

INVITATION TO BID

Pocatello High School – Entrance Renovation School District No. 25

Sealed bid proposals will be received by the Board of Trustees, Pocatello / Chubbuck School District No. 25, at the District Office, 3115 Pole Line Road, Pocatello, ID, until 2:00 p.m. local time, Tuesday, April 9, 2019 for **Pocatello High School – Entrance Renovation**.

Bids will be opened at the above stated location following the closing time for receipt of bids. Bidders and other properly interested parties are invited to be present at bid opening.

A **pre-bid conference** will be held at the project site, 325 N. Arthur Avenue, Pocatello, ID 83204 on Thursday, March 28, at 4:00 p.m. Attendance is strongly recommended. Please meet at the school's NE corner entry off Arthur Avenue.

Drawings and specifications, including bidding documents and conditions of agreement, may be examined at the following offices:

Bonneville Blueprint
1802 Curtis Ave.
Idaho Falls, ID
208-522-0010

Idaho AGC
1649 W. Shoreline Dr. Ste 100
Boise, ID
208-344-2531

Mountainlands Area Plan Room
583 W 3560 S, Ste 4
Salt Lake City, UTG 84115
(802) 288-1188

Plans will be available at no charge via the AGC on-line plan room mentioned above. One (1) hard copy set of plans and specifications may be obtained at Bonneville Blueprint for a refundable deposit of \$50 per set.

No Bid may be withdrawn after the scheduled time for receipt of bids unless the award of contract is delayed for a period exceeding thirty (30) days. The Owner reserves the right to reject any or all Bids, or to waive any informalities, or to accept the bid or bids deemed best for the Pocatello / Chubbuck School District No. 25.

Each Bid must be accompanied by a Certified or Cashier's Check on an Idaho bank, or bid bond, with Idaho State Licensed Survey Company, as surety, in an amount not less than 5% of total bid, made payable to the Pocatello / Chubbuck School District No. 25. This surety shall be forfeited by the Bidder in the event of failure to sign the contract or furnish the necessary 100% Performance Bond and the necessary 100% Payment Bond.

Bidders shall be licensed in the State of Idaho, in accordance with provisions of an act known as "Public Works Contractor's State License Law, Title 54, Chapter 19, Idaho Code Amended." The Term "Public Works Contractors" includes the general, sub, or specialty contractor. The bidder's name must agree to the name on the public works license that is referenced in the bid.

The successful Contractors shall carry out his employment practices and payment of wages according to the provisions of an act known as "Public Works Title 44, Chapter 10, Section 44-1001 through 44-1006 inclusive, Idaho Code Amended" and shall comply with the Equal Employment Opportunity Provisions as defined in the code of respective Federal Regulations.

Rena Johnson, Clerk
POCATELLO / CHUBBUCK SCHOOL DISTRICT NO. 25

Advertisements:
March 19 and March 26, 2019

PROJECT MANUAL – BID SET

FOR:

POCATELLO HIGH SCHOOL ENTRY RENOVATION

325 N ARTHUR AVE.
POCATELLO, IDAHO 83204

MARCH 19, 2019

Owner:



POCATELLO/CHUBBUCK SCHOOL DISTRICT NO. 25
3115 POLE LINE RD.
POCATELLO, IDAHO 83201

Architect:

HUMMEL ARCHITECTS PLLC



a: 2785 North Bogus Basin Road
Boise, ID 83702
p: 208.343.7523

w: www.hummelarch.com

HA Project No. 18027

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POCATELLO HIGH SCHOOL – ENTRY RENOVATION
POCATELLO / CHUBBUCK SCHOOL DISTRICT NO. 25
325 N ARTHUR AVE., POCATELLO, ID 83204

MARCH 19, 2019
BID SET



DATE: MARCH 19, 2019

FROM: Pocatello School District
3115 Pole Line Rd.
Pocatello, ID 83201

You are hereby invited to submit a bid for:

PROJECT TITLE: POCATELLO HIGH SCHOOL – ENTRANCE RENOVATION

LOCATION: POCATELLO HIGH SCHOOL – 325 N ARTHUR AVE

BID DUE DATE: 2:00 PM ON TUESDAY APRIL 9, 2019

PRE-BID MEETING: 4:00 PM ON THURSDAY MARCH 28, 2019

Sealed bids will be received by the Board of Trustees, Pocatello / Chubbuck School District 25, 3115 Pole Line Rd., Boise, Idaho for the above-named project until **Tuesday, April 9, 2019 at 2:00 pm**. Bid instructions and specifications are available to view at the following locations:

Bonneville Blueprint
1802 Curtis Ave.
Idaho Falls, ID
208-522-0010

Idaho AGC
1649 W. Shoreline Dr. Ste 100
Boise, ID
208-344-2531

Mountainlands Area Plan Room
583 W 3560 S, Ste 4
Salt Lake City, UTG 84115
(802) 288-1188

Plans will be available at no charge via the respective online plans rooms mentioned above. One (1) hard copy set of plans and specifications may be purchased at Bonneville Blueprint for a refundable deposit of \$50 per set.

Bids will be publicly opened immediately after the bid due date and time. Bids are to be returned via mail or hand delivered to **Pocatello / Chubbuck School District 25, 3115 Pole Line Rd., Pocatello, ID 83201**.

Questions regarding this Request for Bid must be submitted in writing and received by the Boise School District **NO LATER THAN 5:00 pm, April 1, 2019**. Questions received after this date will not be considered.

The School District will not be responsible for verbal interpretations. Questions will be answered by written addenda and distributed to the above-mentioned plans rooms. All addenda issued during the bid period will be incorporated into the contract. Addenda issued prior to bidding shall be acknowledged on the Bid Form. Failure to acknowledge addenda may be cause for rejection of bid as non-responsive.

Submit questions in writing via email, U.S. Postage or fax to:

Hummel Architects, PLLC.
Attn: Jessica Heggie
jheggie@hummelarch.com
2785 N. Bogus Basin Rd.
Boise, Idaho 83702

Please note a Pre-Bid Meeting will be held on **April 9, 2019 at 2:00 pm**. Attendance is strongly recommended. Meet at the school's front entry near the north east corner off Arthur Ave.

BID FORM

TO: Pocatello / Chubbuck School District Pocatello, Idaho

The Bidder, in compliance with your invitation for bids for **POCATELLO HIGH SCHOOL – ENTRANCE RENOVATION**, having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in written “Notice to Proceed” of the Owner and to adhere to the requirements of subparagraph 8.1.1.1 of the Supplementary Conditions regarding time for the performance of the work. Bidder further agrees to pay as liquidated damages, the sum of **\$1,000.00** for each consecutive calendar day after the established substantial completion date or adjusted date as established by change order as hereinafter provided in Subparagraph 9.11.1 of the Supplementary Conditions.

Bidder acknowledges receipt of addenda No.(s)_____.

Bidder agrees to perform all of the Base Bid work described in the Specifications and shown on the Drawings for the sum of:

BASE BID PROPOSAL:

(\$_____) Dollars; in lawful money of the United States.

(Amounts shall be shown in both words and figures; in event of discrepancy, the amount in words shall govern.

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the specified contract within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

BIDDER CERTIFICATIONS

- 1. Debarment and Suspension** – In submitting this bid proposal, we hereby certify that we have not been suspended or in any way excluded from Federal procurement actions by any Federal Agency. We fully understand that if information contrary to this certification subsequently becomes available, such evidence may be grounds for non-award or nullification of a bid contract.
- 2. Anti-Collusion** – In submitting this bid proposal, we hereby certify this proposal was developed and prepared without any collusion with any competing bidder or District employee. The content of this proposal has not been disclosed to any competing or potentially competing bidder prior to the proposal due date and time. Furthermore, no action to persuade any person, partnership or corporation to submit or withhold a bid has been made.
- 3. Anti-Lobbying** – In submitting this bid proposal, we hereby certify that to the best of our knowledge and belief, no appropriated Federal funds have been paid or will be paid by or on behalf of person associated with this proposal to any person for influencing or attempting to influence and officer or employee of any agency, a member of Congress, an office or employee of Congress or an employee of a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan or cooperative agreement.
- 4. Background Checks** – The Pocatello / Chubbuck School District reserves the right to fingerprint and background check all contractors and subcontractors working on District projects. Should you receive an award for a District project, you will be required to supply the construction manager overseeing the project a list of employees from your company who will be assigned to and working at the school site. By signing below we confirm our company will comply with this process.
- 5. Alcohol and Drug Free Workplace** – In submitting this bid proposal, we hereby certify we comply with the provisions of Idaho Code 72-1717 and provide a drug free workplace program and will maintain such a program throughout the life of the construction project for which this bid is submitted. We further certify that we will only subcontract work to subcontractors who also meet the requirements of Idaho Code 72-1717.
- 6. National Sexual Offender Registry** – In submitting this bid proposal, you certify to the District that your company will prohibit any persons in your employ who are registered or required to register under the Idaho Sex Offender Registration Act from participation in company business with the District if such participation would require them to be present on school property. You certify further that you have cross checked such employees against the National Sex Offender Registry found at the following web link: <http://www.nsopr.gov/>

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby. The names and addresses of the entities who will perform incidental work identified below, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

Plumbing

(Name) _____

(Address) _____

Idaho Public Works Contractors License No. _____

Idaho Plumbing Contractors License No. _____

Heating, Ventilating, & Air Conditioning

(Name) _____

(Address) _____

Idaho Public Works Contractors License No. _____

Idaho HVAC Contractors License No. _____

Electrical

(Name) _____

(Address) _____

Idaho Public Works Contractors License No. _____

Idaho Electrical Contractors License No. _____

FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

The Undersigned notifies that he is of this date duly licensed as an Idaho Public Works Contractor and further that he possesses Idaho Public Works Contractor's License No. _____, and is domiciled in the State of _____.

Dated this _____ day of _____, _____.
(date) (month) (year)

Respectfully submitted by:

(Company)

(Seal - if bid is by a corporation) _____
(Business Address)

(Authorized Signature)

(Title)

(Telephone Number)

(FAX Number)

END OF BID FORM

BID BOND is attached.

INSTRUCTIONS TO BIDDERS

AIA Document A 701, Instructions to Bidders, 2017 Edition, is hereby included by reference and shall be a part of the Contract Documents. Copies of AIA Document A 701 are available for review at the office of the Owner and Architect. Copies of the document may be purchased from the American Institute of Architects or its local distributor.

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BIDDER'S CHECKLIST

This Bidder's Checklist is offered to the prospective bidder as a means of checking the bid form in order to insure that a complete bid is submitted, free from omissions and errors that could possibly lead to rejection of the Bid.

1. Are all blank spaces filled out on Bid Form?
2. Have questions arising from the bidding, contract, specifications or plans been submitted to the proper authority and resolved in the proper manner?
3. Are bid amounts shown correctly? Recheck for errors or omissions.
4. Are authorized signatures properly affixed to the bidding documents, giving also title, Idaho Contractor's License number, etc.?
5. Have the required Bid Submittal forms been reviewed and complied with?
6. Have all Addenda been received and acknowledged on the Bid Form. It is the responsibility of the Bidder to check to see if all addenda's are accounted for.
7. In order for a bid to be considered, all bidding documents must be placed in a properly addressed, sealed and labeled envelope and delivered to the specified authority prior to the time designated for the bid opening.
8. Bid security is required on this project in the amount of 5% of bid. Is Bid bond signed?

END OF BIDDER'S CHECKLIST

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GENERAL CONDITIONS

AIA Document A201, General Conditions of the Contract for Construction, 2017 Edition, is hereby included by reference and shall be a part of the Contract Documents. Copies of AIA Document A201 are available for review at the offices of the Owner and Architect. Copies of the document may be purchased from the American Institute of Architects or its local distributor.

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.

- B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: Pocatello High School – Entrance Renovation

1. Project Location: Pocatello High School, 325 N Arthur Ave., Pocatello, Idaho 83204.

- B. Owner: Pocatello / Chubbuck School District No. 25, 3115 Pole Line Road, Pocatello, Idaho 83201.

1. Owner's Representative: **Bart Reed; Ph: 208-235-3212; E-mail: reedba@sd25.us.**

- C. Architect: Hummel Architects PLLC, 2785 N. Bogus Basin Road, Boise, Idaho, 83702.

1. Contact: Jessica Heggie; Ph: 208-947-2319; E-mail: jheggie@hummelarch.com.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Scope of work includes Base Bid indicated in the project Manual and on the Drawings, including, but not limited to:

- a. Selective demolition of existing site work as indicated on the demolition plans. Relocation of indicated site elements. Construction of new exterior stairs and ramps, interior renovation of the Administration area, and miscellaneous associate site and IT work. Refer to the Project Manual and the Drawings for specific requirements.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 ACCESS TO SITE

- A. General: 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. Use of Site: Limit use of Project site to areas of scope, as indicated on drawings. 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.
- 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.

1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and adjacent 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.

1.7 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
 2. Prime contractor and their subcontractors are to park in area agreed upon with Owner. Lay down area and site access are restricted to area outlined on Architectural Site Plan.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:30 a.m. to 4:00 p.m., Monday through Friday, unless otherwise coordinated with Owner.
- 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 providing 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. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.8 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. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue through the Contractors Supplemental Instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect, through the Contractor, 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. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request 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.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect, through the General Contractor.

1. 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.
 2. 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.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. 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.
 6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests or document with substantially the same information.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect, through the General Contractor will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect, through the General Contractor, 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 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 SCHEDULE OF VALUES

- A. Coordination: Each Prime Contractor shall coordinate preparation of the Schedule of Values with preparation of the Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than ten (10) days after the date of the Notice of Award. Submit (4) four copies.
- B. Format and Content: Submit typed Schedule of Values on AIA Form G703 Continuation Sheet. Use the 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. Name of Architect.
 - c. Architect's project number.
 - d. Name of Construction Manager.
 - e. Contractor's name and address.
 - f. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. 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. If specified, include evidence of insurance or bonded warehousing.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Progress payments shall be submitted to Architect by the 25th of each month. The period covered by each Application for Payment is one month, and starts on the day following the end of the preceding period and ends 15 days before the date for each progress payment.
- C. All Applications for Payment shall be on AIA Form G702 and Form G703 Continuation Sheet.

- 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 Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Construction Manager 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.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is 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 final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanics lien for construction period covered by the application.
 - a. Submit final Application for Payment with or preceded by 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 waivers of lien on forms, executed in a manner acceptable to Owner.
- G. 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. The Construction Schedule.
 4. Products list.
 5. List of Contractor's staff assignments.
 6. Copies of building permits.
 7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 8. Initial progress report.
 9. Certificates of insurance and insurance policies.
 10. Performance and payment bonds.
 11. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After issuing 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.
- I. Final Payment Application: 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. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. RFIs.
 - 3. Digital project management procedures.
 - 4. Project meetings.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for procedures for coordinating general installation.

1.3 DEFINITIONS

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

1.4 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.

1.5 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.
6. Project closeout activities.

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 so as 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. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: AIA Document G716 or software-generated form with substantially the same content as indicated above, acceptable to Architect.

- 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 012600 "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 10 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. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 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.
- 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 seven 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 CAD drawings will be provided by Architect for Contractor's use during construction. Contractor shall field verify all existing conditions prior to bid and 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 Between Architect of Record and Contractor.

- 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 Between Architect of Record and Contractor.
- B. 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.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 5 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. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Sustainable design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises and existing building.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.
 - v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.

- y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.
 - aa. First aid.
 - bb. Security.
 - cc. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Progress Meetings: Conduct progress meetings at biweekly 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) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of Proposal Requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) 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 013100

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 4. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 5. Divisions 02 through 49 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. Submittal Schedule: Each Contractor shall provide a complete schedule of Required Submittals to the Architect within ten (10) days after Notice of Award of each Contract.
- B. Submittal Processing:
 - 1. Submittals will be emailed to the Architect's representative. Include in the subject line "Project Name – Submittal – Spec XXXXXX".
- C. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
 - 1. Electronic Drawings will be provided to Contractors at a cost of \$50.00 per CD (Compact Disk) or Web-based transfers.
 - 2. The Contractor shall agree to the terms and sign the Architect's form "Agreement Between Architect of Record and Contractor for Release of Electronic Media." Prior to receiving the Electronic Drawings on CD or Web-based transfers.

- D. 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. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- E. Processing Time: Allow enough 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 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect 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 10 working days for review of each resubmittal.
 4. Concurrent Review: Where the concurrent review of submittals by the Architect's consultants, owner, or other parties is required, allow 15 working days for review of each submittal.
- F. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect and Contractor.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
 4. Submittal Stamps:
 - a. The contractor shall affix an electronic stamp to PDF submittals. Submittals with wet stamps, which are scanned to PDF, are acceptable.
 - b. Electronic stamps can be added to PDF submittals via Submittal Exchange Software.
- G. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Submittal and transmittal distribution record.
 - j. Remarks.
 - k. Signature of transmitter.
2. Submittal Transmittals:
 - a. Contractor transmittals are not required when the submittal is processed electronically via Submittal Exchange Software automatically provides a time-stamped history of all information exchanged via the software.
- I. 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.
- J. Use for Construction: Use only final submittals with mark indicating Architect's and Contractor's stamps, indicating taken by Architect and Contractor in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
1. Number of Copies: Submit copies of each submittal, as follows, unless otherwise directed.
 - a. Initial Submittal: Submit three (3) blue- or black-line prints. Architect will return one copy.
 - b. Final Submittal: Submit six (6) blue- or black-line prints, unless prints are required for Operation and Maintenance manuals. Submit eight (8) prints where prints are required for Operation and Maintenance Manuals. Architect will retain one print; remainder will be returned. Mark up and retain one returned print as a Project Record Document.
- B. 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 printed data are not suitable 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 written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - o. Number and title of appropriate specification section

- C. 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.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - 1) Differentiate between manufacturer-installed and field-installed wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Seal and signature of professional engineer if specified.
 - n. Differentiate between manufacturer-installed and field-installed wiring.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 3. Number of Copies: Submit copies of each submittal as follows:
 - a. Initial Submittal: Submit one (1) digital preliminary copy of each submittal, and deliver to Architects office the designated number of required samples, where selection of options, color, patter, texture or similar characteristics is required. Architect, through General Contractor, will return one copy with options selected.
 - b. Final Submittal: Submit one (1) digital copy, unless copies are required for Operation and Maintenance manuals. Submit eight (8) paper copies where copies are required for Operation and Maintenance manuals. Architect and Contractor will retain two copies;

remainder will be returned. Mark up and retain one returned copy as a Project Record Document.

- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Comply with Division 01 Section “Quality Requirements” for mockups.
 2. 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.
 3. 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.
 4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect’s Sample where so indicated. Attach label on unexposed side that includes the following information.
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 5. Additional Information: On an attached separate sheet, prepared on Contractor’s letterhead, provide the following:
 - a. Size limitations.
 - b. Compliance with recognized standards.
 - c. Availability.
 - d. Delivery Time.
 6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. If variation in color, pattern, texture, or other characteristics is inherent in the product represented by a sample, submit at least three (3) sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification Sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 7. Number of Samples for Initial Selection: Submit three (3) full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer’s product line. Architect through Contractor will return one (1) submittal with options selected.
 8. Number of Samples for Verification: Submit four (4) sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Document.
 9. 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.

10. Samples and Color Selection:

- a. All samples/color selections shall be delivered by mail or courier to the design team for review.
- b. Samples and color selection shall not be reviewed electronically.
- c. See separate specification sections for quantities and sample selection process. The design team shall return review comments via Submittal Exchange Software.

E. Submittal Logs:

1. The construction team shall maintain the submittal.
2. It is not required that the contractor maintain a separate submittal log between the subcontractors and contractor.
3. Construction team shall make a reasonable effort to deliver all submittals electronically via email to the designated Architect's Representative.

F. Electronic Submittal Delivery:

1. Submittals shall be processed and delivered electronically through email.
2. Contractor prior to sending to Architect must first review and approve all submittals sent by subcontractors.
3. The following types of submittals shall be delivered to the Architect electronically:
 - a. Product Data
 - b. Shop Drawings
 - c. Certifications
 - d. Test Data
 - e. Schedules
 - f. Calculations
 - g. Mix Designs
 - h. Warranty Information

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized 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.
3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare 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.
- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare 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.
- J. Product Test Reports: Prepare written reports indicating 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.
- K. Research/Evaluation Reports: Prepare 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:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- L. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- M. Preconstruction Test Reports: Prepare 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.
- N. Compatibility Test Reports: Prepare 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 primers and substrate preparation needed for adhesion.

- O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, 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.
- P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.
- S. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service 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 whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- U. Material Safety Data Sheets (MSDSs): Submit information directly to Owner.
 - 1. Architect will not review this information but will return it with no action taken for resubmittal.

2.3 DELEGATED DESIGN

- 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 Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit six (6) copies of 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.
 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.
 2. All delegated design engineering calculations intended for review by authorities having jurisdiction shall be job-specific. Generic calculations will be rejected without review.
 3. Contractor shall be responsible for coordination with authorities having jurisdiction, where plan review of delegated designs is required.

PART 3 - EXECUTION

3.1 DELEGATED DESIGN

- A. Contractor shall submit Delegated Design submittals required by authorities having jurisdiction, for plan review.

3.2 CONTRACTOR'S REVIEW

- A. 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.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, 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.

3.3 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. 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.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting 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 -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Divisions 02 through 28 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. 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.
- B. 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. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. 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, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- H. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be 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 SUBMITTALS

- A. Qualification Data: 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.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.

