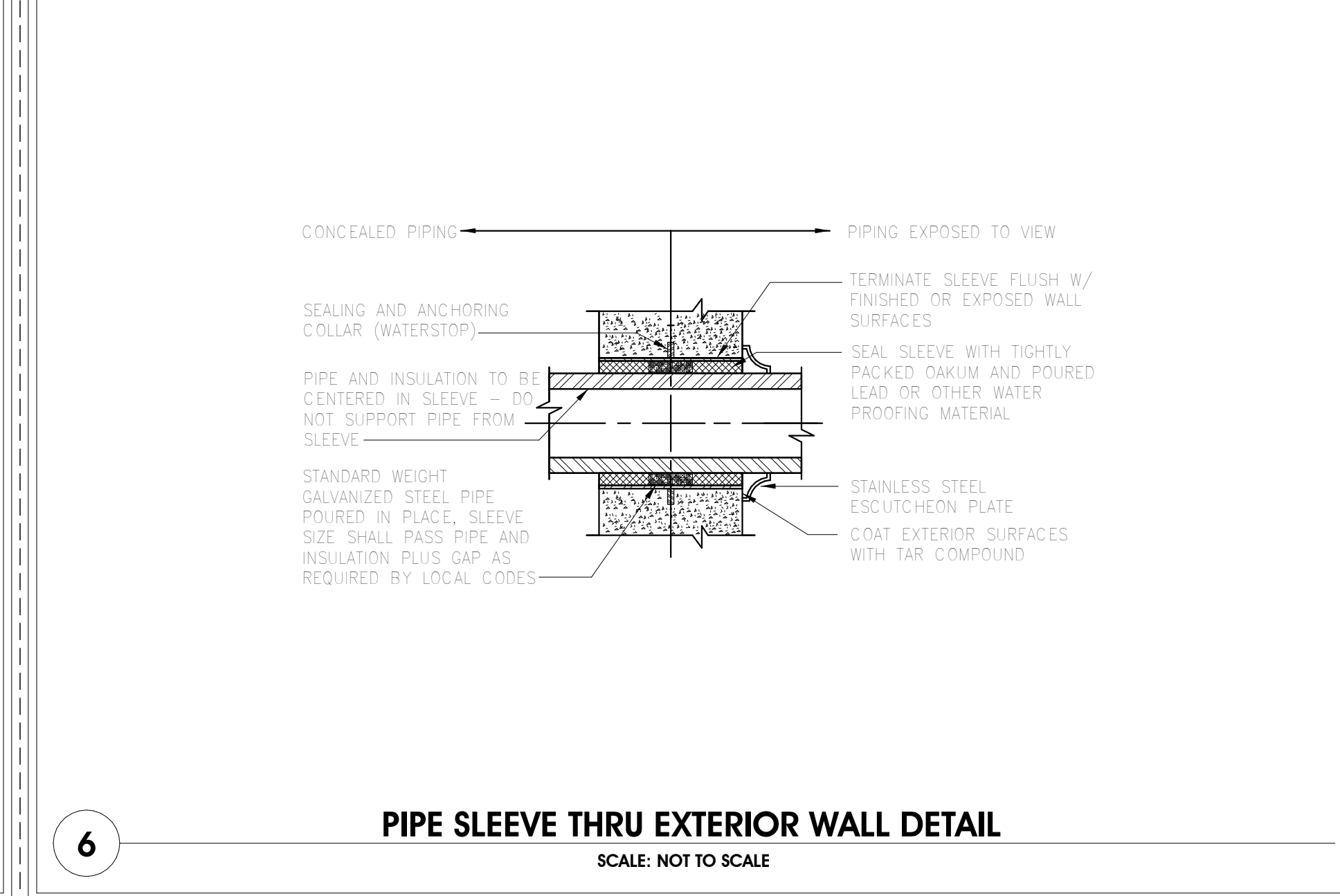


NOTE:
1. ALL PIPE HANGERS SHALL BE PAINTED WITH RUST INHIBITING PAINT AS SPECIFIED.

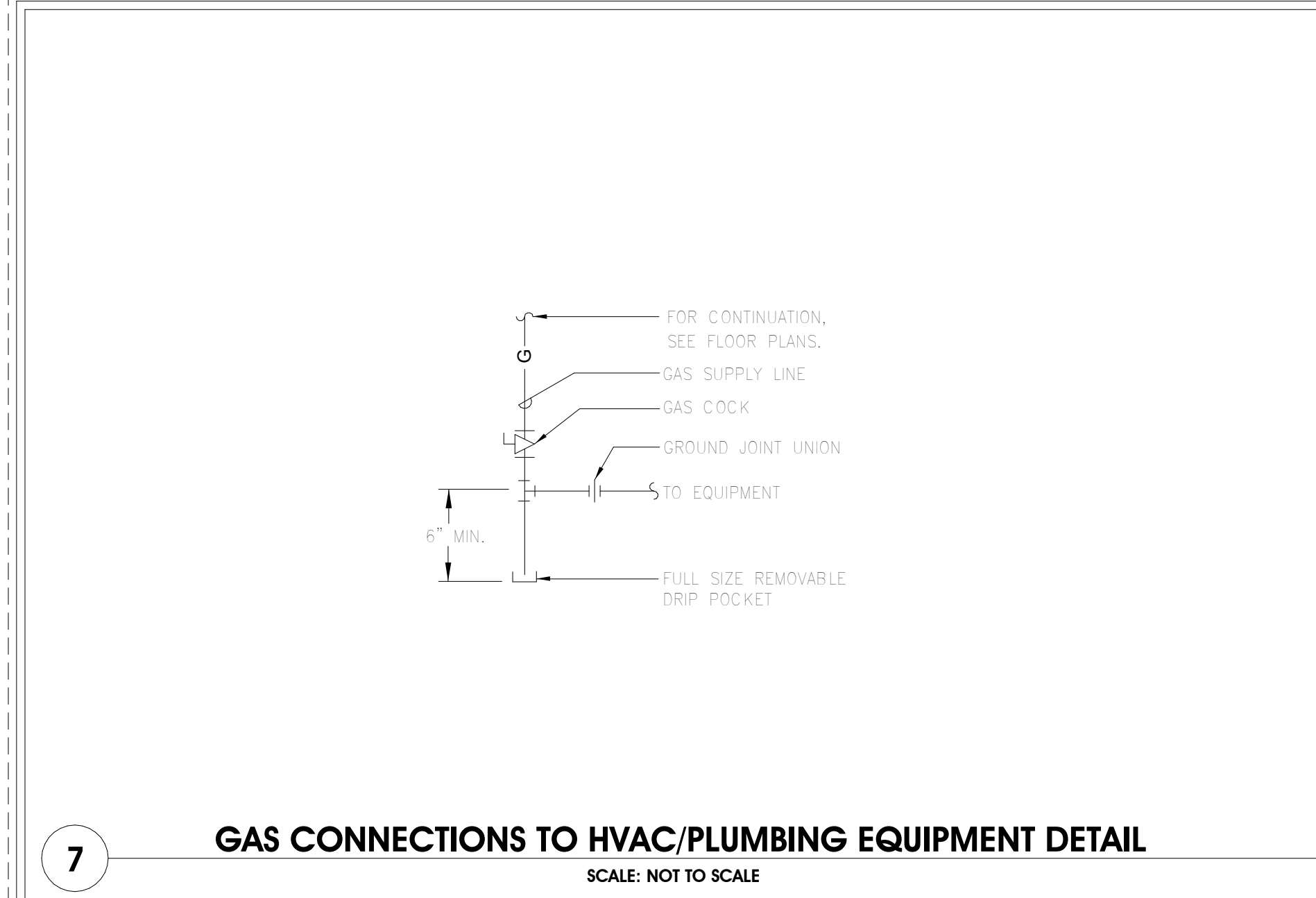
INDIVIDUAL PIPE SUPPORT DETAIL
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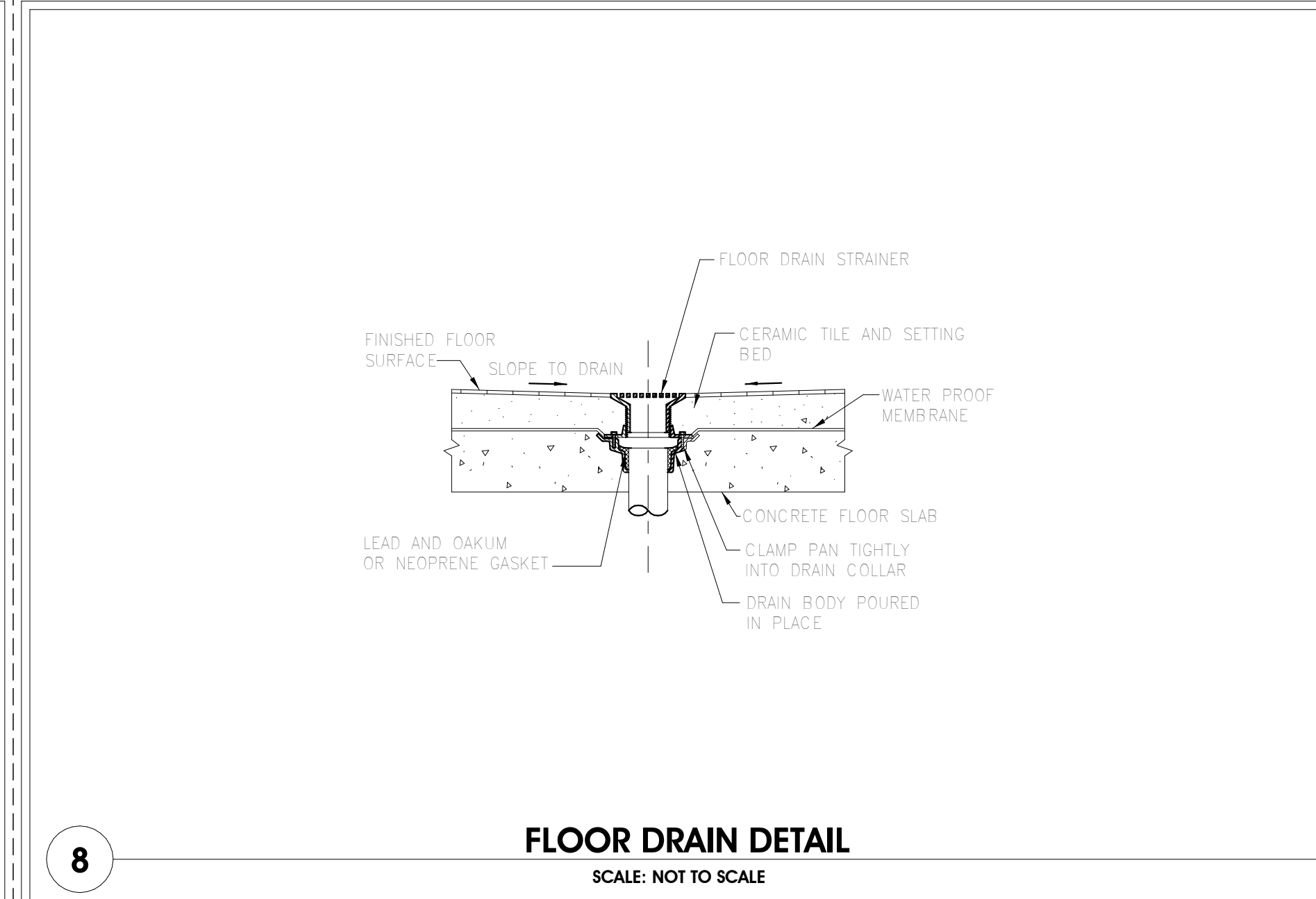
VENT THRU ROOF DETAIL
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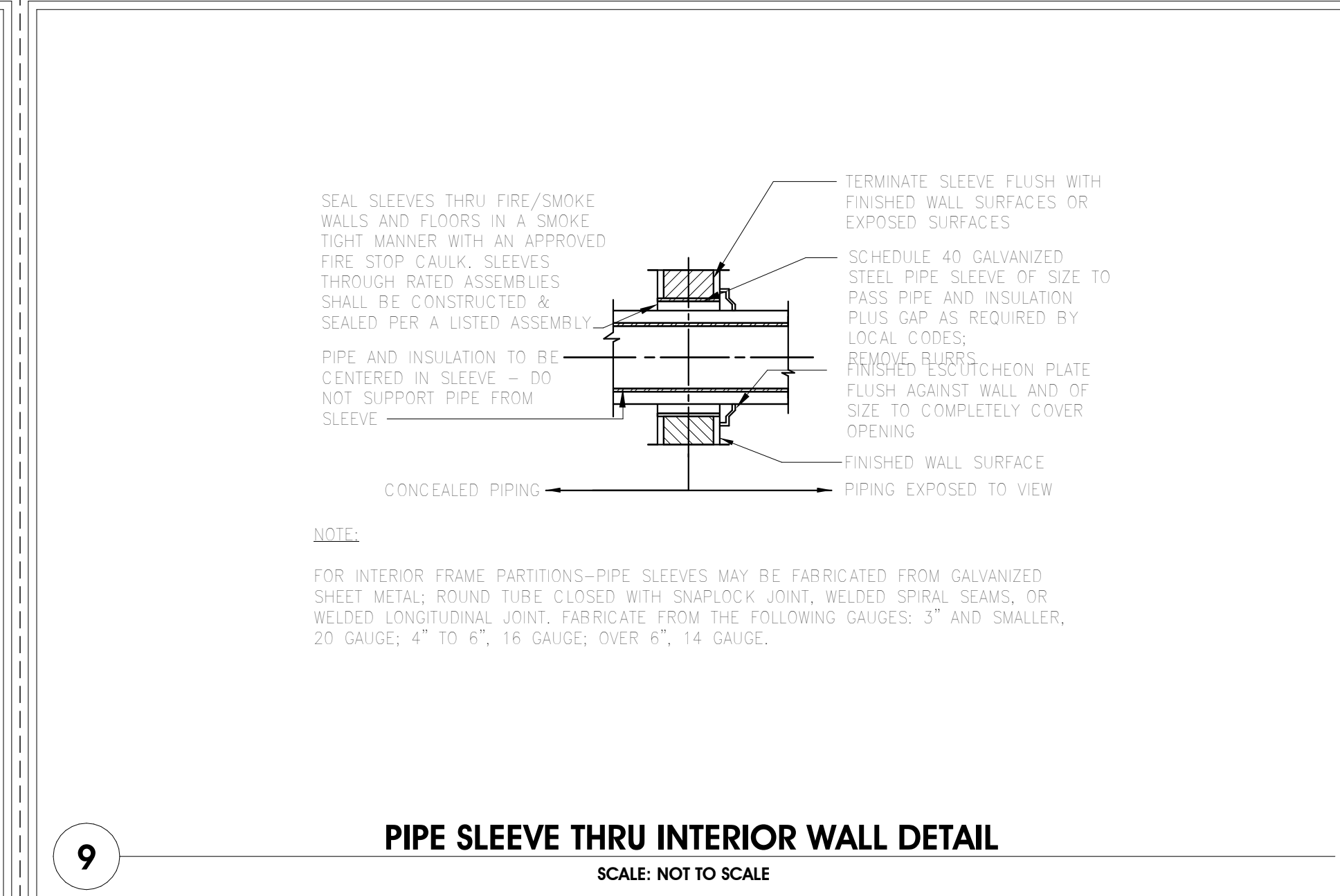
PIPE SLEEVE THRU EXTERIOR WALL DETAIL
SCALE: NOT TO SCALE