7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number 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 inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, 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.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, 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.
- C. 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.
- D. 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.
- 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 are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. 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 in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 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 inspecting they are engaged to perform.
 2. Payment for these services will be made by the Owner.
 3. 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.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. 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.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. 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 Division 01 Section "Submittal Procedures."
- D. 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.
- E. Associated Services: Cooperate with agencies 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 inspecting. 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 inspecting equipment at Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency and/or 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 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, 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. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- 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 014000

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SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 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.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "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."
- E. "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.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "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.

1.3 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.

- 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.
- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil Available from Defense Standardization Program www.dps.dla.mil Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.nibs.org	(215) 697-6257 (202) 619-8925 (202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
ISPWC	Idaho Standards for Public Works Construction	
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

1.4 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 in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association (Now part of CPA)	
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers	(800) 527-4723 (404) 636-8400

	www.ashrae.org	
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industry International) www.awci.org	(703) 534-8300
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208

HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
LMA	Laminating Materials Association (Now part of CPA)	
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	(312) 644-6610
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NADCA	National Air Duct Cleaners Association	(202) 737-2926

	www.nadca.com	
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NWWDA	National Wood Window and Door Association (Now WDMA)	
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010

SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPBS	City of Pocatello Planning and Development Services https://www.pocatello.us	(208) 234-6184
IDBS	Idaho Division of Building Safety www.dbs.idaho.gov	(208) 443-3896

ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of 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 without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- B. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- C. 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. Identify further options if proposed measures are later determined to be inadequate.

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.

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. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- B. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 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.

3.2 TEMPORARY UTILITY INSTALLATION

- A. 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.

- B. Sanitary Facilities: Provide temporary toilets, wash 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.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- D. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
 - 1. Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
 - 2. 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 017300 "Execution."
 - 3. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - a. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 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.
- 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. 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.
- D. 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.

- E. Security Enclosure and Lockup: Install temporary enclosure with lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- G. 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.
- H. 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 according to 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.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

3.6 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. 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. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

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SECTION 016000 - 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.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for requests for substitutions.

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. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process 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. 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.

1.3 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 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.

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 to determine that products are undamaged and properly protected.
- C. Storage:
 1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

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 warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for 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 with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

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.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. 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.
 2. 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.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
 - b. Nonrestricted List: 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. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 - b. Nonrestricted List: 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. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 5. 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 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.
- C. Visual Matching Specification: Where Specifications require "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 012500 "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 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 these 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. Detailed comparison of significant qualities of proposed product with those named in the Specifications. 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.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
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.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Cutting and patching.
 - 3. Progress cleaning.
 - 4. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 INFORMATIONAL SUBMITTALS

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.4 QUALITY ASSURANCE

- A. 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, 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.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: 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.

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 Work, investigate and verify the existence and location of utilities, mechanical and electrical systems, and other construction affecting the Work.
- 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. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. 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.

- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 INSTALLATION

- A. General: 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.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. 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.
- 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: Where possible, 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.
 - 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. Fit exposed connections together to form hairline joints.
- J. Remove and replace damaged, defective, or non-conforming Work.
- K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

- A. Cutting and Patching, 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. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. 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. 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.
- H. 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.

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 minimize evidence of patching and refinishing.
3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

- A. General: 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.
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 in Finished Areas: 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 015000 "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.
- 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.

3.6 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. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 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. Punch list procedures.
 - 4. Warranties.
 - 5. Final cleaning.
 - 6. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for progress cleaning of Project.

1.3 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.5 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.
5. Submit testing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

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. Perform preventive maintenance on equipment used prior to Substantial Completion.
3. Instruct Owner's personnel in maintenance of products and systems.
4. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
5. Complete final cleaning requirements.
6. 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. Reinspection: 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.

1.6 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 according to Section 012900 "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.

- 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- 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, proceeding from lowest floor to highest roof.
 - 2. Organize items applying to each area by major element, including categories for roof, walls, flashings, equipment, and building systems.
 - 3. Submit list of incomplete items in the following format:
 - a. PDF electronic file. Architect will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- B. 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 email to Architect.

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, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. 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.
 - c. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - d. Sweep concrete floors broom clean in unoccupied spaces.
 - e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - f. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - g. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - h. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations, before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 017700

SECTION 024119 - SELECTIVE DEMOLITION

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. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for cutting and patching requirements.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

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

1.5 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 with starting and ending dates for each activity.
- D. Predemolition photographs or video.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.

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:
 - 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.
- G. Arrange selective demolition schedule so as not to interfere with Owner's 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.

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. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Inventory and record the condition of items to be removed and salvaged.

3.2 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. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 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.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. 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.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION

- 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. 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.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. 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.
4. Maintain fire watch during and for at least four hours after flame-cutting operations.
 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 6. 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.
- C. Removed 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 designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
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.

3.5 CLEANING

- 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.
- C. 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 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

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.
- B. References and standards listed herein are to be the latest edition available, unless specifically stated otherwise.

1.2 SUMMARY

- A. This Section specifies cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2.
 - 3. Slabs-on-grade, exterior.
 - 4. Miscellaneous cast-in-place concrete.
- B. Related Requirements:
 - 1. Section 033300 "Architectural Concrete" for concrete exposed to public view.
 - 2. Section 034500 "Precast Architectural Concrete" for concrete caps on retaining walls.
 - 3. Section 042613 "Masonry Veneer" for brick veneer in retaining walls.
 - 4. Section 057300 "Decorative Metal Railings" for metal railings attached to cast in place concrete.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 REFERENCES

- A. International Building Code (IBC), 2012 Edition.
- B. American Concrete Institute (Latest Editions Accepted by the 2012 IBC):
 - 1. ACI 301: Specification for Structural Concrete Buildings.
 - 2. ACI 347: Recommended Practice for Concrete Formwork.
 - 3. ACI 318: Building Code Requirements for Structural Concrete.
 - 4. ACI 117: Specification for Tolerances for Concrete Construction and Materials

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.
11. Foam insulation.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Submit proposed mix designs at least 15 days in advance of placing operations for each concrete mixture. The submitted mix design shall include the following:
 - a. Supporting strength test data not more than 12 months old. At the Engineer's request, reports from the independent testing agencies may be required to document the test data. Reports from the independent testing agencies will be required if fly ash is used in the design mix.
 - b. Statistical analysis in compliance with ACI 301.
 - c. Gradation of fine and coarse aggregates not more than 90 days old (ASTM C 33). No substitution of aggregate type or size from those submitted will be permitted.
 - d. Proportions of all ingredients, including all admixtures added either at time of batching or at job site. Aggregate weights shall be based upon saturated surface dry conditions.
 - e. Water/cement ratio.
 - f. Slump (ASTM C 143): When high range water-reducing admixtures are used, slump before and after addition of admixture are required.
 - g. Air content of freshly mixed concrete (ASTM C 231).
 - h. Certification that all ingredients in each mix design are compatible.
 - i. Locations or intended use of each mix design.
 - j. Source of all materials.
 - k. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1. Corner bars for providing for continuity of horizontal reinforcing around corners of footings, foundation walls, and other concrete items are required and shall be shown on shop drawings.
2. Provide details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include special reinforcement required for openings through concrete structures.
3. Shop drawing re-submittals shall clearly identify all revisions to previous submittals.
 - a. Heavy ink clouded outlines (revision clouds) shall be drawn around revised areas of individual sheets.
 - b. Architect/Engineer will not review information outside of revision clouds on resubmitted drawings.

4. Approval of shop drawings by the Architect shall not relieve the Contractor of providing all reinforcing noted, shown, or implied by the project Contract.
- D. Embedded Item Placement Drawings: Drawings indicating the location and type of plates, anchorages, or other items to be embedded in the finished concrete surfaces. Include wall elevations, slab plans, and details required to locate and install embeds.
- E. Samples: For waterstops and vapor retarder.
- F. Saw Cut Joints: Indicate proposed locations for all saw cut joints not shown on the drawings.
 1. Location of saw cut joints is subject to approval of the Architect.
- G. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 1. Aggregates.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Welding certificates.
- C. Written curing procedure, including curing procedures for hot- and cold-weather placement.
- D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- E. Field quality-control reports.
- F. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- C. Testing Agency Qualifications: An independent agency, according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Owner will engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- G. Special Inspections: Owner will engage an inspection agency to provide special inspections per Structural Notes on Drawings and as required by the International Building Code. Costs for such inspection shall be paid directly to the inspection agency by the Owner.
- H. Structural Concrete: Structural concrete shall have a 28-day compressive strength of at least that required by structural design, codes, and standards specified with strengths as shown on the drawings.
- I. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- J. Coordinate chemical and adhesion compatibility of curing compounds used for curing concrete with coatings, stains, paints, liquid flashings, sealers, waterproofing membranes, joint sealants and other materials that penetrate, adhere to or otherwise come into contact with concrete surfaces that are specified in other sections.
- K. Batch Tickets: Provide batch tickets for review by inspector for each truckload of concrete used in the work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of cement and water introduced.
- L. Concrete Finishing and Curing:
 - 1. Obtain each type, composition, and variety of liquid membrane-forming curing compound used for the Project from the same manufacturer.
 - 2. Products from more than one approved manufacturer may be used for different applications, however all products for like applications shall be by the same manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Store materials in accordance with ACI 301. Admixtures which have been in storage at the project site for longer than six months or which have been subjected to freezing shall not be used, unless retested and proven to meet the specified requirements.

1.9 COORDINATION AND SEQUENCING

- A. Coordinate schedule with other trades where embedments, attachments, or interferences occur.

- B. Schedule and sequence concrete work to coordinate with fabrication and delivery schedules for items to be embedded in concrete work.

1.10 FIELD MEASUREMENTS

- A. Verify that field measurements and conditions are as shown on drawings, shop drawings, or as instructed by Product Manufacturer.

1.11 SYSTEM DESCRIPTION

- A. Redesign or Departures from Requirements of the Contract Documents Initiated by Contractor:
 - 1. Obtain written acceptance from the Architect and Architect's consultants.
 - 2. Bear costs for Contractor-initiated or construction error due to changes in type, form, system, or details of construction from those indicated by the contract documents.
 - 3. Costs of review of such changes by Architect and Architect's consultants will be deducted from the Contract Sum by Change Order.

1.12 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- B. Hot-Weather Placement: Comply with and as follows:

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 - 3. Products or manufacturers other than those specified are subject to approval by Architect prior to bidding.

2.2 FORM-FACING MATERIALS

- A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

- C. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: As indicated on the structural drawings.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed at welded locations.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Tie Wire: Minimum 16 gage, ASTM A 82, or acceptable patented system.
- C. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150, Type I/II, gray. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F.
- B. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 3/4-inch nominal unless indicated otherwise on the drawings.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

- A. General:

1. Admixtures certified by manufacturer to contain not more than 0.05 percent water-soluble chloride ions by mass of cementitious material. Do not use admixtures containing calcium chloride or thiocyanate.
 2. Where more than one admixture is used in the mix, furnish manufacturer's certification to the Architect that the admixtures to be used are compatible in combination with the cement and aggregates.
 3. Accelerating admixtures shall not be used.
- B. Air-Entraining Admixture: ASTM C 260/C 260M.
- C. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Products:
 - a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edoco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film.
 - f. Euclid Chemical Company (The); Eucobar.
 - g. Kaufman Products, Inc.; Vapor Aid.
 - h. Lambert Corporation; Lambco Skin.
 - i. L&M Construction Chemicals, Inc.; E-Con.
 - j. MBT Protection and Repair, Div. of ChemRex; Confilm.
 - k. Meadows, W. R., Inc.; Sealtight Evapre.
 - l. Metalcrete Industries; Waterhold.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
1. Products:
 - a. Dayton Superior Corporation; Sure Film.
 - b. Euclid Chemical Company (The); Eucobar.

- c. Sika Corporation, Inc.; SikaFilm.

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 according to ASTM D 2240.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- D. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336-inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- E. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types I and II, nonload bearing and Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- F. (033000.D) Embedded, Extruded Aluminum Stair Tread
 - 1. Basis of Design Manufacturer, Wooster Products, Inc, Spectra Safety Tread, WP3C.

2.9 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
 - 2. For compressive strength, W/C ratio and exposure categories see structural requirements.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 15 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.10 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
 - 1. Corner bars to provide continuity of all horizontal reinforcing around corners of footings, foundation walls, and other concrete items are required. Bending and straightening in accordance with ACI 318, Chapter 7, unless otherwise noted on the drawings. No bending or straightening of reinforcement will be permitted after partial embedment in concrete. Heating of reinforcement will be permitted only if the entire operation is approved.
- B. Welding and tacking of reinforcing bars is not permitted, unless specifically shown on the structural drawings. When welding of reinforcement is indicated and required, provide welds in accordance with AWS D1.4.
- C. Splicing:
 - 1. Reinforcing bars shall be lap spliced for tension with lap lengths as noted on the structural drawings.
 - 2. Welding or tack welding of reinforcing bars to other bars or to plates, angles, etc., is prohibited, except where specifically detailed on the approved shop drawings. Where welding is approved, it shall be done by AWS/WABO-Certified Welder using E9018 or approved electrodes. Welding procedures shall conform to the requirements of AWS D1.4.
 - 3. Locate reinforcing splices not indicated on the drawings at points of minimum stress.

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.
- B. All sleeves, anchor bolts, dowels, and reinforcing items, together with anchors, weld plates, bearing plates, etc. to be set in concrete, shall be positioned and securely anchored in place prior to placement of concrete. Such items shall not be pushed into freshly placed concrete. Remove all oil, grease, dirt, debris, and corrosion from such items prior to placement.
- C. Where work of other sections requires openings for passage of pipes, conduits, ducts, and other inserts in the concrete, obtain all dimensions and other information. All necessary pipe sleeves, anchors, or other required inserts shall be accurately installed as part of the work of other sections, according to following requirements:
 - 1. Conduits or Pipes:
 - a. Footings:

- 1) Locate so as not to reduce the strength of concrete. In no case place pipes, other than conduits, in a footing 4-1/2" thick or less. Conduit buried in a concrete footing shall not have an outside diameter greater than 1/3 the footing thickness nor be placed below the bottom reinforcing steel or over the top reinforcing steel.
- b. Slab on Grade:
 - 1) In no case place pipes or conduits in an elevated slab or slab on grade.
2. Conduits and pipes of aluminum shall not be embedded in structural concrete unless coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and reinforcing steel.
3. Sleeves: Pipe sleeves may pass through slabs or walls if not exposed to rusting or other deterioration and are of uncoated or galvanized iron or steel. Provide sleeves of diameter large enough to pass any hub or coupling on pipe, including any insulation.
4. Conduits: Conduits may be embedded in walls only if the outside diameter does not exceed 1/3 the wall thickness, are spaced no closer than 3 diameters on centers and do not impair the strength of the structure.
5. Clusters of Conduits:
 - a. Clusters of conduits embedded in a concrete slab shall not exceed 6 conduits per cluster and each conduit per cluster shall be individually spaced as per the above requirements. Conduit clusters shall be reviewed and approved by the structural engineer of record prior to the installation of the conduits.
 - b. If more than one conduit cluster is required in a specific area of the slab, routing and spacing of the clusters shall be reviewed and approved by the structural engineer of record prior to the installation of the conduits.
 - c. At no time shall the quantity and routing of clusters of conduits impair the strength of the concrete construction.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
 1. Leave formwork for slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 4. Space vertical joints in walls as indicated.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

- B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive broom finish.

- C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections may include the following:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
 8. Epoxy-set anchors and dowels.
- C. Concrete Tests: Testing of composite samples of fresh concrete may include the following. Samples will be obtained and tested according to ASTM C 172/C 172M and the following:
1. Slump: ASTM C 143/C 143M.
 2. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete.
 3. Concrete Temperature: ASTM C 1064/C 1064M.
 4. Compression Test Specimens: ASTM C 31/C 31M.
 5. Compressive-Strength Tests: ASTM C 39/C 39M; one set of two field-cured specimens tested at 7 days and one set of two specimens at 28 days.
 6. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength.
 7. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days,

- concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
8. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 9. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Floor and slab flatness and levelness will be measured according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.
- E. Contractor shall notify testing and inspection agency at least 24 hours in advance of concrete construction work to receive testing and/or inspection.

END OF SECTION 033000

SECTION 033300 - ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place architectural concrete, including form facings, reinforcement and accessories, concrete materials, concrete mixture design, placement procedures, and finishes.

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. Design Mixtures: For each concrete mixture.
- C. Formwork Shop Drawings.
- D. Placement schedule.
- E. Samples: For each of the following materials:
1. Form-facing panels.
 2. Form ties.
 3. Form liners.
 4. Exposed aggregates.
 5. Coarse- and fine-aggregate gradations.
 6. Chamfers and rustications.

1.4 INFORMATIONAL SUBMITTALS

- A. Material certificates.
- B. Material test reports.

1.5 QUALITY ASSURANCE

- A. Field Sample Panels: After approval of verification sample and before casting architectural concrete, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, cast vertically, approximately 48 by 48 by 6 inches minimum, to demonstrate the expected range of finish, color, and texture variations.
- B. Mockups: Before casting architectural concrete, build mockups to verify selections made under Sample submittals and to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.7 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1.
- B. Hot-Weather Placement: Comply with ACI 301.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301.
 - 2. ACI 303.1.

2.2 FORM-FACING MATERIALS

- A. General: Comply with Section 031000 "Concrete Forms and Accessories" for formwork and other form-facing material requirements.
- B. Form-Facing Panels for As-Cast Finishes: Steel- and glass-fiber-reinforced plastic, or other approved nonabsorptive panel materials that provide continuous, true, and smooth architectural concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- C. Rustication Strips: Metal, dressed wood, or rigid plastic, or with sides beveled and back kerfed; nonstaining; in longest practicable lengths.
- D. Chamfer Strips: Metal, rigid plastic, elastomeric rubber, or dressed wood, 2-1/2 inch by 2-1/2 inch, unless indicated otherwise on drawings; nonstaining; in longest practicable lengths.
- E. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800; minimum 1/4 inch thick.

2.3 STEEL REINFORCEMENT AND ACCESSORIES

- A. General: Comply with Section 032000 "Concrete Reinforcing" for steel reinforcement and other requirements for reinforcement accessories.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire fabric in place; manufactured according to CRSI's "Manual of Standard Practice."
 - 1. Where legs of wire bar supports contact forms, use gray, all-plastic, CRSI Class 1, gray, plastic-protected, or CRSI Class 2, stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type I/II gray.
 2. Fly Ash: ASTM C618, Class F.
 3. Slag Cement: ASTM C989/C989M, Grade 100 or Grade 120.
 4. Silica Fume: ASTM C1240 amorphous silica.
 5. Blended Hydraulic Cement: ASTM C595/C595M, Type IP, Portland-pozzolan cement.
- C. Normal-Weight Aggregates: ASTM C33/C33M, [Class 5S] [Class 5M] [Class 1N] <Insert class> coarse aggregate or better, graded. Provide aggregates from single source[with documented service-record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials].
1. Maximum Coarse-Aggregate Size: [1 inch] [3/4 inch] [1/2 inch] [3/8 inch].
 2. Gradation: [Uniformly] [Gap] graded.
- D. Air-Entraining Admixture: ASTM C260/C260M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that does not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 2. Retarding Admixture: ASTM C494/C494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
 - a.
 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
 - a.
- F. Water: Potable, complying with ASTM C94/C94M, except free of wash water from mixer washout operations.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
- C. Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B.

- 1.
2. For concrete indicated to be sealed, curing compound shall be compatible with sealer.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of cast-in-place architectural concrete proportioned on basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 1. Use a qualified independent testing agency for preparing and reporting proposed design mixtures based on laboratory trial mixtures.
- B. Cementitious Materials: For cast-in-place architectural concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements. Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Concrete Mixtures:
 1. Compressive Strength (28 Days): 4000 PSI .
 2. Maximum W/C Ratio: 0.45.
 3. Slump Limit: 4 inches plus or minus 1 inch.
 4. Air Content: 5.5%, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
 5. Air Content: 5%, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

2.7 CONCRETE MIXING

- A. Ready-Mixed Architectural Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and furnish batch ticket information.
 1. Clean equipment used to mix and deliver cast-in-place architectural concrete to prevent contamination from other concrete.
 2. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

- A. General: Comply with Section 031000 "Concrete Forming and Accessories" for formwork, embedded items, and shoring and reshoring.
- B. Limit deflection of form-facing panels to not exceed ACI 303.1 requirements.
- C. In addition to ACI 303.1 limits on form-facing panel deflection, limit cast-in-place architectural concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 1. Class A, 1/8 inch.
- D. Construct forms to result in cast-in-place architectural concrete that complies with ACI 117 (ASI 117M).

- E. Chamfer exterior corners and edges of cast-in-place architectural concrete.
- F. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- G. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- H. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and attach securely to prevent deflection and maintain stability of liners during concreting. Prevent form liners from sagging and stretching in hot weather. Seal joints of form liners and form-liner accessories to prevent mortar leaks. Coat form liner with form-release agent.

3.2 INSTALLATION OF REINFORCEMENT AND INSERTS

- A. General: Comply with Section 032000 "Concrete Reinforcing" for fabricating and installing steel reinforcement. Securely fasten steel reinforcement and wire ties against shifting during concrete placement.
- B. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.3 REMOVING AND REUSING FORMS

- A. Formwork for sides of walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Cut off and grind glass-fiber-reinforced plastic form ties flush with surface of concrete.
- B. Leave formwork for slabs, and other structural elements that support weight of concrete in place until concrete has achieved 28-day design compressive strength. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for cast-in-place architectural concrete surfaces.

3.4 JOINTS

- A. Construction Joints: Install construction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
- B. Contraction Joints: Form weakened-plane contraction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

3.5 CONCRETE PLACEMENT

- A. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- B. Deposit concrete continuously between construction joints. Deposit concrete to avoid segregation.

3.6 FINISHES, GENERAL

- A. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces.
 - 1. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.
- B. Maintain uniformity of special finishes over construction joints unless otherwise indicated.
- C. Form-Liner Finish: Produce a textured surface free of pockets, streaks, and honeycombs, and of uniform appearance, color, and texture.

3.7 EXPOSED-AGGREGATE FINISHES

- A. Scrubbed Finish: After concrete has achieved a compressive strength of from 1000 to 1500 psi, apply scrubbed finish. Wet concrete surfaces thoroughly and scrub with stiff fiber or wire brushes, using water freely, until top mortar surface is removed and aggregate is uniformly exposed. Rinse scrubbed surfaces with clean water. Maintain continuity of finish on each surface or area of Work. Remove only enough concrete mortar from surfaces to match mockup.

3.8 CONCRETE CURING

- A. Begin curing cast-in-place architectural concrete immediately after removing forms from concrete. Cure according to ACI 308.1, by one or a combination of the following methods that will not mottle, discolor, or stain concrete:
 - 1. Moisture curing.
 - 2. Moisture-retaining-cover curing.
 - 3. Curing compound.

3.9 FIELD QUALITY CONTROL

- A. General: Comply with field quality-control requirements in Section 033000 "Cast-in-Place Concrete."

3.10 REPAIR, PROTECTION, AND CLEANING

- A. Repair and cure damaged finished surfaces of cast-in-place architectural concrete when approved by Architect. Match repairs to color, texture, and uniformity of surrounding surfaces and to repairs on approved mockups.
 - 1. Remove and replace cast-in-place architectural concrete that cannot be repaired and cured to Architect's approval.
- B. Protect corners, edges, and surfaces of cast-in-place architectural concrete from damage; use guards and barricades.

- C. Protect cast-in-place architectural concrete from staining, laitance, and contamination during remainder of construction period.

END OF SECTION 033300

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SECTION 034500 - PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes architectural precast concrete cladding units.

1.2 DEFINITIONS

- A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by Architect.

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. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.
- C. Shop Drawings:
 - 1. Detail fabrication and installation of architectural precast concrete units.
 - 2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.
 - 3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
 - 4. Indicate details at building corners.
- D. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

1.5 INFORMATIONAL SUBMITTALS

- A. Material certificates.
- B. Material Test Reports: For aggregates.
- C. Field quality-control and inspection reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 - 1. Designated as a PCI-certified plant for Group A, Category A1 - Architectural Cladding and Load Bearing Units at time of bidding or designated as an APA-certified plant for production of architectural precast concrete products.

- B. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."
- C. Sample Panels: After sample approval and before fabricating architectural precast concrete units, produce a minimum of one sample panels approximately 10 lineal feet for review by Architect. Incorporate full-scale details of architectural features, finishes, textures, and transitions in sample panels. Sample panel may be incorporated into the final work.

1.7 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 PRECAST ARCHITECTURAL CONCRETE

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. For ends of walls and corners, provide shape appropriate to accommodate transition with all sides exposed to public view finished to match exposed surface finish and color of adjacent units.
 - 2. Wall Cap **(034500.A)**
 - a. Size: 14 inches wide.
 - b. Shape: Flat top with chamfered edges.
 - c. Color: to match cast in place concrete walls.
 - d. Drip Edge: Provide drip edge at exterior edges on underside of cap.
 - 3. Column Cap **(034500.B)**
 - a. Size: 26 inches by 26 inches.
 - b. Shape: Flat with chambered edges.
 - c. Color: to match cast in place concrete walls.
 - d. Drip Edge: Provide drip edge at underside perimeter of cap.

2.2 PERFORMANCE REQUIREMENTS

- A. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.

- B. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding design loads indicated within limits and under conditions indicated.

2.3 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A706/A706M, deformed.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A185/A185M, fabricated from galvanized-steel wire into flat sheets.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A497/A497M, flat sheet.
- E. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type III, gray, unless otherwise indicated.
 - 1. For surfaces exposed to view in finished structure, use gray or white cement, of same type, brand, and mill source.
- B. Supplementary Cementitious Materials:
 - 1. Metakaolin: ASTM C618, Class N.
 - 2. Silica Fume: ASTM C1240, with optional chemical and physical requirement.
 - 3. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.
 - 4. Blended Hydraulic Cement: ASTM C595.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C33/C33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
 - 1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.
 - a. Gradation: To match design reference sample.
 - 2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand compatible with coarse aggregate; to match approved finish sample.
- D. Coloring Admixture: ASTM C979/C979M, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.
- E. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.
- F. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures.
- G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

2.5 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A36/A36M.
- B. Carbon-Steel-Headed Studs: ASTM A108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or Type B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.
- C. Carbon-Steel Plate: ASTM A283/A283M, Grade C.
- D. Malleable Iron Castings: ASTM A47/A47M, Grade 32510 or Grade 35028.
- E. Carbon-Steel Castings: ASTM A27/A27M, Grade 60-30.
- F. High-Strength, Low-Alloy Structural Steel: ASTM A572/A572M.
- G. Carbon-Steel Structural Tubing: ASTM A500/A500M, Grade B or Grade C.
- H. Wrought Carbon-Steel Bars: ASTM A675/A675M, Grade 65.
- I. Deformed-Steel Wire or Bar Anchors: ASTM A496/A496M or ASTM A706/A706M.
- J. Carbon-Steel Bolts and Studs: ASTM A307, Grade A or ASTM F1554, Grade 36; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A563; and flat, unhardened steel washers, ASTM F844.

2.6 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C150/C150M, Type I, and clean, natural sand, ASTM C144 or ASTM C404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C1218/C1218M.
- B. Nonmetallic, Nonshrink Grout: Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107/C1107M, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C1218/C1218M.
- C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C881/C881M, of type, grade, and class to suit requirements.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
- B. Limit use of fly ash and ground granulated blast-furnace slag to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.
- C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.

- D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C1218/C1218M.
- E. Normal-Weight Concrete Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 5000 psi minimum.
- F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C642, except for boiling requirement.
- G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.
- H. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.8 FABRICATION

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.
- C. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings.
- D. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.
- E. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.
- F. Prestress tendons for architectural precast concrete units by either pretensioning or post-tensioning methods. Comply with PCI MNL 117.
- G. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.
- H. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.
- I. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.
 - 1. Place backup concrete mixture to ensure bond with face-mixture concrete.

- J. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 117.
 - 1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants." Ensure adequate bond between face and backup concrete, if used.
- K. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.
- L. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that does not show in finished structure.
- M. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- N. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.9 FABRICATION TOLERANCES

- A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

2.10 FINISHES

- A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp:
 - 1. PCI's "Architectural Precast Concrete - Color and Texture Selection Guide," of plate numbers indicated.
 - 2. As-Cast Surface Finish: Provide surfaces to match approved sample for acceptable surface, air voids, sand streaks, and honeycomb.
- B. Finish exposed top surfaces of architectural precast concrete units to match face-surface finish.
- C. Finish unexposed surfaces of architectural precast concrete units with as cast finish.

2.11 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, ASTM C1610/C1610M, ASTM C1611/C1611M, ASTM C1621/C1621M, and ASTM C1712.
- B. Owner will employ an independent testing agency to evaluate architectural precast concrete fabricator's quality-control and testing methods.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.
- B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.
 - 1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
 - 2. Unless otherwise indicated, maintain uniform joint widths of 3/4 inch.
- C. Connect architectural precast concrete units in position by grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
- D. Grouting or Dry-Packing Connections and Joints: Grout connections where required or indicated. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for not less than 24 hours after initial set.

3.2 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.3 FIELD QUALITY CONTROL

- A. Testing agency will report test results promptly and in writing to Contractor and Architect.
- B. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

3.4 REPAIRS

- A. Repair architectural precast concrete units if permitted by Architect. Architect reserves the right to reject repaired units that do not comply with requirements.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A780/A780M.
- D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

- E. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.5 CLEANING

- A. Clean surfaces of precast concrete units exposed to view.
- B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
 - 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.
 - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034500

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Steel reinforcing bars.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include [data on material properties] [material test reports substantiating compliance with requirements].
- 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.
 - 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 FIELD CONDITIONS

- A. 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.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

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

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shape indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
 - 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. ACM Chemistries.
 - b. BASF Corporation.
 - c. Euclid Chemical Company (The); an RPM company.
 - d. GCP Applied Technologies Inc.
- C. CMUs: ASTM C129.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2000 psi.

2.3 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.
- 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. Aggregate for Mortar: ASTM C144.
 - 1. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C404.
- F. 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.

G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

H. Water: Potable.

2.4 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

2.5 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.
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. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type S.

C. 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].

D. 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.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. 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.

3.2 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 or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch 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, or 1/2-inch 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, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch 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, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.3 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 running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. 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.
- F. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow 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.

- B. Lay solid CMUs 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. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-JOINT REINFORCEMENT

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

3.6 REINFORCED UNIT MASONRY

- A. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- B. 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.

3.7 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. 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. of wall area or portion thereof.

- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.
- I. Prism Test: For each type of construction provided, according to ASTM C1314 at seven days and at 28 days.

3.8 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.9 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 2. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.10 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. 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 042200

SECTION 042613 - MASONRY VENEER

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. Clay face brick.
- B. Related Requirements:
 - 1. Section 033000 "Cast in Place Concrete."
 - 2. Section 034500 "Precast Architectural Concrete."
 - 3. Section 057300 "Decorative Metal Railings".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each type and color of brick and colored mortar.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product.

1.5 QUALITY ASSURANCE

- A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
 - 1. Build sample panels for typical exterior wall in sizes approximately 48 inches long by 48 inches high.

1.6 FIELD CONDITIONS

- A. 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 and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

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

2.2 BRICK

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Clay Face Brick (**042613.A**): Facing brick complying with ASTM C 216.
 1. Basis-of-Design: Subject to compliance with requirements, provide products by one the following:
 - a. Endicott Clay Products.
 - b. General Shale Brick.
 - c. Interstate Brick.
 - d. Mutual Materials.
 2. Color: To match existing building.
 3. Grade SW.
 4. Type FBX.
 5. Unit compressive strength: Provide units with minimum average net-area compressive strength of 9000 psi.
 6. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
 7. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 8. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
 9. Color and Texture: Match Carolina Ceramics Brick Company color/texture "Heritage Velour,"
 10. Provide manufacturer's special brick shapes as indicated on Drawings.
 11. Use solid brick units where necessary to prevent brick cores from being exposed

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, 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.
- B. Hydrated Lime: ASTM C 207, 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, provide products by one of the following:
 - a. Cemex S.A.B. de C.V.
 - b. Essroc.
 - c. Holcim (US) Inc.
 - d. Lafarge North America Inc.
 - e. Lehigh Hanson; HeidelbergCement Group.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Davis Colors.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. Lanxess Corporation.
 - d. Solomon Colors, Inc.
- F. Aggregate for Mortar: ASTM C 144.
 - 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-thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. GCP Applied Technologies Inc. (formerly Grace Construction Products).
- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete bricks containing integral water repellent from same manufacturer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACM Chemistries.
 - b. BASF Corp. - Construction Chemicals.
 - c. Euclid Chemical Company (The); an RPM company.
 - d. GCP Applied Technologies Inc. (formerly Grace Construction Products).

I. Water: Potable.

2.4 MORTAR 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.
 2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.
 3. 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.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Use Type N unless another type is indicated.
- D. Pigmented Mortar: Use colored cement product.
 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. Application: Use pigmented mortar for exposed mortar joints.

2.5 TIES 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.
- 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 A82/A82M, with ASTM A153/A153M, Class B-2 coating.
 2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
- C. 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 0.075-inch- (1.90-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. Fabricate wire connector sections from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized, carbon-steel wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
6. Seismic Masonry-Veneer Anchors: Connector section and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having slotted holes for inserting vertical leg of connector section. Connector section consists of a rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire.
 - 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) Dur-O-Wal; a Hohmann & Barnard company.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.
7. Seismic Masonry-Veneer Anchors: Connector section 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 connector section. Connector section consists of a triangular wire tie and rigid PVC extrusion with snap-in grooves for inserting continuous wire.
 - 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.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. 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.
- B. 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.

- C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.2 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 or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2-inch 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, or 1/2 inch 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, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch 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, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.3 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 running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay 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. If another joint profile is used, revise paragraph below or show on Drawings.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.5 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to concrete and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten seismic anchors to concrete and masonry backup 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, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, 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.
 - 5. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 25 inches (635 mm) o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. (0.25 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.
 - 6. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and horizontally. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 24 inches (610 mm), around perimeter.

3.6 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. 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.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
- B. Testing Prior to Construction: One set of tests.
- C. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- D. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

3.7 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner.
 - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

3.8 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- 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 042613

SECTION 057300 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel decorative railings.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of railings assembled from standard components.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, and attachment details.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer or testing agency.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E894 and ASTM E935.

C. Preconstruction test reports.

D. Evaluation Reports: For post-installed anchors, from ICC-ES.

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 fabrication and installation. Mockup may be incorporated into final work.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: **[Owner will engage] [Engage]** a qualified testing agency to perform preconstruction testing on laboratory mockups. Payment for these services will be made **[by Owner] [from the testing and inspecting allowance, as authorized by Change Orders] [by Contractor]**. Retesting of products that fail to meet specified requirements shall be done at Contractor's expense.

1. Build laboratory mockups at testing agency facility; use personnel, materials, and methods of construction that will be used at Project site.
2. Test railings according to ASTM E894 and ASTM E935.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.

2.2 METALS, GENERAL

- A. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.3 STEEL AND IRON

- A. Tubing: ASTM A500/A500M or ASTM A513.
- B. Bars: Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.
- C. Plates, Shapes, and Bars: ASTM A36/A36M.

2.4 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.
 - 2. Galvanized-Steel Components: Plated-steel fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating.
 - 3. Dissimilar Metals: Type 304 stainless-steel fasteners.
- B. Post-Installed 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 AC193.
 - 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

2.5 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099600 "High-Performance Coatings."

- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Epoxy Intermediate Coat: Complying with MPI#77 and compatible with primer and topcoat.
- E. Polyurethane Topcoat: Complying with MPI#72 and compatible with undercoat.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for exterior applications.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Connections: Fabricate railings with welded or nonwelded connections unless otherwise indicated.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds; no evidence of a welded joint.
- D. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- E. Form changes in direction by bending.
- F. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- G. Close exposed ends of hollow railing members with prefabricated end fittings.
- H. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

2.7 STEEL AND IRON FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
 - 2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
 - 3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
 - 4. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.

- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. Preparing Nongalvanized Items for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
- F. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.
 - 1. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout.
- E. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout.
- F. Anchor railing ends to concrete and masonry with flanges connected to railing ends and anchored to wall construction with anchors and bolts.
- G. Attach handrails to walls with wall brackets.
 - 1. Use type of bracket with predrilled hole for exposed bolt anchorage.
 - 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- H. Secure wall brackets and railing end flanges to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

- I. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 057300

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SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standing and running trim.
2. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.
3. Shop priming of interior architectural woodwork.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Anchors.
2. Adhesives.
3. Shop finishing materials.

B. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures.

C. Samples: For each exposed product and for each shop-applied color and finish specified.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects of similar scope and size with project names, addresses, names of Architects and Owners, and other information specified.

1.4 CLOSEOUT SUBMITTALS

A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum of 5 years experience in providing manufactured casework systems for similar types of projects, shall be able to produce evidence of financial stability, shall be able to produce evidence of adequate bonding capacity, and shall maintain adequate facilities and personnel required to perform work on this project in a timely manner.
2. Manufacturer shall comply with the minimum levels of material and detailing indicated on the Drawings or as specified.

B. Installer: The installer shall be the casework manufacturer or shall be approved in writing by the casework manufacturer.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of the construction period.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL WOODWORK MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. A manufacturer who fulfills the requirements of the “Quality Assurance” article in Part 1, above.

2.2 ARCHITECTURAL WOODWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels from AWI certification program indicating that woodwork complies with requirements of grades specified.

2.3 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

- A. Architectural Woodwork Standards Grade: Premium.
 - 1. Wood Species: Any closed-grain hardwood.
 - 2. Wood Moisture Content: 5 to 10 percent.
 - 3. Shape: To match existing.

2.4 INTERIOR FRAMES AND JAMBS FOR OPAQUE FINISH

- A. Architectural Woodwork Standards Grade: Premium.
- B. Wood Species: Any closed-grain hardwood.
 - 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
 - 2. Wood Moisture Content: 5 to 10 percent.
 - 3. Shape: To match existing.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
 - 1. Preservative Treatment: Provide softwood lumber treated by pressure process, AWPA U1; Use Category UC3b.
 - a. Provide where in contact with concrete or masonry.
 - b. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - c. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

- d. Mark lumber with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee's (ALSC) Board of Review.
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
 - 1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
 - 2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.

2.6 SHOP PRIMING

- A. Preparations for Finishing: Comply with the Architectural Woodwork Standards for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.
- B. Interior Architectural Woodwork for Opaque Finish: Shop prime with one coat of wood primer as specified in Section 099123 "Interior Painting."
 - 1. Backpriming: Apply one coat of primer, compatible with finish coats, to concealed surfaces of woodwork.

2.7 SHOP FINISHING

- A. Preparation for Finishing: Comply with Architectural Woodwork Standards, Section 5 for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of interior architectural woodwork. Apply two coats to end-grain surfaces.
- B. Opaque Finish:
 - 1. Architectural Woodworking Standards Grade: Same as item to be finished.
 - 2. Color: P-1, see Interior Painting Specification.
 - 3. Sheen: Gloss, 61-100 gloss units measured on 60-degree gloss meter according to ASTM D523.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.
- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
 - 1. Shim as required with concealed shims.
 - 2. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
 - 1. Secure with countersunk, concealed fasteners and blind nailing.
 - 2. Use fine finishing nails for exposed fastening, countersunk and filled flush with interior architectural woodwork.
 - 3. For shop-finished items, use filler matching finish of items being installed.
- F. Standing and Running Trim:
 - 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
 - 2. Do not use pieces less than 60 inches long, except where shorter single-length pieces are necessary.
 - 3. Scarf running joints and stagger in adjacent and related members.
 - 4. Fill gaps, if any, between top of base and wall with latex sealant, painted to match wall.
 - 5. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.

3.3 CLEANING

- A. Wipe off fingerprints, pencil marks, and surface soil etc., in preparation for final cleaning by the building owner.
- B. Remove and dispose of all packing materials and related construction debris.

3.4 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
 - 1. Inspection entity shall prepare and submit report of inspection.

END OF SECTION 064023

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

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. Plastic-laminate-faced architectural cabinets, and hardware.
2. Plastic laminate and solid surface countertops.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets, unless concealed within other construction before cabinet installation.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring and blocking for supporting cabinets that is concealed within wall construction.
2. Section 069023 "Interior Finish Carpentry" for wood panel; product shelving designated to receive opaque (painted) finish.
3. Division 22 "Plumbing" Sections for sinks and other plumbing fixtures to be installed in cabinets and countertops.
4. Division 26 and 27 Sections for electrical service, lighting fixtures, and data lines to be installed in cabinets and countertops.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, cabinet hardware and accessories, and reveals and channels.

- B. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Include section drawings of typical and special casework, work surfaces and accessories.
2. Indicate locations of plumbing and electrical service field connection by others

C. Samples:

1. Plastic laminates, edge banding materials, and thermoset decorative panels, for each color, pattern, and surface finish.
2. Exposed cabinet hardware.

- D. Each countertop material.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification data for firms and persons specified in “Quality Assurance” article to demonstrate their capabilities and experience. Include list of completed projects of similar scope and size with project names, addresses, names of Architects and Owners, and other information specified.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For cabinet finishes to include in maintenance manuals. Include cleaning instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Products: Provide products certified as meeting or exceeding ANSI-A 161.1-1998 testing standards. Owner reserves the right to remove one randomly selected cabinet from the site in order to examine it for compliance to these specifications.

1.7 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 and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install casework until interior concrete work, masonry, plastering and other wet operations are complete.
- C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.8 WARRANTY

- A. All materials and workmanship covered by this section will carry a 5-year warranty from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
- B. Grade: Custom.
- C. Type of Construction: Face frame.
- D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- E. Core Materials:
 - 1. Particleboard up to 7/8-inch-thick: Industrial Grade average 47-pound density particleboard, ANSI A 208.1-1999, M-3.
 - 2. Particleboard 1 inch thick and thicker: Industrial Grade average 45-pound density particleboard, ANSI A 208.1-1999, M-2.
 - 3. MR Moisture Resistant Particleboard: Average 47-pound density particleboard, ANSI
 - 4. A 208.1 1-1999, M-3.
 - 5. Medium Density Fiberboard 1/4-inch-thick: Average 54-pound density grade, ANSI A 208.2.
 - 6. Medium Density Fiberboard 3/4-inch-thick: Average 48-pound density grade, ANSI A 208.2.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Pionite; a Panolam Industries International, Inc. brand.
 - c. Wilsonart LLC.
 - 2. Laminate Cladding for Exposed Surfaces:
 - a. Horizontal Surfaces: Grade HGS.
 - b. Vertical Surfaces: Grade VGS.
 - c. Liner: Grade CLS, .020-inch thick.
 - d. Backer: Grade BKH, thickness to match face layer.
 - e. Pattern Direction: As indicated on Drawings.
 - 3. Materials for Semiexposed Surfaces:
 - a. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - b. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
 - c. Drawer Bottoms: Thermoset decorative panels.
 - 4. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

- a. **PL-1** (Vertical surfaces): Match Wilsonart color #7925 "Monticello Maple, fine velvet 38 finish.