GAS CONNECTIONS TO HVAC/PLUMBING EQUIPMENT DETAIL
SCALE: NOT TO SCALE

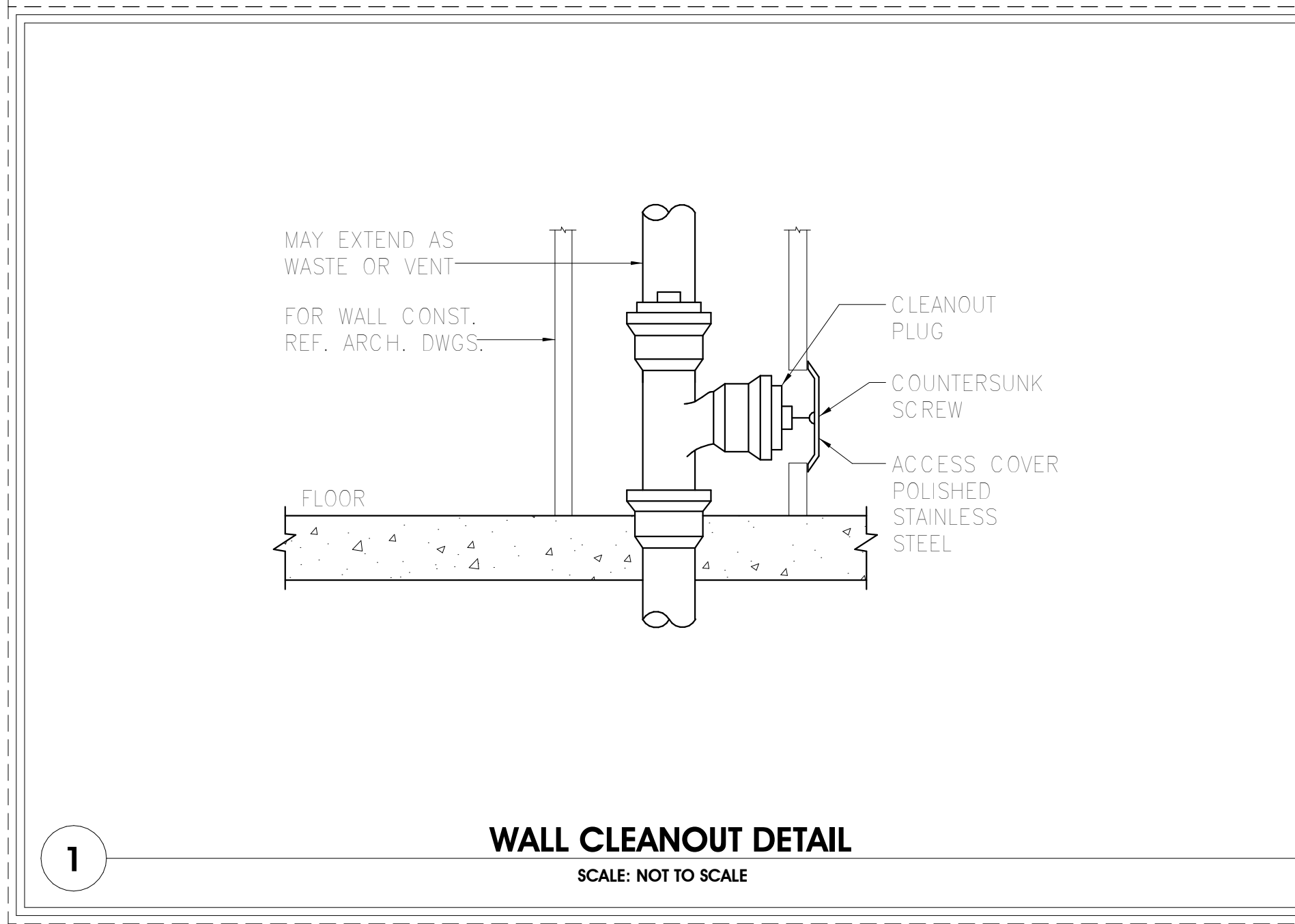


FLOOR DRAIN DETAIL
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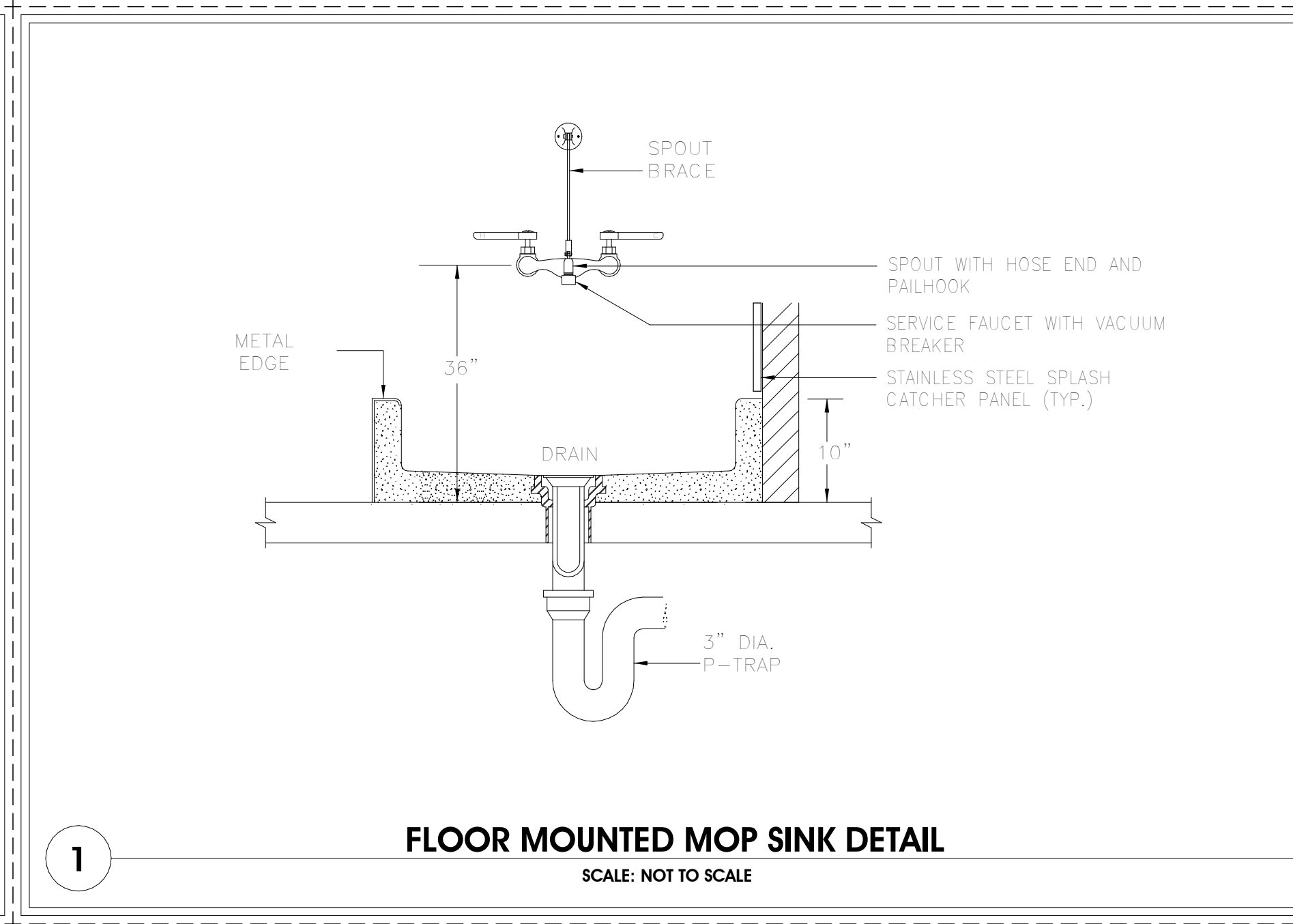