Door and drawer edges: 15/16" x 3mm edge banding, color: Monticello Maple, to match vertical surface.

- b. **PL-2** (Countertops): Match Wilsonart color #4946 "Natural Cotton," fine velvet 38 finish.

Countertop edges: 15/16" x 3mm edge banding, color: Natural Cotton.

2.2 SOLID SURFACE COUNTERS **SS – (064116.YY)**

- A. Basis of Design Manufacturer: Corian 9mm, color: Witch Hazel, edge profile: eased edge, or equal, approved in writing by Architect in an addendum published prior to bidding.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087111 "Door Hardware (Descriptive Specification)."
- B. Butt Hinges: 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch-thick metal, and as follows:
 1. Semi-concealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- C. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter. Pull design shall be compatible with the ANSI A117.1 "Accessible and Usable Buildings and Facilities."
- D. Catches: Push-in magnetic catches, BHMA A156.9, B03131.
- E. Door Bumpers: 3/8" diameter - 1/8" thick – clear.
- F. Cable Grommets (**064116.N**): Plastic, 60 mm diameter, with flush plug type cover, black, as manufactured by "Hafele America, Co." or "Lamp".
- G. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112.
- H. Shelf Rests: BHMA A156.9, B04013; plastic, two-pin type with shelf hold-down clip.
- I. Drawer Slides: BHMA A156.9.
 1. Regular, knee-space, and pencil drawers: Grade 1HD-100; Side mounted; full-extension type; zinc-plated-steel ball-bearing slides. Positive stop both directions with self-closing feature.
 2. Paper storage and file drawers: Grade 1HD-200; Side mounted; full-extension type; zinc-plated-steel ball-bearing slides. Positive stop both directions with self-closing feature.
- J. Cabinet Locks:
 1. Basis-of- Design: Manufacturer: Olympus Lock. Inc.; Product: N-Series, removable-core, disc-tumbler, cam- style lock, master-keyed to 5-pin National Keyway, 2 keys per lock, or equal, approved in writing by Architect in an Addendum published prior to Bidding.
 - a. Drawer and Swinging Door Lock: DCN Series.

- K. File Suspension System: Extruded molding integral with top of drawer box sides to accept standard hanging file folders.
- L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Bronze Base: BHMA 613 for bronze base.

2.4 FABRICATION

- A. 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.
- B. 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.
- C. Fabricate casework, countertops and related products to dimensions, profiles, and details shown.
- D. Cabinet Body Construction:
 - 1. Tops and bottoms are glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals, rails and verticals. Minimum 6 dowels each joint for 24-inch deep cabinets and a minimum of 4 dowels each joint for 12-inch deep cabinets. Mechanical fasteners will not be accepted for cabinet body construction.
 - a. Tops, bottoms and sides of all cabinets except sink base units shall be particleboard core.
 - b. Tops, bottoms and sides of sink base units shall be moisture-resistant particleboard core.
 - 2. Cabinet backs: 1/4-inch thick prefinished medium density fiberboard. Wall and tall cabinets shall be provided with a 1-inch x 1-3/4 -inch PVC mounting strip used to secure the cabinet to the wall.
 - a. Exposed back on fixed cabinets, except sink base units: 3/4-inch thick particleboard with the exterior surface finished in VGS laminate as selected.
 - b. Exposed back on fixed or movable sink base cabinets: 3/4-inch thick moisture-resistant particleboard with the exterior surface finished in VGS laminate as selected.
 - 3. Fixed base units shall have an individual factory-applied base, constructed of 3/4- inch thick exterior grade plywood. Base is nominal 4 inches high unless otherwise indicated on the drawings.
 - 4. Base units, except sink base units: Full sub-top.
 - 5. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides and pullout shelves in the line boring for consistent alignment.
 - 6. Adjustable shelf core: 3/4-inch thick particleboard up to 24-inches wide, 1-inch thick particleboard over 24-inches wide.
 - 7. Interior finish, units with open Interiors:
 - a. Top, bottom, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine laminate with matching prefinished back.

8. Interior finish, units with closed Interiors:
 - a. Top, bottom, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine laminate with matching prefinished back.
9. Exposed cabinet ends:
 - a. Faced with VGS high-pressure decorative laminate.
10. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces shall not be permitted, even on concealed surfaces (excluding edges).

E. Drawers:

1. Sides, back and sub front: Minimum 1/2-inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 1mm PVC.
2. Drawer bottom: Minimum 1/2-inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.
3. Paper storage drawers: Minimum 3/4-inch thick particleboard sides, back, and sub front laminated with thermally fused melamine. Minimum 1/2-inch thick particleboard drawer bottoms screwed directly to the bottom edges of the drawer box. Provide PVC angle retaining bar at the rear of the drawer.
4. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

F. Door/Drawer Fronts:

1. Core: 3/4-inch thick particleboard, except at sink units, which shall have a 3/4-inch thick moisture-resistant particleboard core.
2. Provide double doors for all openings in excess of 24 inches wide.
3. Faces:
 - a. Exterior: VGS High-pressure decorative laminate.
 - b. Interior: High-pressure cabinet liner CLS.

2.5 PLASTIC-LAMINATE-FACED COUNTERTOPS

A. Core Material:

1. All countertops except at sink elevations: 1-inch thick ANSI A 208.1-1993 M-2 particleboard.
2. Countertops at sink elevations: 1-inch thick ANSI A 208.1-1993 M-3 MR moisture resistant particleboard.
3. Surface: HGS high-pressure decorative laminate with balanced backer sheeting.
4. Edges, including applied backsplash: 3mm PVC, exposed edges and corners machine profiled to 1/8-inch radius. Edges are machine applied with moisture curing polyurethane (PUR) hot melt for fast setting, high strength adhesion

2.6 REVEALS/CHANNELS

- A. Basis-of-Design: Subject to compliance with requirements, provide Millwork Corner Keys (MWCK) and 4" Millwork Channel Base with Return Key (MWCB) by Fry Reglet Corporation or a comparable product, with written approval by the Architect prior to bidding.

1. Millwork Corner Keys: **(064116.XX)**
 - a. Description: 90 degrees outside corners, are abuse resistant, and provides a straight and uniform 1/4" exposed post at edges of millwork panels.
 - b. Material: Extruded aluminum
 - c. Dimensions: As indicated on drawings.
 - d. Finish: Buffed Satin in Dark Bronze
2. 4" Millwork Channel Base with Return Key **(064116.WW)**
 - a. Description: Features an exposed 3/16" return keys to cover cut edges of millwork panels, and a 4" base flange that provides a straight, uniform base horizontally at the bottom of millwork panels.
 - b. Material: Extruded aluminum.
 - c. Dimensions: As indicated on drawings.
 - d. Finish: Buffed Satin in Dark Bronze

2.7 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.

PART 3 - EXECUTION

3.1 INSPECTION

- A. The cabinet contractor shall examine the job site and the conditions under which the work under this section is to be performed and notify the building owner in writing of unsatisfactory conditions. Do not proceed with work under this Section until satisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

3.3 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.

- B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
- E. Cabinets: Install without distortion so doors and drawers fit openings properly 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.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.
- F. Countertops: Anchor securely to base units and other support systems as indicated.
- G. Install Millwork trims and accessories in accord with manufacturer's product data.
- H. Complete the finishing work specified in this section to extent not completed at shop before installation of woodwork.
- I. Repair minor damage per plastic laminate manufacturer's recommendations. Replace other damaged cabinets or materials.

3.4 CLEANING

- A. Leave cabinets broom-clean inside and out. Wipe off fingerprints, pencil marks, and surface soil etc., in preparation for final cleaning by the building Owner.
- B. Remove and dispose of all packing materials and related construction debris.

3.5 PROTECTION

- A. Protect accessories from damage until date of Substantial Completion. Replace accessories which become damaged.

END OF SECTION 064116

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Modified bituminous sheet waterproofing.
2. Waterproofing protection course.

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. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

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. [Carlisle Coatings & Waterproofing Inc.](#)
 - b. [CETCO, a Minerals Technologies company.](#)
 - c. [GCP Applied Technologies Inc.](#)
 - d. [MAPEI Corporation.](#)
 - e. [Polyguard Products, Inc.](#)
 - f. [Soprema, Inc.](#)
2. **Physical Properties:**
 - a. Tensile Strength, Membrane: 250 psi minimum; ASTM D412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D412, Die C, modified.
 - c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970/D1970M.
 - d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C836/C836M.
 - e. Puncture Resistance: 40 lbf minimum; ASTM E154/E154M.
 - f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D570.
 - g. Water Vapor Permeance: 0.05 perm maximum; ASTM E96/E96M, Water Method.
 - h. Hydrostatic-Head Resistance: 200 feet minimum; ASTM D5385.
3. **Sheet Strips:** Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.2 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. **Primer:** Liquid waterborne or solvent-borne primer recommended for substrate by sheet-waterproofing material manufacturer.
- C. **Surface Conditioner:** Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
- D. **Liquid Membrane:** Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. **Substrate Patching Membrane:** Low-viscosity, two-component, modified asphalt coating.
- F. **Metal Termination Bars:** Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.
- G. **Protection Course:** See specification section 312323.43 “EPS Geofoam”.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

3.2 INSTALLATION OF MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D6135.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
 - 1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
- D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- E. Seal edges of sheet-waterproofing terminations with mastic.
- F. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.
- H. Immediately install protection course with butted joints over waterproofing membrane.
 - 1. Board insulation may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.3 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071326

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SECTION 072100 - THERMAL INSULATION

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. Glass-fiber blankets.
- B. Related Requirements:
 - 1. Section 092216 “Non-Structural Metal Framing” for insulation installed in metal stud framing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced (**072100.A**): ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
 - 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. Owens Corning.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF POLYISOCYANURATE BOARD FOAM-PLASTIC INSULATION

- A. Comply with manufacturer's written instructions.
- B. Apply sheathing tape to joints between foam-plastic sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

3.3 INSTALLATION OF GLASS-FIBER BLANKETS, UNFACED IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

END OF SECTION 072100

SECTION 076200 - SHEET METAL FLASHING AND TRIM

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. Manufactured reglets with counterflashing.
 - 2. Formed roof-drainage sheet metal fabrications.
 - 3. Formed low-slope roof sheet metal fabrications.
 - 4. Formed wall sheet metal fabrications.

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 sheet metal flashing and trim.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Distinguish between shop- and field-assembled work.
 - 3. Include identification of finish for each item.
 - 4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.
- C. Samples: For each exposed product and for each color and texture specified.

1.5 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.
- C. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.8 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings tested according to SPRI ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Structural Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to

ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color: As selected by Architect from manufacturer's full range.

2.3 UNDERLAYMENT MATERIALS

- A. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Atlas Roofing Corporation.
 - b. Intertape Polymer Group.
 - c. Kirsch Building Products, LLC.
 - d. SDP Advanced Polymer Products Inc.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 2. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2-inch-wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED REGLETS

- A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cheney Flashing Company.
 - b. Fry Reglet Corporation.
 - c. Heckmann Building Products, Inc.
 - d. Hickman Company, W. P.
 - e. Hohmann & Barnard, Inc.
 - f. Sandell Manufacturing Co., Inc.
 - 2. Material: Galvanized steel, 0.022 inch thick.
 - 3. Finish: With manufacturer's standard color coating.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.

- C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

2.7 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
 - 1. Hanger Style: SMACNA Fig, 1-35C.
 - 2. Fabricate from Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- B. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches into field of roof. Fabricate from Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.
- C. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes. Fabricate from Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

2.8 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
 - 1. Fabricate from Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: 0.040 inch thick.

2.9 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws or substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.
- C. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
- D. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper discharge.
- E. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches in direction of water flow.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches.

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Reglets: Installation of reglets is specified in Section 033000 "Cast-in-Place Concrete." Section 042613 "Masonry Veneer."
- C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.

- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

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. Silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants
4. Butyl joint sealants.
5. Latex joint sealants.

- B. Related Requirements:

1. Section 033000 "Cast-In-Place Concrete" for concrete substrates for joint sealants.
2. Division 08 "Door" and "Window" Sections for weather-resistant joint sealants at assembly perimeters.
3. Section 092900 "Gypsum Board" for acoustical joint sealants in sound-rated construction.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- 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.

1.5 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. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of manufacturer who is trained and approved for installation of joint sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant from a single source from a single manufacturer.

1.7 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. **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.**

1.8 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.
 - 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.

1.9 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.
- 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: Five years from date of Substantial Completion.

- 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.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:
1. Architectural sealants shall have a VOC content of 250 g/L or less.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC SEALANTS

- A. Elastomeric Joint Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and use.

2.3 SILICONE JOINT SEALANTS

- A. **Silicone, S, NS, 25, NT**: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
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 Corporation; Construction Systems; "MasterSeal NP-1."
 - b. Pecora Corporation; "Dynatrol I-XL."
 - c. Sika Corporation; "Sikaflex 1A" or "Sikaflex 15 LM."
- B. **Silicone, S, NS, 100/50, T, NT**: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:

- a. Dow Corning Corporation; “NS.”
- b. May National Associates, Inc., a Subsidiary of Sika Corporation; “Bondaflex Sil 728 NS.”

2.4 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, provide one of the following:
 - a. Dow Corning Corporation; Dow Corning® 795 Silicone Building Sealant.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf NB.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 295 FPS NB.
 - d. Pecora Corporation; Pecora 895NST.
 - e. Sika Corporation; Joint Sealants; Sikasil WS-295.
 - f. Tremco Incorporated; Spectrem 2 or Spectrem 3.
- C. **Silicone, Nonstaining, S, NS, 100/50, T, NT:** Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, 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. Dow Corning Corporation; “790.”

2.5 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 products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corporation; Construction Systems; “MasterSeal NP-1.”
 - b. Pecora Corporation; “Dynatrol I-XL.”
 - c. Sika Corporation; “Sikaflex 1A” or “Sikaflex 15 LM.”
- 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 M, Grade P, Class 25, Use T, 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. BASF Construction Chemicals, LLC, Building Systems; “Sonolastic SL-1.”
 - b. Pecora Corporation; “NR-201.”

- c. Polymeric Systems, Inc.; “Flexiprene 952.”
- d. Schnee-Morehead, Inc.; An ITW Company; “Permathane SM7101.”
- e. Sherwin-Williams Company, The: “Stampede 1SL.”

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.

D. **Urethane, M, NS, 25, NT:** Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 25, Use 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. Bostik, Inc.; “Chem-Calk 505. “
- b. Lym Tal International, Inc.; “Iso-Flex 881.”
- c. Sika Corporation; “Sikaflex – 2c NS” or “2c EZ Mix.”

2.6 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

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. Bostik, Inc; Chem-Calk 300.
- b. Pecora Corporation; BC-158.

2.7 LATEX JOINT SEALANTS

A. **Acrylic Latex:** Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex 600 or Bondaflex Sil-A 700.
- b. Pecora Corporation; AC-20, AVW-920, or Tilt-Seal.
- c. Sherwin-Williams Company (The); 850A Siliconized Acrylic Latex Caulk 950A or PowerHouse Siliconized Acrylic Latex Sealant.
- d. Tremco Incorporated; Tremflex 834.

2.8 ACOUSTICAL JOINT SEALANTS

A. Refer to Section 092900 “Gypsum Board” for acoustical joint sealants installed at sound-rated assemblies.

2.9 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.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin,) Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, 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.

2.10 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 joint sealant performance.
- 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, but are not limited to 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, but are not limited to 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.
- 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 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.

3.5 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.

3.6 EXTERIOR JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surface **JS-1**.
1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. 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 **JS-2**.
1. Joint Locations:
 - a. Control and expansion joints in unit masonry.
 - b. Joints between different materials listed above.

- c. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
 - d. Control and expansion joints in ceilings and other overhead surfaces.
2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

3.7 INTERIOR JOINT SEALANT SCHEDULE

A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces **JS-4**.

1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Vertical joints on exposed surfaces of unit masonry and concrete walls and partitions.
2. Joint Sealant: Urethane, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
4. Provide sanded sealant at control and expansion joints in tile flooring.

B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement **JS-5**.

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, windows, and elevator entrances.
2. Joint Sealant: **Acrylic latex**.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Concealed mastics **JS-7**.

1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
2. Joint Sealant: Butyl-rubber based.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

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 interior standard steel doors and frames.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for sealing perimeters of hollow metal frames.
 - 2. Section 087100 "Door Hardware."
 - 3. Section 088000 "Glazing" for vision panels in hollow metal doors and borrowed lites in hollow metal frames.
 - 4. Division 09 Sections "Exterior Painting" and "Interior Painting" for field-finishing of hollow metal frames.
 - 5. Division 26, 27, and 28 Sections for connections to electrified hardware and access control system.

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: Include the following:
 - 1. Elevations of each door design.
 - 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 anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
 - 8. Details of moldings, removable stops, and glazing.
 - 9. Details of conduit and preparations for power, signal, and control systems.
- 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.6 QUALITY REQUIREMENTS

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

1.7 WARRANTY

- A. All hollow metal doors and frames shall be supplied with a one-year warranty against defects in materials and workmanship, that shall commence on the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Ceco Door; ASSA ABLOY.
 2. Curries Company; ASSA ABLOY.
 3. Deansteel Manufacturing Company, Inc.
 4. Republic Doors and Frames.
 5. Steelcraft; an Allegion brand.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Supports and Anchors: Fabricated from not less than 0.042-inch –thick sheet steel where used with steel frames; and 0.053-inch thick metallic-coated sheet steel complying with ASTM A 591 /A 591M, where used with metallic-coated steel frames.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- 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 C 665, 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 E 136 for combustion characteristics.
- A. Glazing: Comply with requirements in Division 08 Section "Glazing."

- B. Primer: Apply after fabrication. Use shop primer that is compatible with intermediate and topcoats specified in Division 09 "Painting" Sections.

2.3 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. Heavy-Duty Doors and Frames: SDI A250.8, Level 2; SDI A250.4, Level B.

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches.
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.042-inch, with minimum A40 (ZF120) coating. See drawings.
- d. Edge Construction: Model 1, Full Flush.
- 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 where required for attachment of weather stripping 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.

2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053-inch, with minimum A40 (ZF120) coating.
- b. Construction: Full profile welded.

2.4 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.
- 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 of frame height above 7 feet.
- 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-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. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

- 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.5 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032-inch thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8-inch-high unless otherwise indicated.
- C. Stops for Glazed Lites in Frames: Minimum 0.032-inch -thick, fabricated from same material as frames in which they are installed.

2.6 ACCESSORIES

- A. Ceiling Struts: Minimum 1/4-inch -thick by 1-inch -wide steel.
- B. Grout Guards: Formed from same material as frames, not less than 0.016-inch thick

2.7 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 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. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 2. 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 door frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce door frames to receive non-templated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal door frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 - 1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 - 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 o.c. and not more than 2-inches o.c. from each corner.

2.8 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 SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

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 door frames to receive non-templated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Hollow-Metal Frames: Comply with 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. Floor Anchors: Secure with postinstalled expansion anchors. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Solidly pack mineral-fiber insulation inside frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 5. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16-inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16-inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16-inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16-inch, measured at jambs at floor.

B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below:

1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.

C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

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. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 087100 "Book Hardware" for track system for barn doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include factory-finishing specifications.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.

- C. Samples: For factory-finished doors.

1.4 CLOSEOUT SUBMITTALS

- A. Factory-Finishing documentation to include in Maintenance Manuals.

1.5 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. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Algoma Hardwoods, Inc.
 2. Eggers Industries.
 3. Graham Wood Doors; ASSA ABLOY Group company.
 4. Marshfield DoorSystems, Inc.
 5. Mohawk Flush Doors, Inc.
 6. Oregon Door.
 7. Oshkosh Door Company.
 8. Vancouver Door Company.
 9. VT Industries Inc.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
- B. WDMA I.S.1-A Performance Grade:
 1. Heavy Duty unless otherwise indicated.
- C. Particleboard-Core Doors:
 1. Particleboard: ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde.
 2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Wood Doors (**081416.A**):
 1. Grade: Premium, with Grade AA faces.
 2. Species: Select white maple.
 3. Cut: Plain sliced (flat sliced).
 4. Match between Veneer Leaves: Book match.
 5. Assembly of Veneer Leaves on Door Faces: Running match.
 6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 7. Core: Particleboard.
 8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
- B. Factory machine doors for hardware that is not surface applied.

2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: WDMA TR-6 catalyzed polyurethane.
 - a. Wash coat, followed by 3 coats of sealer, followed by sanding with 200 grit paper, followed by 2 top coats.
 - b. Staining: Match VT Industries "Alpine" #AL07.
 - c. Sheen: Semigloss, 46-60 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
- 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.

POCATELLO HIGH SCHOOL – ENTRY RENOVATION
POCATELLO / CHUBBUCK SCHOOL DISTRICT NO. 25
325 N ARTHUR AVE., POCATELLO, ID 83204

MARCH 19, 2019
BID SET

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

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 access doors and frames for walls and ceilings.
- B. Related Requirements:
 - 1. Section 092900 "Gypsum Board" for wall and ceiling finishes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of access door and frame and for each finish specified.
- C. Product Schedule: For access doors and frames.

1.4 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- 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. Acudor Products, Inc.
 - 2. Babcock-Davis.
 - 3. Cendrex Inc.
 - 4. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
 - 5. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - 6. Karp Associates, Inc.
 - 7. Larsens Manufacturing Company.
 - 8. MIFAB, Inc.
 - 9. Milcor; Commercial Products Group of Hart & Cooley, Inc.

- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- C. Flush Access Doors with Concealed Flanges:
 - 1. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
 - 2. Locations: Walls and Ceilings.
 - 3. Door Size: 30 by 30 inches minimum.
 - 4. Metallic-Coated Steel Sheet for Door (**083113.A**): Nominal 0.064-inch (16-gauge).
 - a. Finish: Factory primed.

2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.
- E. Frame Anchors: Same material as door face.
- F. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.3 FABRICATION

- A. 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.
- B. 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.
- C. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 - 2. Keys: Furnish two keys per lock and key all locks alike.
 - 3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in Section 087100 "Door Hardware."

2.4 FINISHES

- A. 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.

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.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

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SECTION 084113 - ALUMINUM-FRAMED STOREFRONTS

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. Storefront framing.
- B. Related Requirements:
 - 1. Division 07 Sections “Thermal Insulation and “Joint Sealants” for maintaining continuity of thermal, air, and water barriers at openings.
 - 2. Section 088000 “Glazing.”

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 aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 2. Include point-to-point wiring diagrams.
- C. Samples: For each type of exposed finish required.
- D. Delegated-Design Submittal: For aluminum-framed storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.
- B. Product test reports.

- C. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance data to include in Maintenance Manual.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by the International Accreditation Service or the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement as complying with ISO/IEC 17025.
- C. 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.
- D. Source Limitations for Aluminum-Framed Systems: Obtain entrances, storefronts, and exterior sun control devices from a single source from a single manufacturer.

1.8 FIELD CONDITIONS

- A. Field verify all rough opening dimensions prior to fabrication.

1.9 WARRANTY

- A. Special Warranty: Manufacturer and Installer agree 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. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed, 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 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. Aesthetics: Storefronts are to match existing, adjacent storefronts to the greatest extent possible. This includes but is not limited to, widths of frames, mutton spacing and sizes, and finish of frames.
- D. Structural Loads:
1. Wind Loads: As indicated on structural Drawings.
- E. Deflection of Framing Members: At design wind pressure, as follows:
1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
 - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- F. Structural: Test according to ASTM E 330/E 330M 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.
- G. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
- H. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

I. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.29 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas as a system shall have SHGC of no greater than the following as determined according to NFRC 200:
 - a. South, East, and West Orientation: 0.40.
 - b. North Orientation: 0.53.

J. Shading Performance:

1. Design of standard configurations will allow for negligible direct sunlight to show through the blades based on project location, latitude, altitude, building orientation, surrounding conditions, and aesthetic requirements, except for round, diamond and square louver styles.

K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 GLAZING

- A. Glazing: Comply with Section 088000 "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.

2.3 ACCESSORY MATERIALS

- A. Miscellaneous Brake-Shape Aluminum (**084113.D**): fabricate to profile indicated from 0.050- inch aluminum sheet with same finish as storefront framing.
- B. Compensating Head and Jamb Receptor (**084113.F**): Provide manufacturer's standard units where indicated on Drawings.
- C. High Performance Sill Flashing (**084113.G**): Provide manufacturer's high-performance thermally-broken sill flashing at exterior frame locations.
- D. Galvanized Sheet Steel Frame Anchors (**084113.M**): Continuous sheet metal for fastening storefront frames to wall framing: 0.138-inch -thick galvanized sheet steel.
- E. U-Channel Fittings (**084113.N**): Extruded aluminum, satin anodized finish, dry glazed, and with matching end caps.
 1. Top channel is 1-1/2 inch high by 1 inch deep.
 2. Bottom channel is 1 inch high by 1 inch deep.

3. Finished metal surfaces protected with strippable film.
- F. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.
- G. Sheet and Plate: ASTM B 209.
- H. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- I. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- J. Structural Profiles: ASTM B 308/B 308M.
- K. Steel Reinforcement:
 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
 4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
- L. Fasteners and accessories: Nonmagnetic stainless steel to be non-corrosive and compatible with aluminum members, anchors, and other components.
- M. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

2.4 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. 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. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 6. Provisions for field replacement of glazing from interior.
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- C. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- D. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.5 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

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

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. 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.

- C. Set continuous sill members, flashing, and thresholds in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

- D. Install components plumb and true in alignment with established lines and grades.

- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weatherstripping contact and hardware movement to produce proper operation.

- F. Install glazing as specified in Section 088000 "Glazing."

3.3 ERECTION TOLERANCES

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:

1. Plumb: 1/8-inch in 10-feet; 1/4-inch in 40-feet.
2. Level: 1/8-inch in 20-feet; 1/4-inch in 40-feet.
3. Alignment:

- a. Where surfaces abut in line, limit offset from true alignment to 1/16-inch.
- b. Where surfaces meet at corners, limit offset from true alignment to 1/32-inch.

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/- inch.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner reserves the right to engage a qualified testing agency to perform tests and inspections.

B. Testing Agency: Owner reserves the right to engage a qualified independent testing and inspecting agency to perform field tests and inspections. Field testing to be paid for by Owner.

1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Division 1 Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.

a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.

b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf.

C. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.

D. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 CLEANING

A. Clean exposed surfaces using a method recommended by the storefront and glass manufacturer. Remove dirt from corners. Wipe surfaces dry, free of streaks, and clean.

B. Remove excess sealant using product acceptable to sealant and storefront manufacturer.

END OF SECTION 084113

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SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

- B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Cylinders specified for doors in other sections.

- C. Related Sections:

1. Division 08 Section "Door Hardware Schedule".
2. Division 08 Section "Hollow Metal Doors and Frames".
3. Division 08 Section "Access Control Hardware".

- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

- E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 3. Twenty five years for manual surface door closer bodies.
 - 4. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

- A. 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 door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Acceptable Manufacturers:
 - a. Bommer Industries (BO).
 - b. Hager Companies (HA).
 - c. Ives (IV).

- d. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
- 1. Acceptable Manufacturers:
 - a. Ives (IV).
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
 - c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - d. Select Hinges.
 - e. Stanley Hardware (ST).

2.3 POWER TRANSFER DEVICES

- A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
- 1. Acceptable Manufacturers:
 - a. Hager Companies (HA) - ETW-QC (# wires) Option.
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC (# wires) Option.
 - c. Stanley Hardware (ST) – C Option.
- B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
- 1. Acceptable Manufacturers:
 - a. Von Duprin (VD) - EPT-10 Series.

2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
- 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 - 2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Acceptable Manufacturers:
 - a. Door Controls International (DC).
 - b. Ives (IV).
 - c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - d. Trimco (TC).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
 1. Acceptable Manufacturers:
 - a. Schlage (SC).
 - 1) Exterior: Primus FSIC
 - 2) Interior: Everest FSIC
- C. Cylinders: Original manufacturer cylinders complying with the following:
 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 5. Keyway: Match Facility Standard.
- D. Security Cylinders: ANSI/BHMA A156.5, Grade 1, patterned security cylinders and keys able to be used together under the same facility master or grandmaster key system. Cylinders are to be factory keyed.
 1. Acceptable Manufacturers:
 - a. Schlage Lock (SC) - Primus Everest.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Key locks to Owner's existing system.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide construction master keyed cylinders.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Acceptable Manufacturers:
 - a. Schlage (SC) – L9000 Series.
 - b. No Substitution.

B. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.

1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
2. Locks are to be non-handed and fully field reversible.
3. Acceptable Manufacturers:
 - a. Schlage (SC) – ND Series.
 - b. No Substitution.

2.7 INTEGRATED WIEGAND OUTPUT ACCESS CONTROL LOCKING DEVICES

A. Integrated Wiegand Output Mortise Locks: Wiegand output ANSI A156.13, UL294 6th Edition, CAN ULC S319, A156.25 Grade 1, mortise lockset with integrated RFID card reader, request-to-exit signaling, door position status switch, and latchbolt monitoring in one complete unit. Hard wired, motor driven locking/unlocking control of the lever handle trim, 3/4" deadlocking anti-friction latch, and 1" case-hardened steel deadbolt. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Latchbolt monitoring and

- door position switch act in conjunction to report door-in-frame (DPS) and door latched (door closed and latched) conditions.
2. Reader supports either HID 125 kHz proximity (up to 39 bits, including Corporate 1000) or 13.56 MHz iClass®, iClass® SE, iClass® SR, iClass® Seos, MIFARE, DESFire EV1, and Seos NFC mobile credentials (including Elite, University 1000 and Corporate 1000).
 3. 12VDC external power supply required for reader and lock, with optional 24VDC operation available with iClass® reader (125 kHz reader is always 12VDC). Fail safe or fail secure options.
 4. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
 5. Support end-of-line resistors contained within the lock case.
 6. Installation to include manufacturer's access control panel interface board or module where required for Wiegand output protocol.
 7. Acceptable Manufacturers:
 - a. Schlage (SC) - AD300 Series.
 - b. No Substitution.

2.8 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 4. Dustproof Strikes: BHMA A156.16.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Acceptable Manufacturers:
 - a. Von Duprin (VD) - 35A/98 XP Series.
- C. Extruded Aluminum Removable Mullions: ANSI/BHMA A156.3 anodized, removable mullions with malleable-iron top and bottom retainers. Mullions to be provided standard with stabilizers and imbedded weatherstrip.
1. Acceptable Manufacturers:
 - a. Von Duprin (VD) - 5564 Series.
- D. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.

1. Provide keyed removable feature where specified in the Hardware Sets.
2. Provide stabilizers and mounting brackets as required.
3. Provide electrical quick connection wiring options as specified in the hardware sets.
4. Acceptable Manufacturers:
 - a. Von Duprin (VD) - 9954 Series.

2.10 INTEGRATED WIEGAND OUTPUT ACCESS CONTROL EXIT DEVICES

- A. Wiegand Output Integrated Card Reader Exit Hardware: Wiegand output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated proximity card reader, latchbolt and touchbar monitoring, and request-to-exit signaling, in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.
1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).
 2. Reader supports either HID 125 kHz proximity (up to 39 bits, including Corporate 1000) or 13.56 MHz (2K-32K) iClass® credentials.
 3. 12VDC external power supply required for reader, with optional 24VDC operation available with iClass® reader (125 kHz reader is always 12VDC). 24VDC required for solenoid operated exit trim (12VDC if applicable). Fail safe or fail secure options.
 4. Installation requires only one cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
 5. Acceptable Manufacturers:
 - a. Schlage (SC) - AD300 Series.
 - b. No Substitution.

2.11 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.
1. Acceptable Manufacturers:
 - a. LCN Closers (LC) - 4040XP Series.
 - b. No Substitution.

2.12 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Acceptable Manufacturers:

- a. Hager Companies (HA).
- b. Ives (IV).
- c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- d. Trimco (TC).

2.13 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Acceptable Manufacturers:
 - a. Hager Companies (HA).
 - b. Ives (IV).
 - c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - d. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
 1. Acceptable Manufacturers:
 - a. Architectural Builders Hardware (AH).
 - b. Glynn Johnson (GJ).
 - c. Rixson Door Controls (RF).
 - d. Sargent Manufacturing (SA).

2.14 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Acceptable Manufacturers:
 - 1. National Guard Products (NG).
 - 2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - 3. Zero (ZE).

2.15 ELECTRONIC ACCESSORIES

- A. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.
 - 1. Acceptable Manufacturers:
 - a. Security Door Controls (SD) - MD-31D Series.
 - b. Securitron (SU) - XMS Series.
- B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
 - 1. Acceptable Manufacturers:
 - a. Schlage Electronics (SH)
 - b. Security Door Controls (SD) - DPS Series.
 - c. Securitron (SU) - DPS Series.

2.16 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.17 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. VD - Von Duprin
5. SC - Schlage
6. SH - Schlage Electronic Security
7. RF - Rixson
8. LC - LCN Closers
9. SU - Securitron

Hardware Sets

Set: 1.0

Doors:

END OF SECTION 087100

SECTION 088000 - GLAZING

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. Glass for windows, doors, interior borrowed lites, and storefront framing.
 - 2. Glazing sealants and accessories.
 - 3. Interior window film.
- B. Related Requirements:
 - 1. Division 08 Sections “Hollow Metal Doors and Frames” and “Aluminum-Framed Storefronts” for glazing panels in windows and doors.

1.3 REFERENCES

- A. ASTM International (ASTM)
 - 1. ASTM E 308 – Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.

1.4 PREINSTALLATION MEETINGS

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

1.5 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.6 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 square.

- C. Interior Window Film Samples: 4 inch by 4 inch Samples of specified texture, color and/or pattern for verification.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.
- F. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.

1.7 INFORMATIONAL SUBMITTALS

- A. Preconstruction adhesion and compatibility test report.
- B. Copyright License for window graphic.

1.8 QUALITY ASSURANCE

- A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- B. Installation shall be performed by a trained and qualified installer, specialized and experienced in work required for this project.

1.9 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.**

1.10 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. 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 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E 1300.
 1. Design Wind Pressures: As indicated on structural Drawings.
 2. Design Snow Loads: As indicated on structural Drawings.
 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. 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. 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.
 2. 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.
 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 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.

- 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.

2.3 MONOLITHIC GLASS PRODUCTS

- A. Basis-of-Design - Ultraclear Vision Glass **GL-1**: Subject to compliance with requirements, provide Vitro Architectural Glass; Starphire Ultra-Clear glass, or a comparable product by one of the following:
 - 1. AGC Glass Company North America, Inc.
 - 2. Guardian Glass.
 - 3. Pilkington North America.
 - 4. Viracon, Inc.
- B. ASTM C 1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent.
- C. Provide fully-tempered units where safety glass is indicated.

2.4 GLAZED INTERIOR WALL ASSEMBLY

- A. Basis-of-Design – Frameless Glazed Interior Wall Assembly **GL-2**: Subject to compliance with requirements, provide C.R. Laurence Co., Inc; CRL Cascade Series Frameless Glass Wall Office System or a comparable product, with written approval by the Architect prior to bidding.
- B. Frameless Glazed Interior Wall Assembly: Factory fabricated assemblies consisting of full-width and height glass panels fastened with U-channel fittings on top and bottom edge of glass wall.
- C. ASTM C1036, Type I, Class I (clear), Quality Q3, fully tempered in accordance with ASTM C1048, Kind FT, and as follows:
 - 1. Thickness: 1/2".
 - 5. Prepare glazing panels for indicated fittings and hardware before tempering.
 - 6. Polish edges that will be exposed in finished work to bright flat polish.
 - 7. Temper glass materials horizontally; visible tong marks or tong mark distortions are not permitted.

2.5 INSULATING GLASS PRODUCTS

- 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 seals.
 - 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
- B. Basis-of-Design Product – Low-E Coated, Clear Insulating Glass Unit **IGU-1**: Subject to compliance with requirements, provide Vitro Architectural Glass; Solarban 60 (2) on Starphire Ultra-Clear glass with 1-/2-inch airspace on Starfire Ultra-Clear glass. or a comparable product by one of the following:

1. AGC Glass Company North America, Inc.
2. Guardian Glass.
3. Pilkington North America.
4. Viracon, Inc.

C. Description:

1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: Solarban 60 (2) on Starphire, Ultra-Clear float glass, or approved equal. Provide fully tempered float glass where indicated on Drawings.
4. Interspace Content: Air.
5. Indoor Lite: Starphire, Ultra-Clear float glass. Provide fully tempered float glass where indicated on Drawings.
6. Low-E Coating: Pyrolytic or sputtered on second surface.
7. Visible Light Transmittance: Not less than 74 percent.
8. Winter Nighttime U-Factor: 0.29 maximum.
9. Solar Heat Gain Coefficient: 0.41 maximum.
10. Provide safety glazing labeling.

2.6 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
1. Neoprene complying with ASTM C 864.
 2. EPDM complying with ASTM C 864.
 3. Silicone complying with ASTM C 1115.
 4. Thermoplastic polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, silicone, or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.7 GLAZING SEALANTS

- A. General:
1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will 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.

2.8 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.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. 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.

2.10 INTERIOR WINDOW FILM (088000.F)

- A. Basis-of-Design: Subject to compliance with requirements, provide transparent vinyl window film; manufactured by Signs Now or a comparable product, with written approval by the Architect prior to bidding.
- B. Window Film 1 (WF-1)
 - 1. Size: Approximately 48" x 48" cut to follow graphic outline.
 - 2. Finish: Image to be provided by Architect.
- C. Window Film 2 (WF-2)
 - 1. Size: Approximately 60" x 36" top cut to follow graphic outline.
 - 2. Finish: Image to be provided by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrate(s) for compliance. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Refer to the manufacturers Technical Data Sheet to determine compatibility of finish to substrate.
- C. Responsibility for state of surfaces prior to installation to be pre-determined by installation specialist.

3.2 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. Fit and align glazed interior wall assembly level and plumb.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.
- H. 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.

3.3 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. Apply heel bead of elastomeric sealant.
- F. 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.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.4 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- 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.

3.5 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.

3.6 WINDOW FILM, GENERAL

- A. Comply with all manufacturer's instructions for surface preparation.

- B. Thoroughly clean substrate of substances that could impair the overlay's bond, including mold, mildew, oil, grease.
- C. Re-clean surfaces with appropriate surface prep solvent and remove any haze or surface contamination.
- D. Refer manufacturer's Installation Guide for specific application instructions.
- E. Do not proceed with installation until all finishing work has been completed in and around the work area.
- F. Verify pattern prior to material acquisition.
- G. Comply with manufacturer's installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- H. Remove the liner and wet the adhesive prior to installation.
- I. Form smooth, wrinkle-free, bubble-free surface for finished installation.
- J. Remove air bubbles, wrinkles, blisters and other defects. Use approved procedures to prevent the formation of air bubbles, wrinkles, blisters and other defects.
- K. Residual water phenomenon may cause small water bubbles or clouding in the film that disappears as the water evaporates.

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. Use cleaning methods recommended by architectural surfacing manufacturer for applicable environment.
- E. Protect completed glass finish during remainder of construction period.
- F. Consult with authorized installation specialist for project specifics.

END OF SECTION 088000

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

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. Suspension systems for interior gypsum board ceilings and soffits.
- B. Related Requirements:
 - 1. Division 07 Section "Joint Sealants."
 - 2. Section 092900 "Gypsum Board."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation reports for post-installed anchors and power-actuated fasteners.

1.5 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.

PART 2 - PRODUCTS

2.1 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-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 AC58 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Type: Torque-controlled, expansion anchor, torque-controlled, adhesive anchor, or adhesive anchor.
 - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
 1. Depth: 2 inches.
- E. Furring Channels (Furring Members):
 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
 2. Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0329 inch.
 - b. Depth: 2-1/2 inches.
 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base-Metal Thickness: 0.0329 inch.
 4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.

2.2 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.

PART 3 - EXECUTION

3.1 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.

3.2 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.
- 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. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8-inch in 12-foot measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

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SECTION 092900 - GYPSUM BOARD

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. Interior gypsum board.
- 2. Tile backing panels.

- B. Related Requirements:

- 1. Section 072100 "Thermal Insulation" for glass-fiber blankets, unfaced, used as sound attenuation blanket insulation.
- 2. Division 07 Section "Joint Sealants."
- 3. Section 092216 "Non-Structural Metal Framing" for suspension systems for gypsum board ceilings.
- 4. Section 099123 "Interior Painting" for primers, intermediate coats, and topcoats applied to gypsum wallboard.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 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.

2.2 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Gypsum.
- b. CertainTeed Corporation.
- c. Continental Building Products, LLC.
- d. Georgia-Pacific Gypsum LLC.
- e. National Gypsum Company.
- f. PABCO Gypsum.
- g. USG Corporation.

2. Thickness: 5/8-inch.
3. Long Edges: Tapered.

B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Gypsum.
- b. CertainTeed Corporation.
- c. Continental Building Products, LLC.
- d. Georgia-Pacific Gypsum LLC.
- e. National Gypsum Company.
- f. PABCO Gypsum.
- g. USG Corporation.

2. Thickness: 1/2-inch.
3. Long Edges: Tapered.

C. Impact-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Gypsum.
- b. CertainTeed Corporation.
- c. Continental Building Products, LLC.
- d. Georgia-Pacific Gypsum LLC.
- e. National Gypsum Company.
- f. PABCO Gypsum.
- g. USG Corporation.

2. Core: 5/8-inch, Type X.
3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
4. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
6. Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 1 Level 3 requirements according to test in Annex A1.
7. Long Edges: Tapered.

2.3 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.
- g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

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 setting-type taping compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat, use drying-type, all-purpose compound.
6. Available manufacturers offering precuts that may be incorporated into the Work, include, but are not limited to the following:
 - a. CertainTeed Corp.; "ProRoc Level V Wall and Ceiling Primer/Surfacer."
 - b. USG Corporation; "Sheetrock Brand Tuff-Hide Primer-Surfacer."

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. 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 thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C 665, Type I, glass-fiber blankets, unfaced, as specified in Section 072100 "Thermal Insulation."

- E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834, as specified in Div 07 "Joint Sealants."
- F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C 840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-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.
- D. 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.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. 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: Panels that are a substrate for wall coverings.
 - 4. Level 4: At all panels that will be exposed to view and painted.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- H. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.2 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

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 acoustical panels and exposed suspension systems for interior ceilings.

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. Samples: For each exposed product and for each color and texture specified.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.
- B. Product test reports.
- C. Research reports.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

- B. 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.