NOTE:
FOR INTERIOR FRAME PARTITIONS-PIPE SLEEVES MAY BE FABRICATED FROM GALVANIZED SHEET METAL ROUND TUBE CLOSED WITH SNAPLOCK JOINT, WELDED SPIRAL SEAMS, OR WELDED LONGITUDINAL JOINT, FABRICATE FROM THE FOLLOWING GAUGES: 3\"/>

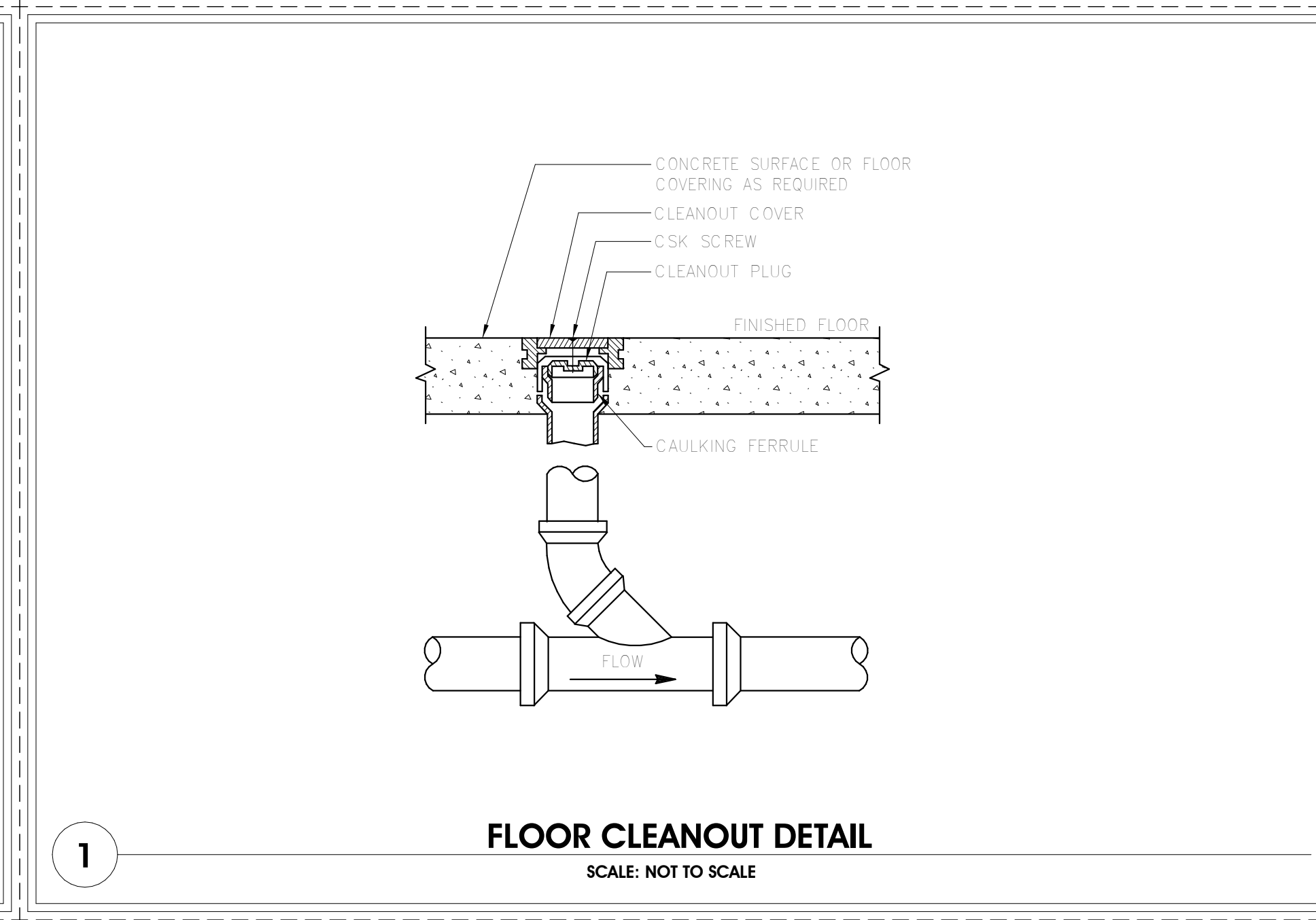
PIPE SLEEVE THRU INTERIOR WALL DETAIL
SCALE: NOT TO SCALE



WALL CLEANOUT DETAIL
SCALE: NOT TO SCALE



FLOOR MOUNTED MOP SINK DETAIL
SCALE: NOT TO SCALE



FLOOR CLEANOUT DETAIL
SCALE: NOT TO SCALE

ELECTRICAL NOTES

GENERAL NOTES

- THE WORK TO BE DONE SHALL INCLUDE THE FURNISHING OF ALL LABOR, MATERIALS, APPLIANCES, EQUIPMENT, TOOLS, TRANSPORTATION, PERMITS AND SERVICES REQUIRED TO CONSTRUCT, INSTALL AND TO MODIFY THE ELECTRICAL SYSTEMS AS HEREIN SPECIFIED AND SHOWN ON THESE DRAWINGS FOR A COMPLETE OPERATIONAL SYSTEM. COORDINATE WORK TO BE PERFORMED OR INSTALLED BY OTHERS AFFECTING THE ELECTRICAL WORK AND PROVIDE AND INSTALL ALL NECESSARY ANCHORS, SLEEVES, HANGERS, ETC. FOR ATTACHING OR CONNECTING ELECTRICAL WORK TO RELATED WORK OF OTHER TRADES.
- ALL ELECTRICAL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE LATEST ADOPTED NATIONAL ELECTRICAL CODE AND ALL OTHER LOCAL CODES AND AUTHORITIES HAVING JURISDICTION.
- THE DRAWINGS, WHICH CONSTITUTE A PART OF THIS CONTRACT, INDICATE THE GENERAL ARRANGEMENT OF CIRCUITS AND LOCATIONS OF OUTLETS, SWITCHES, PANELBOARDS, CONDUIT AND OTHER WORK. ALL ITEMS NOT SPECIFICALLY MENTIONED HEREIN, WHICH ARE ACCESSORY TO MAKE A COMPLETE WORKING INSTALLATION, SHALL BE INCLUDED AT NO EXTRA COST.
- IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO EXAMINE AND TO COORDINATE WITH THE ARCHITECTURAL, MECHANICAL, AND PLUMBING AND DRAWINGS AND THE DRAWINGS OF ALL OTHER TRADES IN ORDER TO BECOME FAMILIAR WITH ALL ASPECTS OF THE DESIGN AFFECTING THE ELECTRICAL WORK.
- CONTRACTOR SHALL COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF ALL NEW ELECTRICAL DEVICES WITH ARCHITECTURAL ELEVATIONS AND DRAWINGS PRIOR TO COMMENCEMENT OF WORK. DEVICES INCLUDE BUT ARE NOT LIMITED TO RECEPTACLES, SWITCHES, FIXTURES AND TELE/PHONE OUTLETS.
- ALL ELECTRICAL MATERIALS SHALL BE NEW EXCEPT WHERE SPECIFICALLY NOTED AS EXISTING TO BE REUSED. ALL MATERIAL SHALL BE LISTED BY THE UNDERWRITERS LABORATORIES, INC. (UL) DEFECTIVE EQUIPMENT AND/OR EQUIPMENT DAMAGED DURING INSTALLATION AND/OR TESTING SHALL BE REPLACED OR REPAIRED IN A MANNER MEETING THE APPROVAL OF THE ARCHITECT AND THE ENGINEER. WHERE APPLICABLE, ALL EQUIPMENT SHALL BE IN ACCORDANCE WITH NEMA STANDARDS.
- ALL WORK SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER OR OWNER'S AUTHORIZED REPRESENTATIVE.
- ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER.
- INSTALL A FIRE STOP OF ROCKWOOL FIBER OR SILICON FOAM SEALANT TO PROVIDE AN EFFECTIVE BARRIER AGAINST THE SPREAD OF FIRE AND SMOKE THROUGH CONDUITS, WIREWAYS, AND OTHER ELECTRICAL RACEWAYS PASS THROUGH FIRE RATED PARTITIONS AND/OR SLABS.
- ALL CERTIFICATES OF APPROVAL SHALL BE IN TRIPlicate, DELIVERED TO THE ENGINEER, AND BECOME THE PROPERTY OF THE OWNER.
- CONTRACTOR SHALL VERIFY ALL EQUIPMENT REQUIREMENTS BEFORE INSTALLING CONDUIT OR CONDUCTORS FROM POWER SOURCE TO EQUIPMENT TERMINATION.
- THE CONTRACTOR SHALL X-RAY SLAB IN AREA OF PENETRATION PRIOR TO CORE DRILLING AND COORDINATE WITH EQUIPMENT IN CEILING SPACE BELOW TO CHECK FOR OBSTRUCTIONS.
- CONDUCTOR INSTALLATION: HOMERUNS TO THE PANELBOARD MAY BE RUN TOGETHER IN ONE CONDUIT.
- PROVIDED ALL CONNECTIONS ARE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND LOCAL ELECTRICAL CODE REQUIREMENTS, AND THE MAXIMUM UNBALANCED CURRENT IN NEUTRAL DOES NOT EXCEED THE CAPACITY OF THE WIRE, NO MORE THAN 3 SINGLE PHASE CIRCUIT SHALL BE INSTALLED IN ONE RACEWAY. ELIMINATE SPLICES WHEREVER POSSIBLE, AND WHERE NECESSARY, SPLICE IN READILY ACCESSIBLE PULL JUNCTION OR OUTLET BOX.
- MODIFICATIONS TO EXISTING PANELBOARDS: THE CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS AND/OR FUSED SWITCHES AS REQUIRED. NEW EQUIPMENT SHALL MATCH EXISTING INSTALLED EQUIPMENT AND SHALL BE OF THE SAME MANUFACTURER AND TYPE AS SIMILAR EXISTING EQUIPMENT. INTERRUPT RATING OF EQUIPMENT SHALL BE THE SAME AS OF THE EXISTING EQUIPMENT.
- INTERRUPTION OF ELECTRICAL POWER: THE CONTRACTOR SHALL COORDINATE ALL WORK REQUIRING INTERRUPTION OF ELECTRICAL POWER WITH THE BUILDING OWNER AND SHALL OBTAIN WRITTEN PERMISSION FROM THE BUILDING OWNER PRIOR TO SHUTTING DOWN POWER TO ANY SWITCHBOARD. THE CONTRACTOR SHALL ALSO PROVIDE NOTICE TO ALL OTHER TRADES OF ALL SCHEDULED INTERRUPTIONS OF POWER.
- SITE VISIT: PRIOR TO SUBMITTING HIS BID, THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS. THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT AND/OR ENGINEER IN ADVANCE OF ANY CONDITIONS THAT EXIST THAT WOULD PREVENT THE WORK HEREIN SPECIFIED OR SHOWN ON THE DRAWINGS FROM BEING PERFORMED. FAILURE TO SURVEY THE SITE PRIOR TO BID AND START OF CONSTRUCTION WILL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO INSTALL DESIGN WITHIN THE CONFINES OF THE EXISTING CONDITIONS.
- GUARANTEE: THE CONTRACTOR SHALL LEAVE THE ENTIRE ELECTRICAL SYSTEM INSTALLED UNDER THIS CONTRACT IN PROPER WORKING ORDER AND SHALL, WITHOUT CHARGE, REPLACE ANY WORK OR MATERIALS WHICH DEVELOP DEFECTS, EXCEPT FROM ORDINARY WEAR AND TEAR, WITHIN ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. BENEFICIAL USE SHALL NOT BE CONSTRUED AS FINAL ACCEPTANCE. THE ELECTRICAL CONTRACTOR SHALL, DURING THE ONE YEAR GUARANTEE PERIOD, BE RESPONSIBLE FOR THE PROPER REPAIR AND ADJUSTMENTS OF ALL ELECTRICAL SYSTEMS AND EQUIPMENT, APPARATUS, DEVICES, ETC. INSTALLED BY HIM, AND DO ALL WORK NECESSARY TO ENSURE EFFICIENT AND PROPER FUNCTIONING. PRIOR TO THE EXPIRATION OF THE GUARANTEE PERIOD, APPROXIMATELY 11 MONTHS AFTER FINAL ACCEPTANCE OF THIS PROJECT, A POST CONSTRUCTION REVIEW OF THE PROJECT WILL BE MADE.
- THE CONTRACTOR SHALL FURNISH PERSONNEL TO ASSIST THE OWNER IN THIS REVIEW. ANY ADJUSTMENTS, REPAIRS OR REPLACEMENTS FOUND NECESSARY DURING REVIEW SHALL BE DONE BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR, AND SHALL INCUR FINANCIAL RESPONSIBILITY FOR ANY DAMAGES CAUSED BY, OR RESULTING FROM, DEFECTS IN HIS WORK.
- THE CONTRACTOR SHALL MAINTAIN AT THE SITE, FOR THE OWNER, ONE COPY OF ALL DRAWINGS, ADDENDA, APPROVED SHOP DRAWINGS, REVISIONS AND OTHER MODIFICATIONS, IN GOOD ORDER AND MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION. THE SET OF DRAWINGS AND OTHER INFORMATION SHALL BE DELIVERED TO THE OWNER AND ONE COPY GIVEN TO THE ENGINEER UPON COMPLETION OF WORK.
- ALL CONDUCTORS SHALL BE COPPER, CONFORMING TO THE LATEST REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE, STRANDED FOR NO. 8 AWG AND LARGER, SOLID FOR NO. 10 AWG AND SMALLER.
- ALL WIRING SHALL BE INSTALLED IN CONDUIT (EMT WITH STEEL COMPRESSION FITTINGS OR TYPE MC CABLE 6" MAX). MINIMUM CONDUIT SIZE SHALL BE 3/4". ALL CONDUIT AND WIRING SHALL BE CONCEALED IN CEILINGS AND/OR WALLS UNLESS SPECIFICALLY NOTED OTHERWISE. CHANNEL EXISTING WALLS WHERE REQUIRED. WHERE WIRING RUNS ARE EXPOSED DUE TO THE LACK OF A NEW FINISHED CEILING, EMT SHALL BE USED. INSTALL ALL CONDUITS IN RUNS WHICH ARE PARALLEL AND PERPENDICULAR WITH BUILDING LINES.