2.2 ACOUSTICAL PANEL CEILING **APC-1 (095113.A)**

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. USG Interiors, LLC, "Radar Basic."
- B. Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E 1264.
 - 1. Classification: Type III, Form 2, Pattern C E.
 - 2. Color: White.
 - 3. Light Reflectance (LR): 0.85.
 - 4. Ceiling Attenuation Class (CAC): 40.
 - 5. Noise Reduction Coefficient (NRC): 0.70.
 - 6. Edge/Joint Detail: Square.
 - 7. Thickness: 3/4 inch.
 - 8. Modular Size: 24 by 48 inches.

2.3 METAL SUSPENSION SYSTEM FOR **APC-1 (095113.B)**

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. USG Interiors, LLC, 15/16-inch "Donn Brand Dx Acoustical Suspension System."
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M.
 - 1. 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 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - a. Structural Classification: Intermediate-duty system.
 - b. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - c. Face Design: Flat, flush.
 - d. Cap Material: Cold-rolled steel.
 - e. Cap Finish: Flat white.

2.4 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. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.
- C. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

- D. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

2.5 METAL EDGE MOLDINGS AND TRIM (095113.C)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. USG Interiors, LLC.
- 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.

PART 3 - EXECUTION

3.1 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.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 - 3. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - 4. Install hold-down impact and seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

END OF SECTION 095113

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

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. Resilient wall base.
 - 2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE **RWB-#**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite; a Tarkett company; Traditional Toe Base, or a comparable product by one of the following:
 - 1. Flexco.
 - 2. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
 - 1. Group: I (solid, homogeneous).
 - 2. Style: Traditional Toe Base.
 - 3. Thermoplastic-rubber base is generally 0.125 inch (3.2 mm) thick; however, sculptured base thicknesses might vary.
 - 4. Thickness: 0.125 inch.
 - 5. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.
 - 6. Outside Corners:
 - a. Job formed where return at corner is 3-inches or greater.
 - b. Preformed where return at corner is less than 3-inches.
 - 7. Inside Corners: Job formed.

8. Height: 4-inches.
9. Color: Match Johnsonite color #168 “Thunder.”
10. Location: As indicated on Drawings.

2.2 RESILIENT MOLDING ACCESSORY **RMA-#**

A. **RMA-1 (096513.C):**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite; a Tarkett Company **SLIT-XX-A** Edge Guard, or comparable product by one of the following:
 - a. Roppe Corporation, USA.
 - b. VPI Corporation.
2. Description: Resilient transition strip from **CPT-1** to **LVT** (Luxury Vinyl Tile).
3. Color: Match Johnsonite color #168 “Thunder.”

2.3 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 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.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 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. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches 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 in length.
 - a. Miter or cope corners to minimize open joints.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

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SECTION 096519 - RESILIENT TILE FLOORING

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. Luxury Vinyl Floor Tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and pattern specified.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 LUXURY VINYL FLOOR TILE **VQT-#**

- A. Products: Subject to compliance with requirements, provide Interface Natural Stone A001.
- B. Tile Standard: ASTM F 1066, Class 2, through pattern.

- C. Wearing Surface: Manufacturer's standard.
- D. Thickness: 4.5mm.
- E. Size: 50cm x 50cm.
- F. Colors and Patterns:
 - 1. **LVT-1 (096519.A)**: Color "Botticino Marble".
- G. Finish: Ceramor

2.3 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. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 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 9.9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., 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 5 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 85 percent 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.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- 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 on Drawings.
- 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 as directed by Architect.
- 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. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. 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.

END OF SECTION 096519

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SECTION 096813 - TILE CARPETING

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. Modular carpet tile.
- B. Related Requirements:
 - 1. Section 033000 "Cast-In-Place Concrete" for substrate for carpet tile and walk-off mat.
 - 2. Section 096513 "Resilient Base and Accessories" for resilient base and flooring transition strips.

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 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. Transition details to other flooring materials.
- C. Samples: For each exposed product and for each color and texture required.

1.5 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

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 Period: Lifetime Limited Commercial.

PART 2 - PRODUCTS

2.1 CARPET TILE **CPT-1 (096813.A)**

- A. Products: Subject to compliance with requirements, provide Milliken and Company; "Textured Sky" Collection a Berkshire Hathaway company "No Rules" Collection.

- 1. Style: "Cloud Canopy."
- 2. Color: "Stratus."
- 3. Fiber Type: Universal Fibers SDN Type 6, 6.
- 4. Dye Method: 100% solution-dyed.
- 5. Construction: Tufted, Textured Loop TIP Sheer.
- 6. Weight: 28 oz./sq. yd.
- 7. Density: 8,553 oz./cu. yd.
- 8. Pile Height: .16"
- 9. Backing System: PVC-Free WellBac Comfort Plus Cushion.
- 10. Size: 19.7 by 19.7 inches.
- 11. Installation: Ashlar.
- 12. Applied Treatments:
 - a. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - b. Antimicrobial Treatment: Manufacturer's standard treatment.
- 13. Performance Characteristics:
 - a. Traffic Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.
 - b. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
 - c. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.2 CARPET TILE **CPT-2 (096813.B)**

- A. Products: Subject to compliance with requirements, provide Milliken and Company; "Textured Sky" Collection.
1. Collection: "Steppin Out."
 2. Style: Cloud Canary.
 3. Color: Monsoon
 4. Fiber Type: Universal Fibers SDN Type 6,6.
 5. Dye Method: 100% solution-dyed.
 6. Construction: Tufted, Textured Loop, Tip Sheer.
 7. Weight: 28 oz./sq. yd.
 8. Density: 8553 oz./cu. yd.
 9. Total Thickness: .16".
 10. Backing System: PVC-Free WellBac Comfort Plus Cushion.
 11. Size: 9.85 inches by 39.4 inches.
 12. Installation: Ashlar.
 13. Applied Treatments:
 - a. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - b. Antimicrobial Treatment: Manufacturer's standard treatment.
 14. Performance Characteristics:
 - a. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
 - b. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.3 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. Concrete Slabs:
1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. 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. in 24 hours.
 - 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.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI 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 wide or wider, and protrusions more than 1/32-inch 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. 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.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. 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.
- G. Install pattern parallel to walls and borders.
- H. 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 096813

SECTION 099123 - INTERIOR PAINTING

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 surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMUs).
 - 2. Steel and iron.
 - 3. Galvanized metal.
 - 4. Wood.
 - 5. Gypsum board.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
 - 2. Division 08 Sections "Hollow Metal Doors and Frames" and "Access Doors and Frames" for factory-primed doors and frames.
 - 3. Section 092900 "Gypsum Board" for substrates to be painted.
 - 4. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

- A. MPI Gloss Level 1 (Flat): Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3 (Eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4 (Satin): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5 (Semi-Gloss): 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6 (Gloss): 70 to 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Samples: For each type of paint system and in each color and gloss of topcoat.

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.

1.5 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. Paint: 5 percent, but not less than 1 gal. of each material, color, and gloss applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. Kelly-Moore Paint Company Inc.
3. PPG Paints.
4. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. 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.

C. Paint Color Schedule:

1. General and Gypsum Board Ceiling, and Hollow Metal Door Frame Paint Color P-1: Match Behr color "Polar Behr."
2. Accent Color P-2: Match Sherwin-Williams color #SW6516 "Down Pour."

2.3 PRIMERS/SEALERS

A. Interior Latex Primer/Sealer: MPI #50.

- B. Interior Latex Block Filler: MPI #4.

2.4 METAL STEEL PRIMER

- A. Quick Dry Primer (Alkyd): MPI #76.
- B. Anti-Corrosive Primer (Alkyd): MPI #79.
- C. Interior Alkyd Primer/Sealer: MPI #45.

2.5 LATEX PAINTS

- A. Latex: MPI #60, MPI #118, and MPI #133.
- B. High-Performance Architectural Latex MPI # 140 and MPI # 141.
- C. High-Performance Architectural Latex (Semi-gloss): MPI #141 (Gloss Level 5).

2.6 ALKYD PAINTS

- A. Interior Alkyd (Semi-gloss): MPI #47 (Gloss Level 5).
- B. Interior Alkyd (Gloss): MPI #48 (Gloss Level 6).

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. Concrete Masonry: 12 percent.
 - 2. Wood: 15 percent.
 - 3. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. 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.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete and Concrete Masonry Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Wood Substrates:
 - 1. Prime edges, ends, faces, undersides, and backsides of wood.
 - 2. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- H. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
 - 1. Pre-prime all surfaces to receive textile wall coverings.

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 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. Minimum total prime, intermediate, and top coat dry film thickness shall be 5.0 mils, and greater as required.
- 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.
- E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets
 - f. and outlets.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - i. Visible roof top mechanical equipment whether or not factory primed or finish coated.
 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 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.

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 INTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Alkyd System MPI INT 5.1E:

- a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.
 - 1) Benjamin Moore & Co.; Super Spec HP Alkyd Metal Primer P06/KP06.
 - 2) Kelly-Moore Paint Company Inc.; N/A.
 - 3)
 - 4) PPG Paints; PPG Paints: Speedhide Int/Ext Rust Inhibitive Steel Primers #6-212.
 - 5) Sherwin-Williams Company (The); Protective & Marine Kem Bond HS #B50WZ4.
- b. Prime Coat: Shop primer specified in Section where substrate is specified.
- c. Intermediate Coat: Alkyd, interior, matching topcoat.
- d. Topcoat: Alkyd, interior, semi-gloss (MPI Gloss Level 5), MPI #47.
 - 1) Benjamin Moore & Co.; Super Spec Alkyd Semi-Gloss Enamel #C271.
 - 2) Kelly-Moore Paint Company Inc.; 630 KELCOTE Interior Alkyd SG Enamel 1630 KELCOTE Interior Alkyd SG Enamel #1630111.
 - 3) PPG Paints; Glidden Professional (US) Alkyd Semi-Gloss Paint #1507.
 - 4) Sherwin-Williams Company (The); ProMar 200 Alkyd Semi-Gloss #B34W02251.

B. Wood Substrates: Wood casework and plywood backing panels.

1. High-Performance Architectural Latex System MPI INT 6.4S:

- a. Prime Coat: Primer, latex, for interior wood, MPI #39.
 - 1) Benjamin Moore & Co.; Fresh Start High Hiding All Purpose Primer #046/K046.
 - 2) Kelly-Moore Paint Company Inc.; KEL-BOND 295 KEL-BOND Acrylic Universal Primer #95100.
 - 3) PPG Paints: PPG Paints Gripper Stain Killer Primer #3210G.
 - 4) Sherwin-Williams Company (The); PrepRite ProBlock Primer Sealer #B51W00620.
- b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 4), MPI #140.

- 1) Benjamin Moore & Co.; Ultra Spec 500 Interior Semi-Gloss Finish #N539/K539.
- 2) Kelly-Moore Paint Company Inc.; 1687 Durapoxy Satin Enamel 121 Light Base Vapor Barrier Acrylic Primer & Finish #1687121.
- 3) PPG Paints; Glidden Diamond Interior Paint + Primer Satin #GLD7311.
- 4) Sherwin-Williams Company (The); N/A.

C. Gypsum Board Substrates:

1. High-Performance Architectural Latex System MPI INT 9.2B:

a. Prime Coat: Primer sealer, latex, interior, MPI #50.

- 1) Benjamin Moore & Co.; Super Spec Premium Interior Latex Primer #253/K253.
- 2) Kelly-Moore Paint Company Inc.; 971 AcryPlex Interior PVA Low Odor Primer Sealer #971100.
- 3) PPG Paints; PPG Paints High Hide Interior Primer Sealer #1000-1200G.
- 4) Sherwin-Williams Company (The); Pro Tech Interior Multi-Solution Latex Primer/Sealer #C152.

b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.

c. Topcoat on Ceilings: Latex, interior, high performance architectural (MPI Gloss Level 4), MPI #140.

- 1) Benjamin Moore & Co.; Ultra Spec 500 Interior Semi-Gloss Finish #N539/K539.
- 2) Kelly-Moore Paint Company Inc.; 1687 Durapoxy Satin Enamel 121 Light Base Vapor Barrier Acrylic Primer & Finish #1687121.
- 3) PPG Paints; Glidden Diamond Interior Paint + Primer Satin #GLD7311.
- 4) Sherwin-Williams Company (The); N/A.

d. Topcoat on Walls: Latex, interior, high performance architectural, semi-gloss (MPI Gloss Level 5), MPI #141.

- 1) Benjamin Moore & Co.; Ultra Spec HP DTM Acrylic Semi-Gloss Enamel #HP29/FP29.
- 2) Kelly-Moore Paint Company Inc.; DuraPoxy 100% Acrylic Semi-Gloss Enamel #1685-121.
- 3) PPG Paints; Timeless Interior Semi-Gloss Paint + Primer #PPG83-510.
- 4) Sherwin-Williams Company (The); Pro Industrial Acrylic Semi-Gloss Coating #B66W00651.

END OF SECTION 099123

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SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:
 - 1. Exterior Substrates:
 - a. Steel.
 - b. Galvanized metal.

1.2 DEFINITIONS

- A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of coating system and in each color and gloss of topcoat indicated.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated 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 coating system.
 - 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.

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. [Benjamin Moore & Co.](#)
2. [PPG Paints.](#)
3. [Rust-Oleum Corporation; a subsidiary of RPM International, Inc.](#)
4. [Sherwin-Williams Company \(The\).](#)

- B. Products: Subject to compliance with requirements, [provide product] [provide one of the products] [available products that may be incorporated into the Work include, but are not limited to products] listed in the Exterior High-Performance Coating Schedule or Interior High-Performance Coating Schedule for the coating category indicated.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. 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.
 3. Products shall be of same manufacturer for each coat in a coating system.
- C. Colors: As selected by Architect from manufacturer's full range.

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 coating 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 coatings, 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 coating systems indicated.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Steel Substrates:

1. Aliphatic Acrylic-Polyester Polyurethane over Organic Zinc-Rich Primer:
 - a. Prime Coat: Organic zinc rich primer, 5 mil minimum dry film thickness.
 - b. First and Second Topcoat: Aliphatic Acrylic-Polyester Polyurethane, Semi-Gloss.

END OF SECTION 099600

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SECTION 101423 - PANEL SIGNAGE

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. The following types of panel signage that are directly attached to the building:
 - a. Room Identification signage.
 - b. Building code required signage.

- B. Related Requirements:

- 1. Division 26 "Electrical" Sections for illuminated exit signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For panel signs.

- 1. Include fabrication and installation details and attachments to other work.
- 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
- 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image.
 - c. Separation or delamination of sheet materials and components.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 PANEL SIGNS

- A. Panel Sign with Window Insert (**101423.A**): Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Inpro SignScape, Inpro Corporation; Savannah Collection or a comparable product by one of the following:
 - a. ACE Sign Systems, Inc.
 - b. Advance Corporation.
 - c. ASI Sign Systems, Inc.
 - d. Inpro Corporation.
 - e. Mohawk Sign Systems.
 - f. Nelson-Harkins Industries.
 - g. Signs & Decal Corp.
- B. Plaque material shall consist Rigid Vinyl.
 - 1. For exterior signs, provide acrylic sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- C. Lettering style shall be Heleveltica, upper case, or other sans serif or simple serif typeface.
- D. Sizes of letters and numbers shall be as follows:
 - 1. Room numbers shall be 5/8-inch high.
 - 2. Lettering for room usage and directional identification shall be 5/8-inch high.
- E. Letters and numbers shall be centered on sign.

- F. Grade 2 braille shall be placed directly below last line of letters or numbers, except for room number signs, where they shall be placed directly behind the last number.
- G. Edge Condition: Square cut.
- H. Radius corners: 1/2-inch.
- I. Sign Colors – Typical: Black letters and graphic symbols on Designer White 0101 Faceplate, on Backplate in color: Applewood 0537.
- J. Mounting: Manufacturer's standard method for surface-mounting to substrates indicated with countersunk flathead through fasteners, adhesive, or two-face tape. Any signage mounted on glazing shall have a blank signage attached at opposite side of glass.

2.3 SIGN SIZE

- A. Room identification signs shall be 6 x 8-inches.
- B. International symbol of accessibility sign shall be 6 x 6-inches.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
 - 2. For exterior exposure, furnish nonferrous-metal or stainless-steel devices unless otherwise indicated.
 - 3. Sign Mounting Fasteners:
 - a. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, and installed in predrilled holes.
- B. Adhesive: As recommended by sign manufacturer.
- C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 - 2. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Engraved copy in "Surface-Engraved Graphics" Paragraph below does not leave raised text.

- C. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into indicated sign surface to produce precisely formed copy, incised to uniform depth.
 - 1. Engraved Plastic Laminate: Engrave through exposed face ply of plastic-laminate sheet to expose contrasting core ply.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
 - 1. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
 - 2. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
 - 3. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position and push to engage tape adhesive.
- D. Remove temporary protective coverings and strippable films as signs are installed.

3.2 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.3 SIGNAGE SCHEDULES

SIGNAGE SCHEDULE					
DOOR NUMBER	ROOM NUMBER	SIGN COPY	BRAILLE	GRAPHIC SYMBOL	SIGN TYPE
100A	EXTERIOR	N/A		INTERNATIONAL SYMBOL OF ACCESSIBILITY	BUILDING ENTRANCE
102	102	ATHLETIC DIRECTOR	X	N/A	ROOM IDENTIFICATION
103	103	VICE PRINCIPAL	X	N/A	ROOM IDENTIFICATION
109	109	CONFERENCE ROOM	X	N/A	ROOM IDENTIFICATION
110	110	PRINICIPAL	X	N/A	ROOM IDENTIFICATION

END OF SECTION 101423

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SECTION 122413 - 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.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.

1.6 WARRANTY

- A. Roller Shade Hardware and Chain Warranty: Manufacturer's standards non-depreciating twenty-five year limited warranty.
- B. Shadecloth: Manufacturer's standard twenty-five year warranty.
- C. Roller Shade Installation: One year from date of Substantial Completion.

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 (122413.A)

- A. **Manufacturers:** Basis of Design Manufacturer, MechoShade Systems, Inc., Bottom-Up Roller Shade. 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. [Draper Inc.](#)
 2. [Hunter Douglas Contract.](#)
 3. [Insolroll Window Shading Systems.](#)
 4. [Levolor.](#)
 5. [OEM Shades Inc.](#)
 6. [Qmotion Shades.](#)
 7. [Rollease Acmeda, Inc.](#)
 8. [TimberBlindMetroShade.](#)
- 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. Chain-Retainer Type: Firmly attached to sill or jamb.
 2. Spring Lift-Assist Mechanisms: Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Crank-and-Gear Operating Mechanisms: Sealed gearbox drive system controlled by permanently mounted crank handle.
- D. 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: Left or right side of interior face of shade.
 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
- E. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- F. 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.
- G. Shadebands:
1. Shadeband Material: Light-filtering fabric.
 2. Shadeband Top (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Exposed with endcaps.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.

H. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism, both at the head and sill, and attaches to roller endcaps without exposed fasteners.
2. Endcap Covers: To cover exposed endcaps.
3. Top (Head) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
4. 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.
 2. Orientation on Shadeband: Up the bolt.
 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
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
 2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- 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.
 2. Skylight Shades: Provide battens and seams at uniform spacings along shadeband as required to ensure shadeband tracking and alignment through its full range of movement without distortion or sag of material.
 3. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- D. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

SECTION 230501 – COMMON HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.
- B. It is the intent of these specifications that the systems specified herein are to be complete and operational before being turned over to the owner. During the bidding process, the contractor is to ask questions or call to the engineer's attention any items that are not shown or may be required to make the system complete and operational. Once the project is bid and the contractor has accepted the contract, it is his responsibility to furnish and install all equipment and parts necessary to provide a complete and operational system without additional cost to the owner.
- C. Furnish and install fire stopping materials to seal penetrations through fire rated structures and draft stops.
- D. Includes But Not Limited To:
 - 1. General procedures and requirements for HVAC.
- E. Related Sections:
 - 1. Section 23 0593: Testing, Adjusting, and Balancing for HVAC.

1.3 SUBMITTALS

- A. Substitutions: By specific designation and description, standards are established for specialties and equipment. Other makes of specialties and equipment of equal quality will be considered provided such proposed substitutions are submitted to the Architect for his approval, complete with specification data showing how it meets the specifications, at least 5 working days prior to bid opening. A list of approved substitutions will be published as an addendum.
 - 1. Submit a single copy of Manufacturer's catalog data including Manufacturer's complete specification for each proposed substitution.
 - 2. The Architect or Engineer is to be the sole judge as to the quality of any material offered as an equal.
- B. Product Data, Shop Drawings: Within 30 days after award of contract, submit 10 sets of Manufacturer's catalog data for each manufactured item.
 - 1. Literature shall include enough information to show complete compliance with Contract Document requirements.
 - 2. Mark literature to indicate specific item with applicable data underlined.
 - 3. Information shall include but not be limited to capacities, ratings, type of material used, guarantee, and such dimensions as are necessary to check space requirements.
 - 4. When accepted, submittal shall be an addition to Contract Documents and shall be in equal force. No variation shall be permitted.
 - 5. Even though the submittals have been accepted by the Engineer, it does not relieve the contractor from meeting all of the requirements of the plans and specifications and providing a complete and operational system.

- C. Drawings of Record: One complete sets of blue line mechanical drawings shall be provided for the purpose of showing a complete picture of the work as actually installed.
 - 1. These drawings shall serve as work progress report sheets. Contractor shall make notations neat and legible therein daily as the work proceeds.
 - 2. The drawings shall be kept at the job at a location designated by the Mechanical Engineer.
 - 3. At completion of the project these "as-built" drawings shall be signed by the Contractor, dated, and returned to the Architect.