ELECTRICAL NOTES

DEMOLITION NOTES

- ALL EXISTING INSTALLATIONS WHICH ARE TO BE REMOVED, ABANDONED, RELOCATED, AND/OR CAPPED SHALL BE EXECUTED BEHIND FINISHED SURFACES. ALL SUCH WORK SHALL BE EXECUTED IN A PERMANENT MANNER. NO EXISTING CONDUIT TO BE ABANDONED SHALL BE LEFT OPEN AND NO UNUSED CONDUCTORS SHALL BE ABANDONED IN PLACE WITHOUT WRITTEN AUTHORIZATION FROM THE OWNER.
- IN ALL AREAS WHERE DEMOLITION WORK OCCUR, PATCH AND REPAIR TO MATCH NEW FINISH OR EXISTING FINISHES WHICH ARE TO REMAIN.
- ALL DEMOLITION WORK SHALL BE COORDINATED WITH THE ARCHITECTURAL AND OTHER SECTIONS OF THE CONTRACT DOCUMENTS.
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING OF ANY DISCOVERED CONFLICTS BETWEEN EXISTING INSTALLATIONS WHICH ARE NOT SCHEDULED FOR DEMOLITION AND THE NEW WORK INDICATED WITHIN THE CONTRACT DOCUMENTS. SUCH NOTIFICATION SHALL BE ACCOMPANIED WITH A DRAWING DELINEATING THE PROPOSED SOLUTION PRIOR TO STARTING ANY WORK IN THE AFFECTED AREA.
- THE CONTRACTOR SHALL PROVIDE A PROPOSED SCHEDULE OF DEMOLITION WORK FOR REVIEW BY THE OWNER.
- ANY ADDITIONAL DEMOLITION WORK DEEMED NECESSARY AND NOT INCLUDED WITHIN THE SCOPE OF THE CONTRACT DOCUMENTS SHALL BE EXECUTED ONLY UPON RECEIPT OF WRITTEN AUTHORIZATION FROM THE OWNER.
- CONTRACTOR IS TO ASSURE THE CONTINUITY OF POWER TO REMAINING LIGHTING FIXTURES AND POWER EQUIPMENT AFFECTED BY THE DEMOLITION.
- ALL LIGHTING, POWER, DATA AND TELEPHONE OUTLETS AND PUNCHBLOCKS INSIDE THE AREA OF CONTRACT SHOWN SHALL BE REMOVED REGARDLESS OF WHETHER THEY ARE SHOWN ON THE PLAN. DRAWING UNLESS NOTED OTHERWISE.
- FOR ALL LIGHTING AND POWER DEVICES INDICATED TO BE REMOVED, REMOVE DEVICE, BOX, RACEWAY/CONDUIT, WIRE AND ASSOCIATED SUPPORTS BACK TO THE NEXT ACTIVE DEVICE. IF THERE ARE NO ACTIVE DEVICES TO REMAIN ON THE CIRCUIT THE ASSOCIATED WIRING SHALL BE REMOVED BACK TO THE SOURCE PANELBOARD AND THE EXISTING BREAKER AT THE PANEL SHALL BE LABELED "SPARE". A NEW TYPED PANEL SCHEDULE SHALL THEN BE CREATED.
- ALL REMOVED LIGHT FIXTURES, WHICH ARE NOT RELOCATED/ REUSED ON THIS PROJECT, SHALL BE CLEANED AND RETURNED TO THE BUILDING OWNER PRIOR TO BEGINNING NEW WORK.
- COORDINATE REMOVAL OF TELEPHONE/DATA OUTLETS WITH THE OWNER PRIOR TO BEGINNING OF WORK.

DEMOLITION

NOTE: REFER TO DEMOLITION DRAWINGS & NOTES FOR REQUIREMENTS.

- (N): NEW WORK
 (R): EXISTING TO BE REMOVED.
 (E): EXISTING TO REMAIN.
 (ER): EXISTING TO BE RELOCATED.
 (RE): RELOCATED EXISTING DEVICE IN NEW LOCATION.
 - - - - ITEMS SHOWN DASHED INDICATE EXISTING TO BE REMOVED.
 --- LIGHT LINES INDICATE EXISTING TO REMAIN.

ABBREVIATIONS

| | | | |
|--------|------------------------------|--------|------------------------------|
| A, AMP | AMPERES | IG | ISOLATED GROUND |
| AB | ABOVE | INCAND | INCANDESCENT |
| AC | ALTERNATE CURRENT | KAIC | KILOAMP INTERRUPTING CURRENT |
| AFF | ABOVE FINISHED FLOOR | KVA | KILOVOLT AMPERES |
| ARCH | ARCHITECTURAL ARCHITECT | KW | KILOWATTS |
| BEL | BELOW | LT(S) | LIGHT(S) |
| BKR | BREAKER | M | METER |
| C | CONDUIT | MCB | MAIN CIRCUIT BREAKER |
| CEIL | CEILING | MECH | MECHANICAL |
| CKT | CIRCUIT | MH | MOUNTING HEIGHT |
| CM | CENTIMETER | MLO | MARK LOSS ONLY |
| DC | DIRECT CURRENT | MM | MILLIMETER |
| D/S | DISCONNECT SWITCH | MTD | MOUNTED |
| DISC | DISCONNECT SWITCH | NEC | NATIONAL ELECTRICAL CODE |
| DWG | DRAWING | NO. # | NUMBER |
| EC | ELECTRICAL CONTRACTOR | NTS | NOT TO SCALE |
| EF | EXHAUST FAN | P | POLE |
| ELEC | ELECTRICAL | PH | PHASE |
| EM | EMERGENCY | PHL | PANEL |
| EQUIP | EQUIPMENT | RECEP | RECEPTACLE |
| EXIST | EXISTING | RM | ROOM |
| FA | FIRE ALARM | TELE | TELEPHONE |
| FACP | FIRE ALARM CONTROL PANEL | TYP | TYPICAL |
| FAAP | FIRE ALARM ANNUNCIATOR PANEL | UON | UNLESS OTHERWISE NOTED |
| FIXT | FIXTURE | V | VOLTS |
| FLA | FULL LOAD AMPERES | W | WATTS |
| G, GND | GROUND | WP | WEATHERPROOF |
| GC | GENERAL CONTRACTOR | W/ | WITH |
| GFI | GROUND FAULT INTERRUPTER | | |

GENERAL

- # INDICATES PLAN NOTE.
 # INDICATES REVISION. CLOUDED AREA CONTAINS THE REVISION.
 # INDICATES ROOM NUMBER.
 —○— BRANCH CIRCUIT HOMERUN
 —○ CONDUIT DOWN
 —● CONDUIT UP
 —+ GROUND

ELECTRICAL LEGEND

POWER

NOTES: REFER TO ARCHITECTURAL DRAWINGS AND ELEVATIONS FOR EXACT LOCATION AND MOUNTING HEIGHTS.

- WP: WEATHER PROOF (NEMA 3R)
 IG: ISOLATED GROUND.
 GFI: GROUND FAULT INTERRUPTER.
 Ⓢ WALL MOUNTED 20A DUPLEX RECEPTACLE. (18" AFF UON).
 Ⓢ WALL 20A QUADRUPLX RECEPTACLE. (18" AFF UON).
 Ⓢ WALL MOUNTED JUNCTION BOX.
 Ⓢ DISCONNECT SWITCH - NON-FUSED.
 Ⓢ FUSED DISCONNECT SWITCH. FUSE SIZE PER PLANS.
 Ⓢ COMBINATION STARTER/DISCONNECT SWITCH.
 Ⓢ VARIABLE FREQUENCY DRIVE.
 Ⓢ VARIABLE FREQUENCY DRIVE WITH INTEGRAL DISCONENCT.
 Ⓢ MOTOR. REFER TO MECHANICAL PLANS FOR HORSEPOWER.
 120/208 VOLT 3 PHASE, 4-WIRE, SURFACE MOUNTED PANEL.

FIRE ALARM

- Ⓢ FIRE ALARM SYSTEM PULL STATION.
 Ⓢ FIRE ALARM HORN/STROBE. # INDICATES CANDELA RATING.
 Ⓢ FIRE ALARM STROBE ONLY. # INDICATES CANDELA RATING.
 Ⓢ FIRE ALARM SMOKE DETECTOR.
 Ⓢ FIRE ALARM HEAT DETECTOR.
 Ⓢ FIRE ALARM CONTROL PANEL.
 Ⓢ FIRE ALARM ANNUNCIATOR PANEL.

ELECTRICAL LEGEND

LIGHTING

NOTE: REFER TO LIGHTING FIXTURE SCHEDULE FOR FIXTURE TYPES.

- A CAPITAL LETTER ADJACENT TO FIXTURE INDICATES TYPE.
 a LOWER CASE LETTER INDICATES SWITCHING.
 NL INDICATES NIGHT LIGHTING - UNSWITCHED FIXTURE.
 ● SHADED CIRCLE INDICATES FIXTURE ON EMERGENCY CIRCUIT.
 ○ 2'X4' FIXTURE - SURFACE OR RECESSED.
 ○ 1'X4' FIXTURE - SURFACE OR RECESSED.
 ○ 2'X2' FIXTURE - SURFACE OR RECESSED.
 4' LONG STRIP FIXTURE.
 TRACK FIXTURE. TRIANGLES INDICATE HEADS.
 ○ CEILING MOUNTED DOWN LIGHT FIXTURE.
 ○ CEILING MOUNTED WALL WASHER.
 ○ WALL MOUNTED FIXTURE.
 ○ EMERGENCY BATTERY PACK LIGHT FIXTURE.
 ○ CEILING/WALL MOUNTED EXIT SIGN - SINGLE FACE. PROVIDE DIRECTIONAL ARROWS PER PLANS.
 ○ CEILING/WALL MOUNTED EXIT SIGN - DOUBLE FACE. PROVIDE DIRECTIONAL ARROWS PER PLANS.
 S 20A, 1P, 120/277V TOGGLE TYPE LIGHT SWITCH.
 S 20A, 3-WAY, 120/277V TOGGLE TYPE LIGHT SWITCH.
 OS WALL MOUNTED OCCUPANCY SENSOR. WATTSTOPPER DW-100 OR APPROVED EQUAL.
 OS CEILING MOUNTED OCCUPANCY SENSOR. WATTSTOPPER DT-355 OR APPROVED EQUAL.

LIGHTING FIXTURE SCHEDULE

| TYPE | SYMBOL | DESCRIPTION | MANUFACTURER AND CATALOG NUMBER | LAMP DATA | | | VOLTS | NOTES |
|------|--------|---|------------------------------------|-----------|-------|------|-------|-------|
| | | | | NO. | WATTS | TYPE | | |
| L1 | ○ | 4" WAFER THIN DOWNLIGHT, 3000K, FOR TROPHY CASE | JUNO LIGHTING WF4 S5W5 90CRI MB M6 | - | 9 | LED | 120 | |

GENERAL NOTES:

- A. EQUAL LIGHTING FIXTURE MANUFACTURERS WILL BE CONSIDERED.
 B. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF FIXTURES.
 C. SUPPORT RECESSED FIXTURES FROM BUILDING STRUCTURE WITH MINIMUM #12 HANGER WIRE FROM TWO DIAGONAL CORNERS OF FIXTURE.

SPECIFIC NOTES:

- 1.

ELECTRICAL LEGEND

SPECIAL SYSTEMS

NOTE: UNLESS OTHERWISE NOTED, FOR ALL DEVICES IN THIS COLUMN PROVIDE BACK BOX AND 1" EMPTY CONDUIT STUBBED INTO ACCESSIBLE CEILING SPACE. FOR FLOOR MOUNTED BOXES, PROVIDE CONDUIT EITHER IN SLAB OR VIA FLOOR BELOW TO ACCESSIBLE CEILING SPACE OF DEVICE LOCATION.

- ▽ DATA OUTLET.
 ▼ TELEPHONE OUTLET.
 ▼ COMBINATION DATA/TELEPHONE OUTLET.
 ▽ FLOOR MOUNTED DATA/TELEPHONE OUTLET.
 ▭ WALL MOUNTED AUDIO/VISUAL OUTLET.

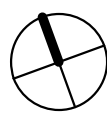
SHEET NAMING LEGEND

- DISCIPLINE: "E" DEMO, "E" NEW WORK
 E-111A SECTOR
 PLAN TYPE: "1" FLOOR PLAN, "2" ENLARGED FLOOR ETC.
 FLOOR LEVEL: "0" LOWEST FLOOR LEVEL ETC., "1" NEXT FLOOR LEVEL ETC.
 SYSTEM TYPE: "0" SITE, "1" LIGHTING, "2" POWER, "3" FIRE ALARM



I hereby certify that these documents were prepared or approved by me and that I am a duly licensed engineer under the laws of the State of Maryland. Expiration date: 07/11/2025. License number: 44226

KEY PLAN



REVISIONS

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ELECTRICAL COVER SHEET

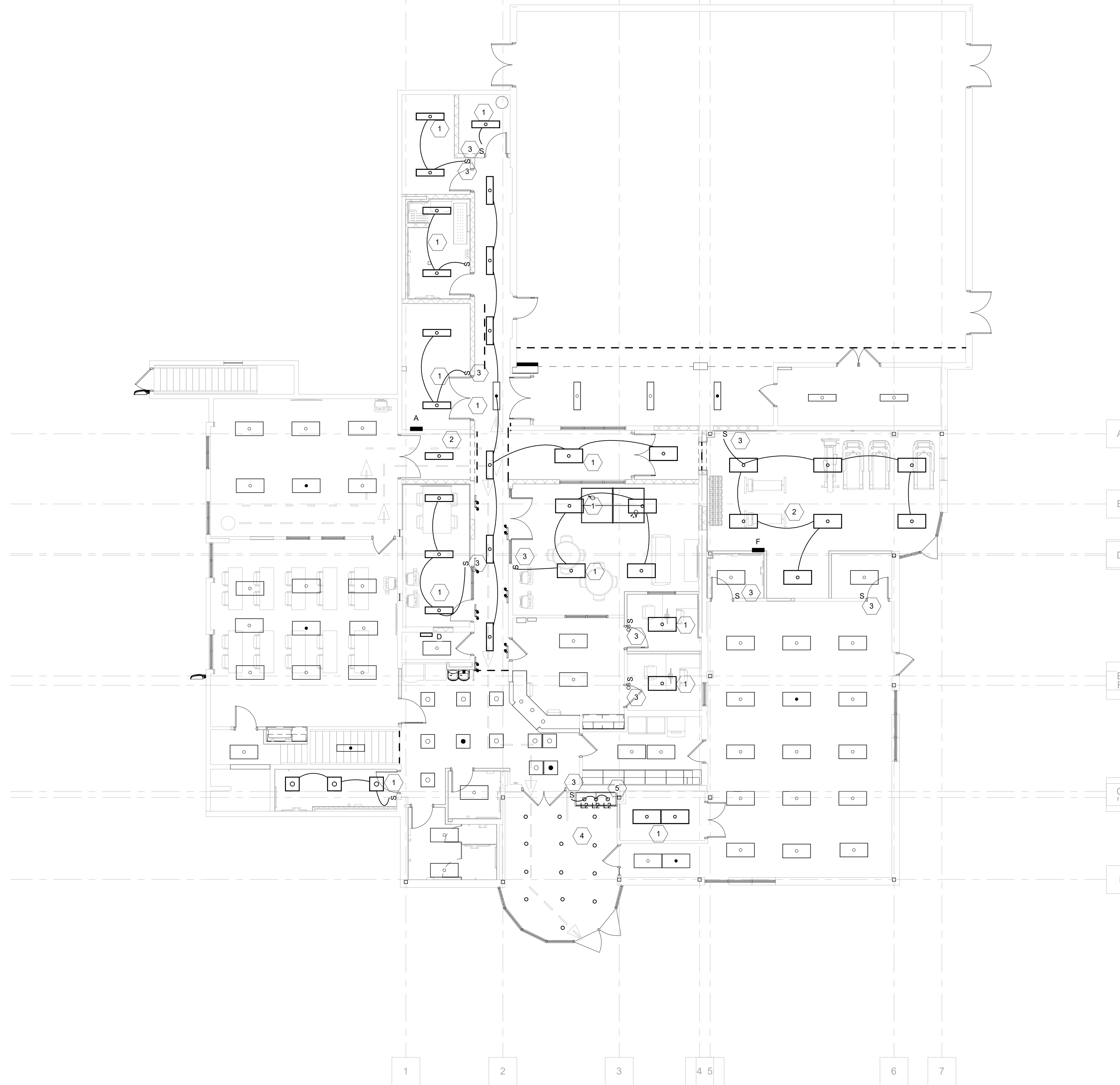
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GENERAL NOTES

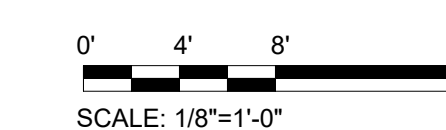
1. REFER TO E001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.

KEYED NOTES

- 1 RELOCATE EXISTING LIGHT FIXTURE TO NEW LOCATION. RECONNECT LIGHTING FIXTURES TO EXISTING 120V CIRCUIT MADE SPARE BY DEMOLITION.
- 2 RELOCATE EXISTING RECESSED MOUNTED LIGHT FIXTURE TO NEW LOCATION. RECONNECT LIGHTING FIXTURES TO EXISTING 120V CIRCUIT MADE SPARE BY DEMOLITION.
- 3 PROVIDE NEW LIGHTING CONTROL SWITCH. CONNECT TO EXISTING 120V CIRCUIT SERVING THIS AREA.
- 4 RECONNECT EXISTING DOWNLIGHTS TO EXISTING 120V CIRCUIT SERVING THIS AREA.
- 5 RECONNECT THE NEW LIGHTING FIXTURES TO THE EXISTING 120V CIRCUIT SERVING THIS AREA.