- D. Operating Instructions and Service Manual: The Mechanical Contractor shall prepare 2 copies of an Operation and Maintenance Manual for all mechanical systems and equipment used in this project. Manuals shall be bound in hard-backed binders and the front cover and spine of each binder shall indicate the name and location of the project. Use plastic tab indexes for all sections. Provide a section for each different type of equipment item. The following items shall be included in the manual, together with any other pertinent data. This list is not complete and is to be used as a guide.
 - 1. Provide a master index at the beginning of the manual showing all items included.
 - 2. The first section of the manual shall contain:
 - a. Names, addresses, and telephone numbers of Architect, Mechanical Engineer, Electrical Engineer, General Contractor, Plumbing Contractor, Sheet Metal Contractor, and Temperature Control Contractor.
 - b. List of Suppliers which shall include a complete list of each piece of equipment used with the name, address, and telephone number of vendor.
 - c. General Description of Systems including –
 - 1) Location of all major equipment
 - 2) Description of the various mechanical systems
 - 3) Description of operation and control of the mechanical systems
 - 4) Suggested maintenance schedule
 - d. Copy of contractor's written warranty
 - 3. Provide a copy of approved submittal literature for each piece of equipment.
 - 4. Provide maintenance and operation literature published by the manufacturer for each piece of equipment which includes: oiling, lubrication and greasing data; belt sizes, types and lengths; wiring diagrams; step-by-step procedure to follow in putting each piece of mechanical equipment in operation.
 - 5. Include parts numbers of all replaceable items.
 - 6. Provide control diagram and operation sequence, along with labeling of control piping and instruments to match diagram.
 - 7. Include a valve chart indicating valve locations.

- E. Include air balance and/or water balance reports.

1.4 SUBMITTALS FOR COMMON HVAC REQUIREMENTS

- A. Samples: Sealer and gauze proposed for sealing ductwork.

- B. Quality Assurance / Control:
 - 1. Manufacturer's installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.
 - 2. Specification data on sealer and gauze proposed for sealing ductwork.

- C. Quality Assurance
 - 1. Requirements: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA HVAC Duct Construction Standards.
 - 2. Pre-Installation Conference: Schedule conference immediately before installation of ductwork.

1.5 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Perform work in accordance with applicable provisions of local and state Plumbing Code, Gas Ordinances, and adoptions thereof. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
 - 2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Architect in writing of such differences.

- B. Applicable Specifications: Referenced specifications, standards, and publications shall be of the issues in effect on date of Advertisement for Bid.
 - 1. "Heating, Ventilating and Air Conditioning Guide" published by the American Society of Heating and Air Conditioning Engineers.
 - 2. "Engineering Standards" published by the Heating, Piping, and Air Conditioning Contractors National Association.
 - 3. "2015 International Building Code", "2015 International Mechanical Code", "2015 International Plumbing Code" and "2015 International Fire Code" as published by the International Conference of Building Officials.
 - 4. "National Electrical Code" as published by the National Fire Protection Association.
 - 5. "2015 International Energy Conservation Code".

- C. Identification: Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when Project is turned over to Owner.

1.6 INSPECTIONS AND PERMITS

- A. Pay for permits, fees, or charges for inspection or other services. Local and state codes and ordinances must be properly executed without expense to Owner and are considered as minimum requirements. Local and state codes and ordinances do not relieve the Contractor from work shown that exceeds minimum requirements.

1.7 ADDITIONAL WORK:

- A. Design is based on equipment as described in the drawing equipment schedule. Any change in foundation bases, electrical wiring, conduit connections, piping, controls and openings required by alternate equipment submitted and approved shall be paid for by this division. All work shall be in accordance with the requirements of the applicable sections.

PART 2 - PRODUCTS FOR COMMON HVAC REQUIREMENTS

- A. Finishes, Where Applicable: Colors as selected by Architect.

- B. Duct Hangers:
 - 1. One inch 25 mm by 18 ga 1.27 mm galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches 2 400 mm apart. Do not use wire hangers.
 - 2. Attaching screws at trusses shall be 2 inch 50 mm No. 10 round head wood screws. Nails not allowed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Inspection:

1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.
2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

B. Drawings:

1. Mechanical drawings show general arrangement of piping, ductwork, equipment, etc, and do not attempt to show complete details of building construction which affect installation. This Contractor shall refer to architectural, structural, and electrical drawings for additional building detail which affect installation of his work.
 - a. Follow mechanical drawings as closely as actual building construction and work of other trades will permit.
 - b. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work or where minor changes are necessary to facilitate installation.
 - c. Everything shown on the mechanical drawings shall be the responsibility of Mechanical Contractor unless specifically noted otherwise.
2. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over mechanical drawings.
3. Because of small scale of mechanical drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions. Do not scale drawings for locations of equipment or piping. Refer to large scale dimensioned drawings for exact locations.

C. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.

1. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.
2. If non-specified equipment is used and it will not fit job site conditions, this Contractor assumes responsibility for replacement with items named in Contract Documents.

3.2 PREPARATION

- A. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
 2. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
 3. Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.

3.3 INSTALLATION

- A. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

3.4 STORAGE AND PROTECTION OF MATERIALS:

- A. Provide storage space for storage of materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public

thoroughfare.

- B. Protect completed work, work underway, and materials against loss or damage.
- C. Close pipe openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt, or injury caused by water, chemical, or mechanical accident.

3.5 EXCAVATION AND BACKFILL

- A. Perform necessary excavation of whatever substance encountered for proper laying of all pipes and underground ducts.
 - 1. Excavated materials not required for fill shall be removed from site as directed by Engineer.
 - 2. Excavation shall be carried low enough to allow a minimum coverage over underground piping of 5'-0" or to be below local frost level.
 - 3. Excess excavation below required level shall be backfilled at Contractor's expense with earth, sand, or gravel as directed by Engineer. Tamp ground thoroughly.
 - 4. Ground adjacent to all excavations shall be graded to prevent water running into excavated areas.
- B. Backfill pipe trenches and allow for settlement.
 - 1. Backfill shall be mechanically compacted to same density as surrounding undisturbed earth.
 - 2. Cinders shall not be used in backfilling where steel or iron pipe is used.
 - 3. No backfilling shall be done until installation has been approved by the Engineer.

3.6 COOPERATION

- A. Cooperate with other crafts in coordination of work. Promptly respond when notified that construction is ready for installation of work under Division 23000. Contractor will be held responsible for any delays which might be caused by his negligence or failure to cooperate with the other Contractors or crafts.

3.7 SUPERVISION

- A. Provide a competent superintendent in charge of the work at all times. Anyone found incompetent shall be removed at once and replaced by someone satisfactory, when requested by the Architect.

3.8 INSTALLATION CHECK:

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment indicated in the equipment schedule shall visit the project to inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the project as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the Engineer.
- B. Each equipment supplier's representative shall furnish to the Owner, through the Engineer, a written report certifying the following:
 - 1. Equipment has been properly installed and lubricated.
 - 2. Equipment is in accurate alignment.
 - 3. Equipment is free from any undue stress imposed by connecting piping or anchor bolts.
 - 4. Equipment has been operated under full load conditions.
 - 5. Equipment operated satisfactorily.

- C. All costs for this installation check shall be included in the prices quoted by equipment suppliers.

3.9 CLEANING EQUIPMENT AND PREMISES

- A. Properly lubricate equipment before Owner's acceptance.
- B. Clean exposed piping, ductwork, equipment, and fixtures. Repair damaged finishes and leave everything in working order.
- C. Remove stickers from fixtures and adjust flush valves.
- D. At date of Substantial Completion, air filters shall be new, clean, and approved by Owner's representative.
- E. Trap elements shall be removed during cleaning and flushing period. Replace trap elements and adjust after cleaning and flushing period.

3.10 TESTS

- A. No piping work, fixtures, or equipment shall be concealed or covered until they have been inspected and approved by the inspector. Notify inspector when the work is ready for inspection.
- B. All work shall be completely installed, tested as required by Contract Documents and the city and county ordinances and shall be leak-tight before the inspection is requested.
- C. Tests shall be repeated to the satisfaction of those making the inspections.
- D. Water piping shall be flushed out, tested at 100 psi and left under pressure of supply main or a minimum of 40 psi for the balance of the construction period.

3.11 WARRANTY

- A. Contractor shall guarantee work under Division 23 to be free from inherent defects for a period of one year from acceptance.
 - 1. Contractor shall repair, revise or replace any and all such leaks, failure or inoperativeness due to defective work, materials, or parts free of charge for a period of one year from final acceptance, provided such defect is not due to carelessness in operation or maintenance.
 - 2. In addition, the Contractor shall furnish all refrigeration emergency repairs, emergency service and all refrigerant required due to defective workmanship, materials, or parts for a period of one year from final acceptance at no cost to the Owner, provided such repairs, service and refrigerant are not caused by lack of proper operation and maintenance.
- B. In addition to warranty specified in General Conditions, heating, cooling, and plumbing systems are to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

3.12 SYSTEM START-UP, OWNER'S INSTRUCTIONS

- A. Off-Season Start-up
 - 1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
 - 2. Notify Owner 7 days minimum before scheduled start-up.

3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.

B. Owner's Instructions

1. Instruct building maintenance personnel and Owner Representative in operation and maintenance of mechanical systems utilizing Operation & Maintenance Manual when so doing.
2. Minimum instruction periods shall be as follows –
 - a. Mechanical - Four hours.
 - b. Temperature Control - Four hours.
 - c. Refrigeration - Two hours.
3. Instruction periods shall occur after Substantial Completion inspection when systems are properly working and before final payment is made.
4. None of these instructional periods shall overlap another.

3.13 PROTECTION

- A. Do not run heat pump, air handling units, fan coil units, or other pieces of equipment used for moving supply air without proper air filters installed properly in system.
- B. The mechanical systems are not designed to be used for temporary construction heat. If any equipment is to be started prior to testing and substantial completion, such equipment will be returned to new condition with full one year warranties, from date of substantial completion after any construction use. This includes, but is not necessarily limited to: Equipment, filters, ductwork, fixtures, etc.

3.14 COMMON HVAC REQUIREMENTS:

A. INSTALLATION

1. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.
2. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.
3. Hangers And Supports:
 - a. Install pair of hangers close to each transverse joint and elsewhere as required by spacing indicated in table on Drawings.
 - b. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
 - c. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
 - d. Where hangers are secured to forms before concrete slabs are poured, cut off flush all nails, strap ends, and other projections after forms are removed.
 - e. Secure vertical ducts passing through floors by extending bracing angles to rest firmly on floors without loose blocking or shimming. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

B. CLEANING

1. Clean interior of duct systems before final completion.

END OF SECTION 230501

SECTION 230502 - DEMOLITION AND REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Under this section remove obsolete piping and mechanical equipment and relocate, reconnect or replace existing piping affected by demolition or new construction. Remove concealed piping abandoned due to demolition or new construction, or cap piping flush with existing surfaces.

1.3 DRAWINGS AND EXISTING CONDITIONS

- A. All relocations, reconnections and removals are not necessarily indicated on the drawings. As such, the Contractor shall make adequate allowance in his proposal for this work as no extra charges will be allowed for these items.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 TEMPORARY CONNECTIONS

- A. Where existing piping must remain in service to supply occupied areas during construction, provide temporary piping, connections, and equipment to maintain service to such areas. All shall be performed in a neat and safe manner to prevent injury to the building or its occupants.

3.2 EXISTING TO BE ABANDONED

- A. All required drilling, cutting, block-outs and demolition work required for the removal and/or installation of the mechanical system is the responsibility of this Contractor.
- B. No joists, beams, girders, trusses or columns shall be cut by any Contractor without written permission from the Architect.
- C. The patching, repair, and finishing to existing or new surfaces is the responsibility of this Contractor, unless specifically called for under sections of specifications covering these materials.
- D. Disconnect all equipment that is to be removed or relocated. Relocate any existing equipment that obstructs new construction.

3.3 EXISTING TO REMAIN IN USE

- A. Where affected by demolition or new construction, relocate, replace, extend, or repair piping and equipment to allow continued use of same. Use methods and materials as specified for new construction.

3.4 MATERIALS AND EQUIPMENT REMOVED

- A. All obsolete materials, piping, and equipment shall become the property of the Contractor and be removed from the site promptly.

END OF SECTION 230502

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install identification of equipment and piping as described in Contract Documents.
- B. Mechanical Contractor shall touch-up equipment where factory paint has been damaged. Repaint entire item where more than 20 percent of the surface is involved.
- C. Primary painting of walls, ceilings, ductwork, piping and plenums is covered in the general painting section of these Contract Documents.

PART 2 - PRODUCTS

2.1 PAINT

- A. Benjamin Moore Impervo or equivalent by Paint Manufacturer approved in Section 09 900.
- B. Use appropriate primer.

2.2 LABELS

- A. Black Formica with white reveal on engraving.

2.3 CODED BANDS

- A. Using colored bands and arrows to indicate supply and return, with colored reflective tape, color code all piping installed in this contract at not more than 20-foot intervals, at equipment, at walls, etc., in accordance with ANSI Standards.
- B. Approved Manufacturers:
 - 1. Seton
 - 2. Craftmark

2.4 PIPE IDENTIFICATION

- A. In addition to the colored bands, stencil with black paint in 1/2 inch high letters a symbol and directional arrow for all fluids handled or use Seaton coded and colored pipe markers and arrows to meet ANSI Standards.

2.5 EQUIPMENT IDENTIFICATION

- A. Provide an engraved plastic plate for each piece of equipment stating the name of the item, symbol number, area served, and capacity. Label all control components with plastic embossed mechanically attached labels. Sample:
 - 1. Supply Fan SF-1 - North Classrooms
 - 2. 10,000 CFM @ 2.5"

PART 3 - EXECUTION

3.1 APPLICATION

A. Engraved Plates:

1. Identify thermostats and control panels in mechanical rooms, furnaces, boilers and hot water heating specialties, duct furnaces, air handling units, electric duct heaters, and condensing units with following data engraved and fastened to equipment with screws –
 - a. Equipment mark noted on Drawings (i.e., SF-1)
 - b. Area served (i.e., North Classrooms)
 - c. Capacity (10,000 CFM @ 2.5)

END OF SECTION 230553

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Division 23 0501 - Common HVAC Requirements and Basic Mechanical Materials and Methods Sections apply to work of this section.

1.2 SUMMARY SCOPE

- A. This Section includes TAB to produce design objectives for the following:
 - 1. Air Systems.
 - a. Heat Pumps.
 - 2. Hydronic Piping Systems.
 - a. Heat Pumps

1.3 SUBMITTALS

- A. Agency Data:
 - 1. Submit proof that the proposed testing, adjusting, and balancing agency meets the qualifications specified below. The firm or individuals performing the work herein specified may not be the installing firm.
- B. Engineer and Technicians Data:
 - 1. Submit proof that the Test and Balance Engineer assigned to supervise the procedures, and the technicians proposed to perform the procedures meet the qualifications specified below.
- C. Procedures and Agenda: Submit a synopsis of the testing, adjusting, and balancing procedures and agenda proposed to be used for this project.
- D. Sample Forms: Submit sample forms, if other than those standard forms prepared by the AABC or NEBB are proposed.
- E. Certified Reports: Submit testing, adjusting, and balancing reports bearing the seal and signature of the Test and Balance Engineer. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting, and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems. Follow the procedures and format specified below.
 - 1. Draft Reports: Upon completion of testing, adjusting, and balancing procedures, prepare draft reports on the approved forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports in the same manner specified for the final reports. Submit 2 complete sets of draft reports. Only 1 complete set of draft reports will be returned.
 - 2. Final Report: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 4 complete sets of final reports.
 - 3. Report Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data. Divide the contents of the binder into the below listed divisions, separated by divider tabs:
 - a. General Information and Summary

- b. Air Systems
 - c. Temperature Control System Verification.
- F. Report Contents: Provide the following minimum information, forms, and data:
- 1. General information and Summary: Inside cover sheet to identify testing, adjusting, balancing agency, Contractor, Owner, Engineer, and Project. Include addresses and contact names and telephone numbers. Also include a certification sheet containing the seal and name, address, telephone number, and signature of the Certified Test and Balance Engineer. Include in this division a listing of the instrumentation used for the procedures along with the instrument calibration sheet.
 - 2. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC or NEBB, for each respective item and system. Prepare a schematic diagram for each item of equipment and system to accompany each respective report form. The report shall contain the following information, and all other data resulting from the testing, adjusting, and balancing work:
 - a. All nameplate and specification data for all air handling equipment and motors.
 - b. Actual metered running amperage for each phase of each motor on all pumps and air handling equipment.
 - c. Actual metered voltage at air handling equipment (phase-to-phase for all phases).
 - d. Fan RPM for each piece of air handling equipment.
 - e. Total actual CFM being handled by each piece of air handling equipment.
 - f. Actual CFM of systems by rooms.
 - 3. Certify that all smoke and fire dampers operate properly and can be reset under actual system operating conditions.
- G. Calibration Reports:
- 1. Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

1.4 CERTIFICATION

- A. Agency Qualifications:
- 1. Employ the services of a certified testing, adjusting, and balancing agency meeting the qualifications specified below, to be the single source of responsibility to test, adjust, and balance the building mechanical systems identified above, to produce the design objectives. Services shall include checking installations for conformity to design, measurement, and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, recording and reporting the results, and operation of all systems to demonstrate satisfactory performance to the owner.
 - 2. The testing, adjusting, and balancing agency certified by National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC) in those testing and balancing disciplines required for this project, and having at least one person certified by NEBB or AABC as a Test and Balance supervisor, and a registered professional mechanical engineer, licensed in the state where the work will be performed.
- B. Codes and Standard:
- 1. NEBB: "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
 - 2. AABC: "National Standards for Total System Balance."
 - 3. ASHRAE: ASHRAE Handbook, 1984 Systems Volume, Chapter 37, Testing, Adjusting, and Balancing.

1.5 PROJECT CONDITIONS

- A. Systems Operation: Systems shall be fully operation and clean prior to beginning procedures.

1.6 SEQUENCING AND SCHEDULING

- A. Test, adjust, and balance the air systems before hydronic, steam, and refrigerant systems within +10% to -5% of contract requirements.
- B. The report shall be approved by the Engineer. Test and balance shall be performed prior to substantial completion.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 PRELIMINARY PROCEDURES FOR AIR SYSTEM BALANCING

- A. Before operating the system, perform these steps.
 - 1. Obtain design drawings and specifications and become thoroughly acquainted with the design intent.
 - 2. Obtain copies of approved shop drawings of all air handling equipment, outlets (supply, return, and exhaust) and temperature control diagrams.
 - 3. Compare design to installed equipment and field installations.
 - 4. Walk the system from the system air handling equipment to terminal units to determine variations of installation from design.
 - 5. Check filters for cleanliness and to determine if they are the type specified.
 - 6. Check dampers (both volume and fire) for correct and locked position. Check automatic operating and safety controls and devices to determine that they are properly connected, functioning, and at proper operating setpoint.
 - 7. Prepare report test sheets for both fans and outlets. Obtain manufacturer's outlet factors and recommended procedures for testing. Prepare a summation of required outlet volumes to permit a cross-check with required fan volumes.
 - 8. Determine best locations in main and branch ductwork for most accurate duct traverses.
 - 9. Place outlet dampers in the full open position.
 - 10. Prepare schematic diagrams of system "As-Built" ductwork and piping layouts to facilitate reporting.
 - 11. Lubricate all motors and bearings.
 - 12. Check fan belt tension.
 - 13. Check fan rotation.

3.2 PROCEDURES FOR HYDRONIC SYSTEMS

- A. Measure water flow at pumps. Use the following procedures, except for positive-displacement pumps:
 - 1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - 2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.
 - 3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
 - 4. Report flow rates that are not within plus or minus 5 percent of design.
- B. Set calibrated balancing valves, if installed, at calculated presettings.

- C. Measure flow at all stations and adjust, where necessary, to obtain first balance.
 - 1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.
- D. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.
- E. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:
 - 1. Determine the balancing station with the highest percentage over indicated flow.
 - 2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
 - 3. Record settings and mark balancing devices.
- F. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.
- G. Measure the differential-pressure control valve settings existing at the conclusions of balancing.

3.3 MEASUREMENTS

- A. Provide all required instrumentation to obtain proper measurements, calibrated to the tolerances specified in the referenced standards. Instruments shall be properly maintained and protected against damage.
- B. Provide instruments meeting the specifications of the referenced standards.
- C. Use only those instruments which have the maximum field measuring accuracy and are best suited to the function being measured.
- D. Apply instrument as recommended by the manufacturer.
- E. Use instruments with minimum scale and maximum subdivisions and with scale ranges proper for the value being measured.
- F. When averaging values, take a sufficient quantity of readings which will result in a repeatability error of less than 5%. When measuring a single point, repeat readings until 2 consecutive identical values are obtained.
- G. Take all readings with the eye at the level of the indicated value to prevent parallax.
- H. Use pulsation dampeners where necessary to eliminate error involved in estimating average of rapidly fluctuation readings.
- I. Take measurements in the system where best suited to the task.

3.4 PERFORMING TESTING, ADJUSTING, AND BALANCING

- A. Perform testing and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards. Balancing of the air systems and hydronic systems shall be achieved by adjusting the automatic controls, balancing valves, dampers, air terminal devices, and the fan/motor drives within each system.
- B. Cut insulation, ductwork, and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.