1 FIRST FLOOR LIGHTING PLAN - NEW WORK
1/8" = 1'-0"



LINCON PARK COMMUNITY CENTER

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OWNER: THE CITY OF ROCKVILLE

PROJ. NO.: 19/06A



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KEY PLAN

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BASEMENT AND FIRST FLOOR LIGHTING PLAN - NEW WORK

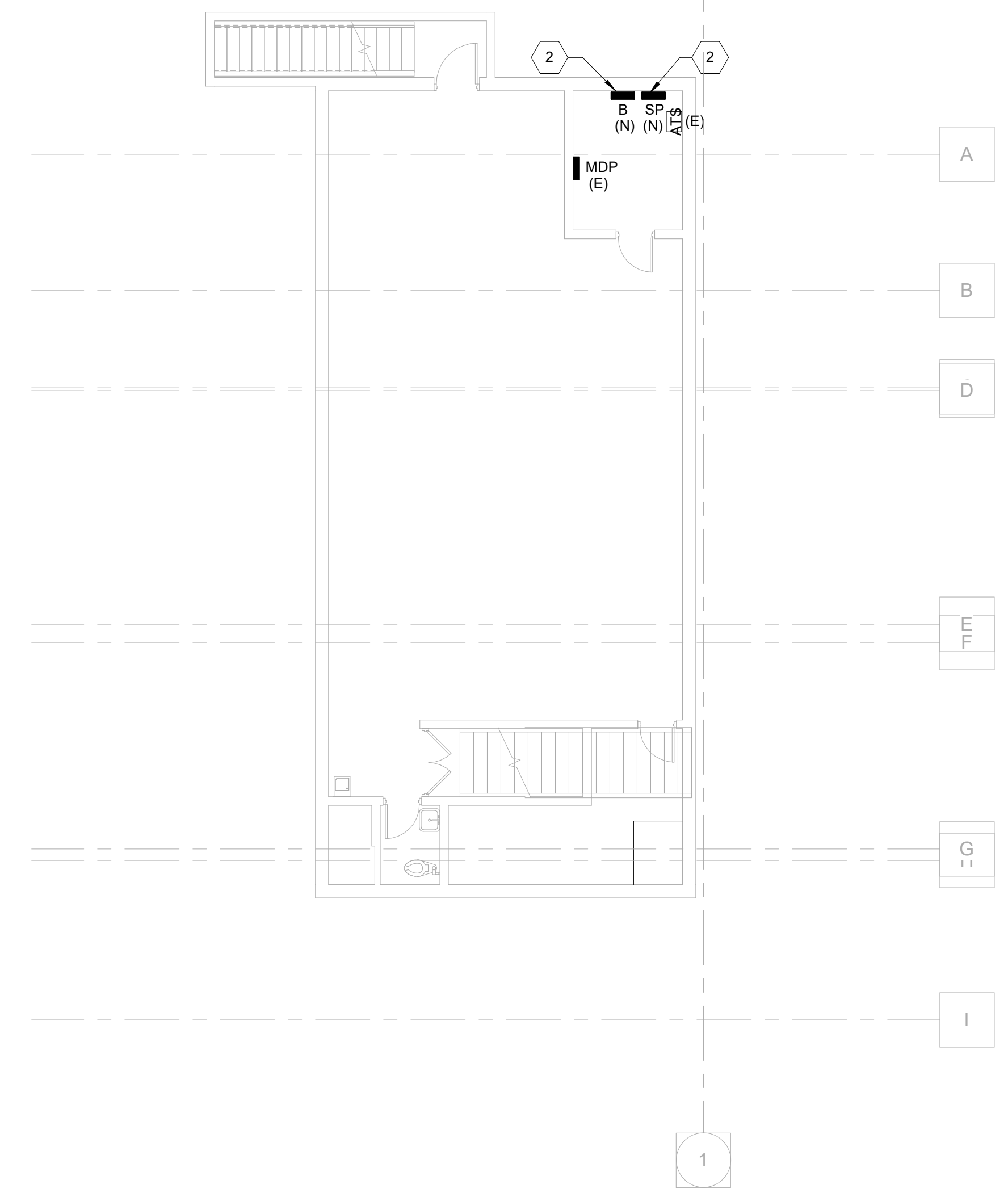
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GENERAL NOTES

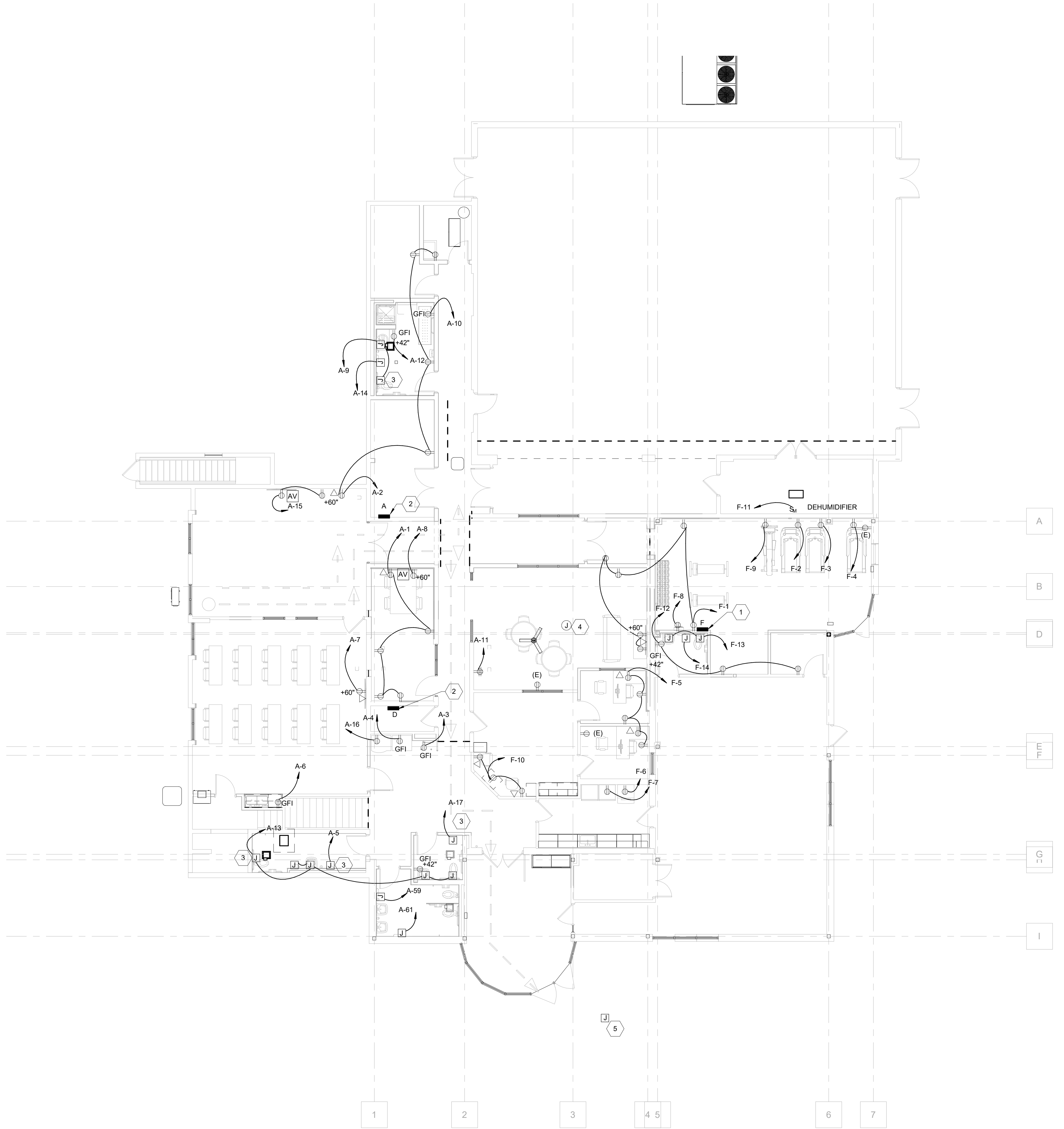
- REFER TO E001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.

KEYED NOTES

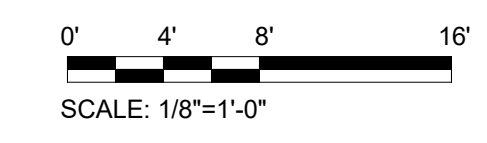
- RELOCATE EXISTING PANELBOARD TO THIS NEW LOCATION. EXTEND EXISTING FEEDER AND BRANCH CIRCUITS TO NEW LOCATION.
- PROVIDE NEW PANEL BOARD. EXTEND EXISTING BRANCH CIRCUITS TO NEW LOCATION. REFER TO ONE-LINE DIAGRAM FOR MORE INFORMATION.
- COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF JUNCTION BOXES WITH THE ARCHITECT PRIOR TO INSTALLATION.
- INSTALL THE NEW CEILING FAN JUNCTION BOX FOR THE NEW CEILING FAN. COORDINATE OF JUNCTION BOX LOCATION AND MOUNTING HEIGHT WITH THE ARCHITECT PRIOR TO INSTALLATION.
- PROVIDE NEW AUTOMATIC DOOR OPENER PUSH BUTTON. RECONNECT EXISTING CONTROL WIRE TO NEW PUSH BUTTON.



2 BASEMENT POWER PLAN - NEW WORK
1/8" = 1'-0"



1 FIRST FLOOR POWER PLAN - NEW WORK
1/8" = 1'-0"



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BASEMENT AND FIRST FLOOR POWERPLAN - NEW WORK

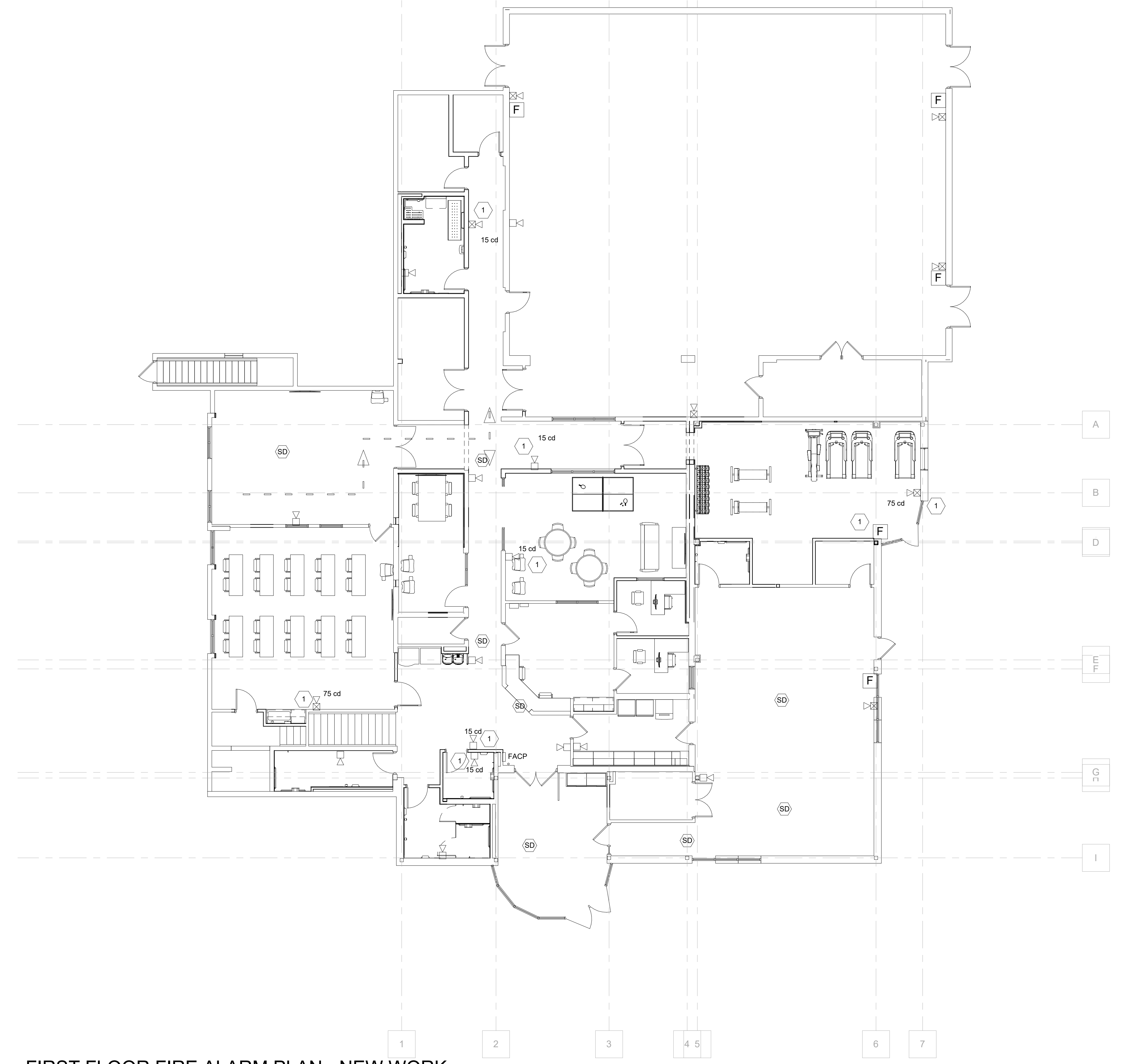
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GENERAL NOTES

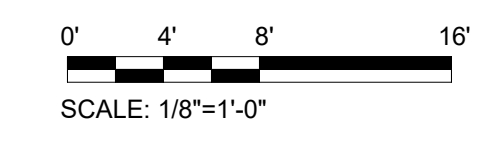
1. REFER TO E001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.

KEYED NOTES

1. PROVIDE NEW FIRE ALARM DEVICE. CONNECT TO EXISTING FIRE ALARM CIRCUIT IN THE AREA.



1 FIRST FLOOR FIRE ALARM PLAN - NEW WORK
1/8" = 1'-0"



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6700A ROCKLEDGE DRIVE SUITE 301
BETHESDA, MARYLAND 20817
(T) 301-216-2871 (F) 301-216-9671

LINCOLN PARK COMMUNITY CENTER

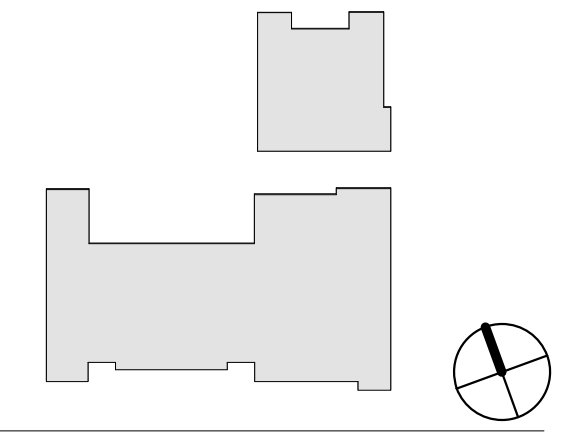
PROJECT ADDRESS: 357 FREDERICK AVE, ROCKVILLE MD

OWNER: THE CITY OF ROCKVILLE
PROJ. NO.: 19/0A



I hereby certify that these documents were prepared or approved by me and that I am a duly licensed engineer under the laws of the State of Maryland
License number: 44228 Expiration date: 07/11/2025

KEY PLAN



REVISIONS

| MARK | DATE | ISSUE |
|------|------|-------|
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ISSUANCES

| DATE | ISSUANCE |
|------------|----------|
| 03/12/2024 | PERMIT |
| 03/20/2024 | BID SET |

FIRST FLOOR FIRE ALARM PLAN- NEW WORK

E-131



ENGINEERING PROGRAM MANAGEMENT CONSTRUCTION MANAGEMENT 6700A ROCKLEDGE DRIVE SUITE 301 BETHESDA, MARYLAND 20817 (T) 301-216-2871 (F) 301-216-9671

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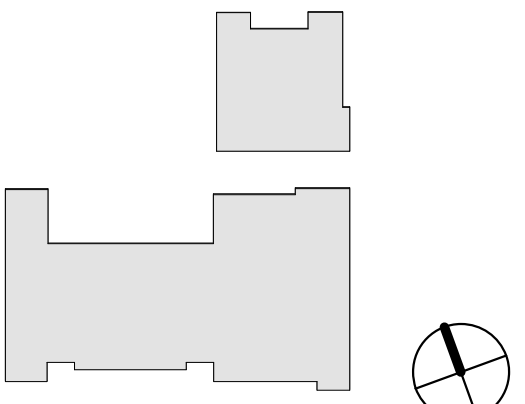
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KEY PLAN



REVISIONS

Table with columns: MARK, DATE, ISSUE. Contains one entry for 03/20/2024 BID SET.

ISSUANCES

Table with columns: DATE, ISSUANCE. Contains entries for 03/12/2024 PERMIT and 03/20/2024 BID SET.

PANELBOARD SCHEDULES

E-301

PANELBOARD NAME: MDP. Includes specifications (Voltage: 120/208 Wye, Bus Rating: 600 A, Poles: 24) and a detailed load schedule table with columns for CKT, Load Description, Trip, Poles, A, B, C, and Panel Totals.

PANELBOARD NAME: F. Includes specifications (Voltage: 120/208 Wye, Bus Rating: 200 A, Poles: 42) and a detailed load schedule table with columns for CKT, Load Description, Trip, Poles, A, B, C, and Panel Totals.

PANELBOARD NAME: A. Includes specifications (Voltage: 120/208 Wye, Bus Rating: 200 A, Poles: 84) and a detailed load schedule table with columns for CKT, Load Description, Trip, Poles, A, B, C, and Panel Totals.

PANELBOARD NAME: B. Includes specifications (Voltage: 120/208 Wye, Bus Rating: 60 A, Poles: 24) and a detailed load schedule table with columns for CKT, Load Description, Trip, Poles, A, B, C, and Panel Totals.

PANELBOARD NAME: D. Includes specifications (Voltage: 120/208 Wye, Bus Rating: 200 A, Poles: 42) and a detailed load schedule table with columns for CKT, Load Description, Trip, Poles, A, B, C, and Panel Totals.

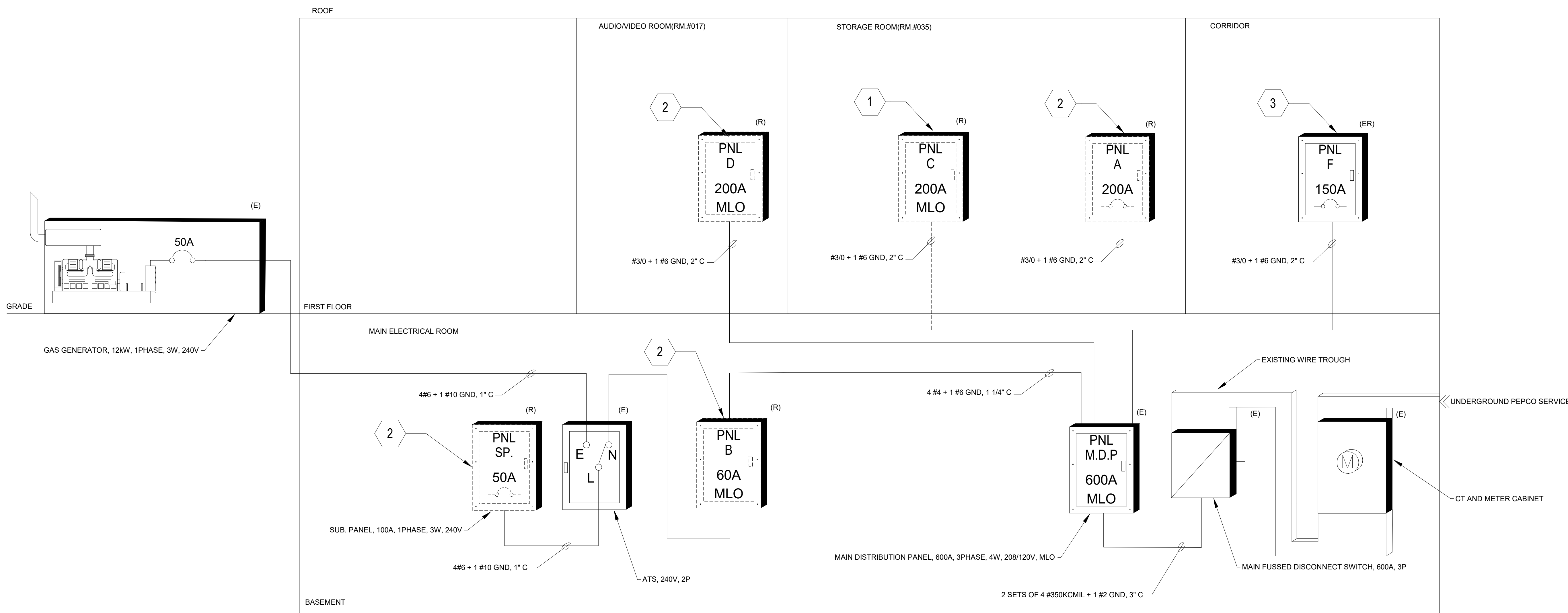
PANELBOARD NAME: SP. Includes specifications (Voltage: 120/208 Single, Bus Rating: 100 A, Poles: 12) and a detailed load schedule table with columns for CKT, Load Description, Trip, Poles, A, B, C, and Panel Totals.

GENERAL NOTES

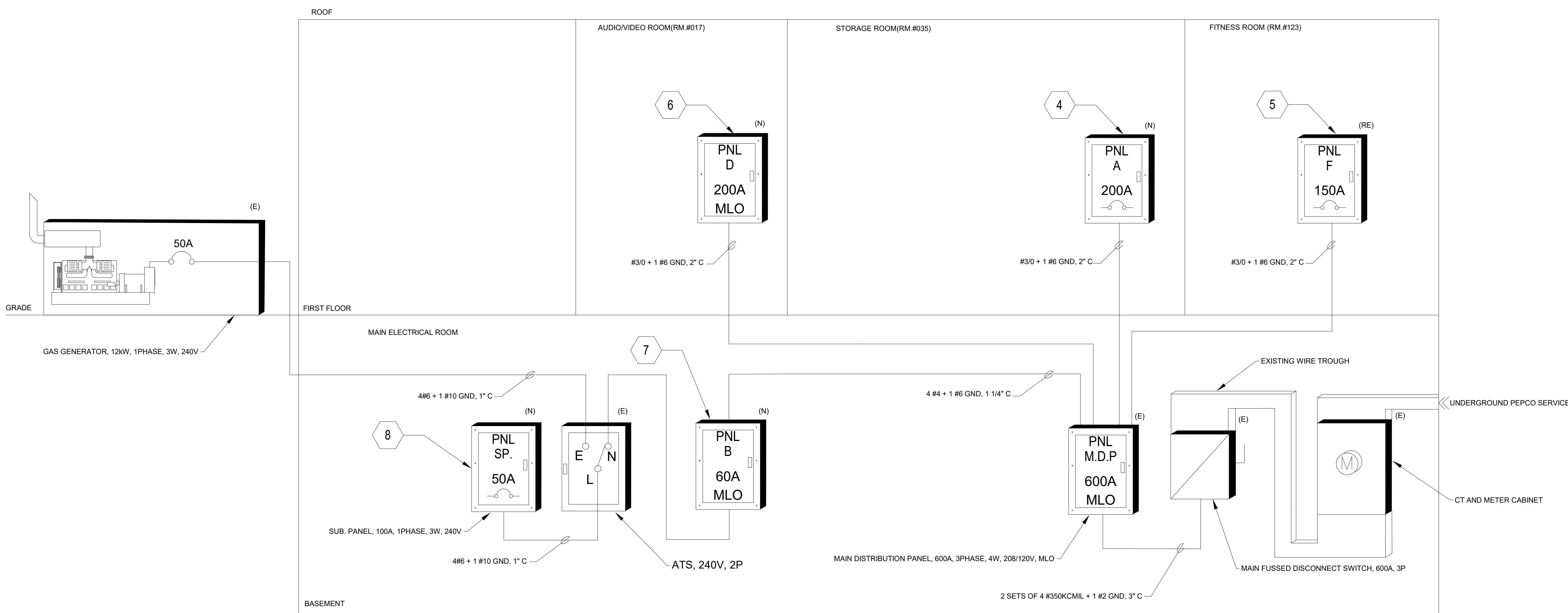
1. REFER TO E-001 FOR GENERAL NOTES, SYMBOL, LEGEND AND LIST OF ABBREVIATIONS.

KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING PANELBOARD AND ASSOCIATED FEEDER BACK TO SOURCE. SALVAGE EXISTING BRANCH CIRCUITS IN 2'x2' PULL BOX ABOVE PANELBOARD.
2. DISCONNECT AND REMOVE EXISTING PANELBOARD. SALVAGE EXISTING FEEDER AND BRANCH CIRCUITS IN 2'x2' PULL BOX ABOVE PANELBOARD.
3. DISCONNECT AND REMOVE EXISTING PANELBOARD. SALVAGE EXISTING FEEDER AND BRANCH CIRCUITS IN 2'x2' PULL BOX ABOVE PANELBOARD.
4. PROVIDE NEW 200A, 208Y/120V, WITH 200A MCB PANELBOARD. RECONNECT EXISTING FEEDER AND BRANCH CIRCUITS TO NEW PANELBOARD. SPLICE AND EXTEND EXISTING PANELBOARD "C" BRANCH CIRCUITS TO NEW PANELBOARD "A".
5. RELOCATE EXISTING PANELBOARD TO NEW LOCATION. REFER TO SHEET E-121 PANELBOARD LOCATION. SPLICE AND EXTEND EXISTING FEEDER AND BRANCH CIRCUITS TO NEW LOCATION.
6. PROVIDE NEW 200A MLO, 208Y/120V, PANELBOARD. RECONNECT EXISTING FEEDER AND BRANCH CIRCUITS TO NEW PANELBOARD.
7. PROVIDE NEW 60A MLO, 208Y/120V, PANELBOARD. RECONNECT EXISTING FEEDER AND BRANCH CIRCUITS TO NEW PANELBOARD.
8. PROVIDE NEW 100A, 208/120V SINGLE PHASE 3-WIRE PANELBOARD WITH A 50A MCB. RECONNECT EXISTING FEEDER AND BRANCH CIRCUITS TO NEW PANELBOARD.



1 ELECTRICAL POWER RISER DIAGRAM - DEMOLITION
NOT TO SCALE



2 ELECTRICAL POWER RISER DIAGRAM - NEW WORK
NOT TO SCALE



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ELECTRICAL RISER DIAGRAMS - EXISTING/DEMOLITION AND NEW WORK

GENERAL NOTES

- REFER TO E001 FOR GENERAL NOTES, SYMBOL LEGEND AND LIST OF ABBREVIATIONS.

KEYED NOTES

- DISCONNECT AND REMOVE EXISTING LIGHTING FIXTURE. SALVAGE EXISTING LIGHTING FIXTURES AND THEIR ASSOCIATED CONDUCTORS AND CONDUIT FOR RECONNECTION. REFER TO NEW WORK FOR NEW LIGHT LOCATION.
- DISCONNECT AND REMOVE EXISTING PANELBOARD. SALVAGE EXISTING FEEDER AND BRANCH CIRCUITS IN 2X2 PULL BOX ABOVE PANEL. REFER TO SHEET E120 FOR NEW LOCATION OF PANELBOARD.
- DISCONNECT AND REMOVE EXISTING WIRING DEVICE AND ASSOCIATED CONDUCTORS AND CONDUIT BACK TO SOURCE UNLESS OTHERWISE NOTED.
- DISCONNECT AND REMOVE EXISTING FIRE ALARM DEVICE. SALVAGE WIRING, UNLESS OTHERWISE NOTED.
- DISCONNECT AND REMOVE EXISTING LIGHTING FIXTURE CONTROL. RECONNECT BY THE NEW WORK DRAWING NOTES.
- DISCONNECT AND REMOVE EXISTING CEILING FAN JUNCTION BOX WITH ASSOCIATED WIRING BACK TO THE SOURCE.
- DISCONNECT AND REMOVE EXISTING AUTOMATIC DOOR OPENER PUSH BUTTON (EXISTING PEDESTAL TO REMAIN) SALVAGE EXISTING CONTROL WIRE FOR RECONNECTION.

LITTLE

DIVERSIFIED ARCHITECTURAL CONSULTING

1753 PINNACLE DR, SUITE 1100
MCLEAN, VA 22102
703.908.4501



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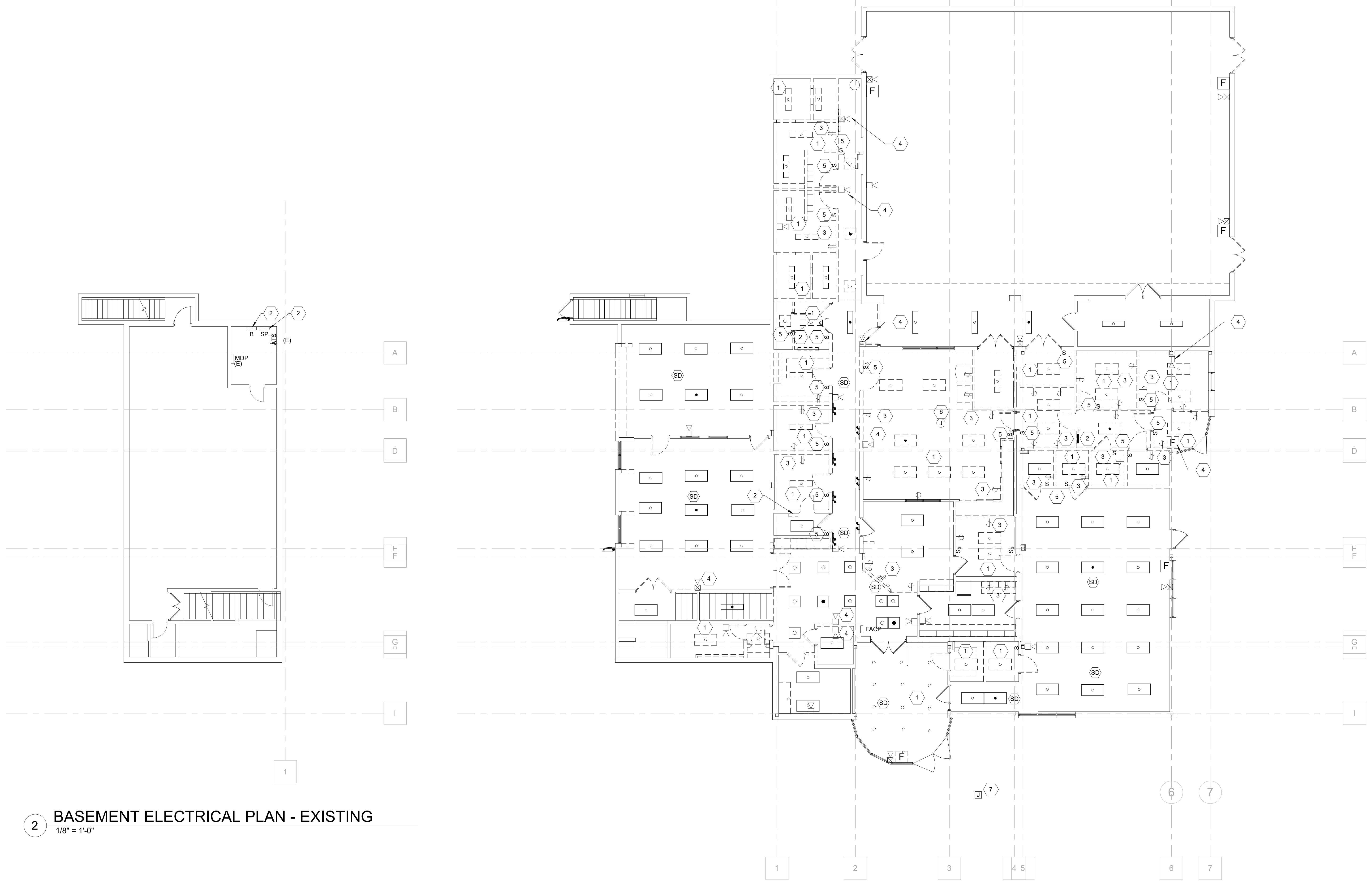
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BASEMENT AND FIRST FLOOR ELECTRICAL PLAN - DEMOLITION

ED-111



2 BASEMENT ELECTRICAL PLAN - EXISTING
1/8" = 1'-0"

1 FIRST FLOOR ELECTRICAL PLAN - DEMOLITION
1/8" = 1'-0"