- C. Patch insulation, ductwork, and housings, using materials identical to those removed.
- D. Seal ducts and piping, and test for and repair leaks.
- E. Seal insulation to re-establish integrity of the vapor barrier.
- F. Adjust timing relays of environmental equipment motor reduced voltage starters to the optimum time period for the motor to come up to the maximum reduced voltage speed and then transition to the full voltage speed to prevent damage to motor, and to limit starting current spike to the lowest possible and practical.
- G. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.
- H. Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

3.5 RECORD AND REPORT DATA

- A. Record all data obtained during testing, adjusting, and balancing in accordance with, and on the forms recommended by the referenced standards, and as approved on the sample report forms.
- B. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.
- C. Report shall be certified and stamped by a registered professional mechanical engineer employed by the agency and licensed in the state where the work will be performed.
- D. Engineer is to provide a floor plan and test and balance contractor to include the plan in test and balance report and identify actual cfm on drawing or number the diffusers to match report.

3.6 DEMONSTRATION

- A. If requested, testing, adjusting, and balancing agency shall conduct any or all of the field tests in the presence of the engineer.
- B. Agency shall include a maximum of one (1) call back to the project within the one year warranty period to make additional adjustments if requested by the engineer.

END OF SECTION 230593

SECTION 230712 - MECHANICAL INSULATION AND FIRE STOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install mechanical insulation and fire stopping as described in Contract Documents including but not limited to the following:
 - 1. Ductwork Insulation
 - 2. Fire Stopping

1.3 QUALITY ASSURANCE

- A. Insulation shall have composite (insulation, jacket or facing and adhesive used to adhere facing or jacket to insulation) fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255 and UL 723 not exceeding: Flame Spread of 25 and Smoke Developed of 50.
- B. Insulation Contractor shall certify in writing, prior to installation, that all products to be used will meet the above criteria.
- C. Accessories, such as adhesives, mastics, cements, and tapes, for fittings shall have the same component ratings as listed above.
- D. Products, or their shipping cartons, shall bear a label indicating that flame and smoke ratings do not exceed above requirements.
- E. Any treatment of jacket or facings to impart flame and smoke safety shall be permanent.
- F. The use of water-soluble treatments is prohibited.

END OF SECTION 230712

SECTION 230716 - DUCTWORK INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install insulation on air ducts outside building insulation envelope as described in Contract Documents.
- B. Furnish and install insulation on fresh air ducts and combustion air ducts within building insulation envelope as described in Contract Documents.
- C. Furnish and install insulation on other air ducts where indicated on Drawings.

PART 2 - PRODUCTS

2.1 INSULATION

- A. 1-1/2 inch thick fiberglass with aluminum foil scrim kraft facing and have a density of one lb/cu ft.
- B. Approved Manufacturers:
 - 1. Manville Microlite FSK
 - 2. CSG Type IV standard duct insulation
 - 3. Owens-Corning FRK
 - 4. Knauf (Duct Wrap FSK)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct wrap in accordance with Manufacturer's recommendations.
- B. Do not compress insulation except in areas of structural interference.
- C. Completely seal joints.

END OF SECTION 230716

SECTION 230717 – ROUND SUPPLY DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install round supply duct insulation as described in Contract Documents.

1.3 QUALITY ASSURANCE

- A. Insulation shall be UL rated with FSK (foil-skrim-kraft) facing.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Fiberglass blanket insulation
- B. Approved Manufacturers:
 1. Johns-Manville R-4 Microlite (R-4 does not include the vapor barrier material).
 2. Owens-Corning faced duct wrap insulation FRK-25 ED-150
 3. Certainteed Standard Duct Wrap.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Insulate round air supply ducts.
- B. Facing shall overlap 2" at joints and shall be secured with outward clinch staples on 4" centers.
- C. Ducts over 30" in width shall have spot application of adhesive, weld pins or metal screws and caps on not more than 18" centers applied to underside.
- D. 3" wide vapor barrier paper shall be applied over seams and sealed with vapor barrier adhesive.
- E. Insulate attenuators.
- F. Insulate high and low pressure flex ducts.

END OF SECTION 230717

SECTION 230718 - DUCT LINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install acoustic lining in following above ground metal ductwork as described in Contract Documents unless detailed otherwise:
 1. Outside air
 2. Supply air
 3. Return air
 4. Mixed air
 5. Transfer air
 6. Relief air
 7. Elbows, fittings, and diffuser drops greater than 12 inches in length.

1.3 SYSTEM DESCRIPTION

- A. Duct dimensions shown on Drawings are for free area inside insulation. Allowance must be made for insulation, where applicable.

1.4 RATINGS:

- A. Material shall have maximum air friction correction factor of 1.10 at 1000 FPM velocity and have a minimum sound absorption coefficient NRC of .60.

PART 2 - PRODUCTS

2.1 DUCT LINER

- A. One inch thick, 1-1/2 lb density fiberglass, factory edge coated.
- B. Duct lining materials are to meet the requirements of UL 181 for mold, humidity, and erosion resistance.
- C. Approved Manufacturers:
 1. Certaineed Ultralite 150 Certa Edge Coat
 2. Knauf - Type M
 3. Manville - Lina-Coustic
 4. Owen Corning Fiberglas - Aeroflex

2.2 ADHESIVE

- A. Water Base Type:
 1. Cain - Hydrotak
 2. Duro Dyne - WSA
 3. Kingco - 10-568
 4. Miracle - PF-101
 5. Mon-Eco - 22-67
 6. Techno Adhesive - 133

- B. Solvent Base (non-flammable) Type:
 - 1. Cain - Safetak
 - 2. Duro Dyne - FPG
 - 3. Kingco - 15-137
 - 4. Miracle - PF-91
 - 5. Mon-Eco - 22-24
 - 6. Techno Adhesive - 'Non-Flam' 106

- C. Solvent Base (flammable) Type:
 - 1. Cain - HV200
 - 2. Duro Dyne - MPG
 - 3. Kingco - 15-146
 - 4. Miracle - PF-96
 - 5. Mon-Eco - 22-22
 - 6. Techno Adhesive - 'Flammable' 106

2.3 FASTENERS

- A. Adhesively secured fasteners not allowed.

- B. Approved Manufacturers:
 - 1. AGM Industries Inc - "DynaPoint" Series DD-9 pin
 - 2. Cain
 - 3. Duro Dyne
 - 4. Omark dished head "Insul-Pins"
 - 5. Grip nails may be used if each nail is installed by "Grip Nail Air Hammer" or by "Automatic Fastener Equipment" in accordance with Manufacturer's recommendations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install mat finish surface on air stream side. Secure insulation to cleaned sheet metal duct with continuous 100% coat of adhesive and with 3/4 inch long mechanical fasteners 12 inches on center maximum unless detailed otherwise on Drawings. Pin all duct liner.

- B. Accurately cut liner and thoroughly coat ends with adhesive. Butt joints tightly. Top and bottom sections of insulation shall overlap sides. If liner is all one piece, folded corners shall be tight against metal. Ends shall butt tightly together.

- C. In casings and plenums further contain insulation with wire mesh.

3.2 FIELD QUALITY CONTROL

- A. If insulation is installed without longitudinal and end joints butted together, installation will be rejected and work removed and replaced with work that conforms to this Specification.

- B. Insulation shall be installed in accordance with Duct Liner Application Standard SMACNA Manual 15.

3.3 ADJUSTING, CLEANING

- A. Keep duct liner clean and free from dust. At completion of project, vacuum duct liner if it is dirty or dusty.

END OF SECTION 230718

SECTION 230800 – FIRE STOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install fire stopping as described in Contract Documents.

1.3 QUALITY ASSURANCE

- A. Fire stopping material shall meet ASTM E814, E84 and be UL listed.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Material shall be flexible, long lasting, intumescent acrylic seal to accommodate vibration and building movement.
- B. Caulk simple penetrations with gaps of 1/4" or less with:
 - 1. Dow Corning Fire Stop Sealant
 - 2. Pensil 300
- C. Caulk multiple penetrations and/or penetrations with gaps in excess of 1/4" with:
 - 1. Dow Corning Fire Stop Foam
 - 2. Pensil 200
 - 3. IPC flame safe FS-1900
 - 4. Tremco "Tremstop 1A"

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Follow manufacturer's installation instructions explicitly.
- B. Seal penetrations of ductwork, piping, and other mechanical equipment through one-hour and two-hour rated partitions as shown on Architectural and Mechanical Drawings.
- C. Install fire stopping material on clean surfaces to assure adherence.

END OF SECTION 230800

SECTION 232113 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. This Section includes piping, special-duty valves, makeup water for these systems; blowdown drain lines; and condensate drain piping.

1.3 DEFINITIONS

- A. CPVC: Chlorinated polyvinyl chloride.
- B. PVC: Polyvinyl chloride.

1.4 SUBMITTALS

- A. Product Data: For each type of special-duty valve indicated. Include flow and pressure drop curves based on manufacturer's testing for diverting fittings, calibrated balancing valves, and automatic flow-control valves.
- B. Shop Drawings: Detail fabrication of pipe anchors, hangers, special pipe support assemblies, alignment guides, expansion joints and loops, and their attachment to the building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
- C. Welding Certificates: Copies of certificates for welding procedures and personnel.
- D. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Failed test results and corrective action taken to achieve requirements.
- E. Maintenance Data: For hydronic specialties and special-duty valves to include in maintenance manuals specified in Division 23.
- F. Water Analysis: Submit a copy of the water analysis to illustrate water quality available at Project site.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify processes and operators according to the ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.
- C. To assure uniformity and compatibility of piping components in grooved end piping systems, all

grooved products utilized shall be supplied by a single manufacturer. Grooving tools shall be supplied by the same manufacturer as the grooved components.

1.6 COORDINATION

- A. Coordinate layout and installation of hydronic piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.
- B. Coordinate pipe sleeve installations for foundation wall penetrations.
- C. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations.
- D. Coordinate pipe fitting pressure classes with products specified in related Sections.
- E. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into base. Concrete, reinforcement, and formwork requirements are specified in Division 3 Sections.
- F. Coordinate installation of pipe sleeves for penetrations through exterior walls and floor assemblies. Coordinate with requirements for firestopping specified in Division 7 Section "Through-Penetration Firestop Systems" for fire and smoke wall and floor assemblies.

1.7 EXTRA MATERIALS

- A. Water Treatment Chemicals: Furnish sufficient chemicals for initial system startup and for preventive maintenance for one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grooved Mechanical-Joint Fittings and Couplings:
 - a. Central Sprinkler Company; Central Grooved Piping Products.
 - b. Grinnell Mechanical Products.
 - c. Victaulic Company of America.
 - 2. Calibrated Balancing Valves:
 - a. Armstrong Pumps, Inc.
 - b. Flow Design, Inc.
 - c. Gerand Engineering Company.
 - d. Griswold Controls.
 - e. ITT Bell & Gossett; ITT Fluid Technology Corp.
 - f. Taco, Inc.
 - g. Tour Andersson supplied by Victaulic
 - 3. Pressure-Reducing Valves:
 - a. Amtrol, Inc.
 - b. Armstrong Pumps, Inc.
 - c. Conbraco Industries, Inc.
 - d. ITT Bell & Gossett; ITT Fluid Technology Corp.
 - e. Spence Engineering Company, Inc.
 - f. Watts Industries, Inc.; Watts Regulators.
 - 4. Safety Valves:

- a. Amtrol, Inc.
- b. Armstrong Pumps, Inc.
- c. Conbraco Industries, Inc.
- d. ITT McDonnell & Miller Div.; ITT Fluid Technology Corp.
- e. Kunkle Valve Division.
- f. Spence Engineering Company, Inc.
5. Automatic Flow-Control Valves:
 - a. Flow Design, Inc.
 - b. Griswold Controls.
6. Expansion Tanks:
 - a. Amtrol, Inc.
 - b. Armstrong Pumps, Inc.
 - c. ITT Bell & Gossett; ITT Fluid Technology Corp.
 - d. Taco, Inc.
7. Air Separators and Air Purgers:
 - a. Amtrol, Inc.
 - b. Armstrong Pumps, Inc.
 - c. ITT Bell & Gossett; ITT Fluid Technology Corp.
 - d. Taco, Inc.

2.2 PIPING MATERIALS

- A. General: Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.3 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.
- B. Annealed-Temper Copper Tubing: ASTM B 88, Type K.
- C. DWV Copper Tubing: ASTM B 306, Type DWV.
- D. Wrought-Copper Fittings: ASME B16.22.
- E. Wrought-Copper Unions: ASME B16.22.
- F. Solder Filler Metals: ASTM B 32, 95-5 tin antimony.
- G. Brazing Filler Metals: AWS A5.8, Classification BAg-1 (silver).

2.4 STEEL PIPE AND FITTINGS

- A. Steel Pipe, NPS 2 and Smaller: ASTM A 53, Type S (seamless) or Type F (furnace-butt welded), Grade B, Schedule 40, black steel, plain ends.
- B. Steel Pipe, NPS 2-1/2 through NPS 12: ASTM A 53, Type E (electric-resistance welded), Grade B, Schedule 40, black steel, plain ends.
- C. Steel Pipe, NPS 14 through NPS 18: ASTM A 53, Type E (electric-resistance welded) or Type S (seamless), Grade B, Schedule 30, black steel, plain ends.
- D. Steel Pipe, NPS 20: ASTM A 53, Type E (electric-resistance welded) or Type S (seamless), Grade B, Schedule 20, black steel, plain ends.
 1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53, Schedule 40, black steel; seamless for NPS 2 and smaller and electric-resistance welded for NPS 2-1/2 and larger.

- E. Cast-Iron Threaded Fittings: ASME B16.4; Classes 125 and 250.
- F. Malleable-Iron Threaded Fittings: ASME B16.3, Classes 150 and 300.
- G. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300.
- H. Cast-Iron Pipe Flanges and Flanged Fittings: ASME B16.1, Classes 25, 125, and 250; raised ground face, and bolt holes spot faced.
- I. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.
- J. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - 1. Material Group: 1.1.
 - 2. End Connections: Butt welding.
 - 3. Facings: Raised face.
- K. Grooved Mechanical-Joint Fittings: ASTM A 536, Grade 65-45-12 ductile iron; ASTM A 47, Grade 32510 malleable iron; ASTM A 53, Type F, E, or S, Grade B fabricated steel; or ASTM A 106, Grade B steel fittings with grooves or shoulders designed to accept grooved end couplings.
- L. **Standard Mechanical Couplings, 2 inch through 12 inch:** Manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12. Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. (Gaskets used for potable water applications shall be UL classified in accordance with ANSI/NSF-61 for potable water service.) Mechanical Coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to ASTM A-449 and ASTM A-183, minimum tensile strength 110,000 psi (758450 kPa).
 - a. **Rigid Type:** Coupling housings with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with ANSI B31.1, B31.9, and NFPA 13.
 - 1. 2 inch through 12 inch: Installation ready rigid coupling for direct stab installation without field disassembly. Gasket shall be Grade EPDM compound designed for operating temperatures from -30 deg F to +250 deg F. Gasket temperature rating shall be met without the use of special lubricants.
 - b. **Flexible Type:** Use in locations where vibration attenuation and stress relief are required. Flexible couplings may be used in lieu of flexible connectors at equipment connections. Three couplings, for each connector, shall be placed in close proximity to the vibration source.
 - 1. 2" through 8": Installation-ready flexible coupling for direct stab installation without field disassembly. Gasket shall be grade EPDM compound designed for operating temperatures from -30 deg F to +250 deg F. Gasket temperature rating shall be met without the use of special lubricants.
 - 2. 10" through 12": Standard flexible couplings. Gasket shall be Grade "E" EPDM compound designed for operating temperatures from -30 deg F to +230 deg F.
- M. Flexible Connectors: Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket; 150-psig minimum working pressure and 250 deg F maximum operating temperature. Connectors shall have flanged or threaded-end connections to match equipment connected and shall be capable of 3/4-inch misalignment.
- N. Spherical, Rubber, Flexible Connectors: Fiber-reinforced rubber body with steel flanges drilled to align with Classes 150 and 300 steel flanges; operating temperatures up to 250 deg F and pressures up to 150 psig.

- O. Packed, Slip, Expansion Joints: 150-psig minimum working pressure, steel pipe fitting consisting of telescoping body and slip-pipe sections, packing ring, packing, limit rods, flanged ends, and chrome-plated finish on slip-pipe telescoping section.
- P. Welding Materials: Comply with Section II, Part C, of the ASME Boiler and Pressure Vessel Code for welding materials appropriate for wall thickness and for chemical analysis of pipe being welded.
- Q. Gasket Material: Thickness, material, and type suitable for fluid to be handled; and design temperatures and pressures.

2.5 HYDRONIC SPECIALTIES

- A. Automatic Air Vent: Designed to vent automatically with float principle; bronze body and nonferrous internal parts; 150-psig working pressure; 240 deg F operating temperature; with NPS 1/4 discharge connection and NPS 1/2 inlet connection.
- B. Y-Pattern Strainers: 125-psig working pressure; cast-iron body (ASTM A 126, Class B), flanged ends for NPS 2-1/2 and larger, threaded connections for NPS 2 and smaller, bolted cover, perforated stainless-steel basket, and bottom drain connection.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Heat Pump Water, NPS 2 and Smaller: Aboveground, use Type L drawn-temper copper tubing with soldered joints or Schedule 40 steel pipe with threaded joints. Belowground or within slabs, use Type K annealed-temper copper tubing with soldered joints. Use the fewest possible joints belowground and within floor slabs.
- B. Heat Pump Water, NPS 2-1/2 and Larger: Schedule 40 steel pipe with welded and flanged joints.
- C. Condensate Drain Lines: Type L drawn-temper copper tubing with soldered joints or Schedule 40, PVC pipe with solvent-welded joints.

3.2 PIPING INSTALLATIONS

- A. Refer to Division 23 Section "Basic Mechanical Materials and Methods" for basic piping installation requirements.
- B. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- C. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- D. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- E. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- F. Unless otherwise indicated, install branch connections to mains using tee fittings in main pipe, with the takeoff coming out the bottom of the main pipe. For up-feed risers, install the takeoff coming out the top of the main pipe.
- G. Install strainers on supply side of each control valve, pressure-reducing valve, solenoid valve,

in-line pump, and elsewhere as indicated. Install NPS 3/4 nipple and ball valve in blowdown connection of strainers NPS 2 and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2.

- H. Anchor piping for proper direction of expansion and contraction.

3.3 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor devices are specified in Division 23 Section "Hangers and Supports." Comply with requirements below for maximum spacing of supports.
- B. Install the following pipe attachments:
 1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
 2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer. cal runs at roof, at each floor, and at 10-foot intervals between floors.

3.4 PIPE JOINT CONSTRUCTION

- A. Refer to Division 23 Section "Basic Mechanical Materials and Methods" for joint construction requirements for soldered and brazed joints in copper tubing; threaded, welded, and flanged joints in steel piping; and solvent-welded joints for PVC and CPVC piping.

3.5 HYDRONIC SPECIALTIES INSTALLATION

- A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.
- B. Install automatic air vents in mechanical equipment rooms only at high points of system piping, at heat-transfer coils, and elsewhere as required for system air venting.
- C. Install dip-tube fittings in boiler outlet. Install piping to expansion tank with a 2 percent upward slope toward tank. Connect boiler-outlet piping.
- D. Install in-line air separators in pump suction lines. Install piping to compression tank with a 2 percent upward slope toward tank. Install drain valve on units NPS 2 and larger.
- E. Install combination air separator and strainer in pump suction lines. Install piping to compression tank with a 2 percent upward slope toward tank. Install blowdown piping with gate valve; extend to nearest drain.
- F. Install bypass chemical feeders in each hydronic system where indicated, in upright position with top of funnel not more than 48 inches above floor. Install feeder in bypass line, off main, using globe valves on each side of feeder and in the main between bypass connections. Pipe drain, with ball valve, to nearest equipment drain.
- G. Install expansion tanks above air separator. Install gage glass and cocks on end of tank. Install tank fitting in tank bottom and charge tank. Use manual vent for initial fill to establish proper water level in tank.
 1. Support tank from floor or structure above with sufficient strength to carry weight of tank, piping connections, and fittings, plus weight of a full tank of water. Do not overload building components and structural members.
- H. Install expansion tanks on floor. Vent and purge air from hydronic system, and ensure tank is properly charged with air to suit system design requirements.

3.6 TERMINAL EQUIPMENT CONNECTIONS

- A. Size for supply and return piping connections shall be same as for equipment connections.
- B. Install control valves in accessible locations close to connected equipment.
- C. Install bypass piping with globe valve around control valve. If multiple, parallel control valves are installed, only one bypass is required.
- D. Install ports for pressure and temperature gages at coil inlet connections.

3.7 FIELD QUALITY CONTROL

- A. Prepare hydronic piping according to ASME B31.9 and as follows:
 - 1. Leave joints, including welds, uninsulated and exposed for examination during test.
 - 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
 - 3. Flush system with clean water. Clean strainers.
 - 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
 - 5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.
 - 6. Grooved pipe ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove for proper gasket sealing.
 - 7. The grooved couplings gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.
 - 8. Grooved couplings installation shall be complete when visual metal-to-metal contact is reached.

3.8 GROOVED PIPING TRAINING

- A. A factory trained representative (direct employee) of the grooved coupling supplier shall provide on-site training for contractor's field personnel in the use of grooving tools, application of groove, and product installation.

PART 4 - Testing

- A. Perform the following tests on hydronic piping:
 - 1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
 - 2. While filling system, use vents installed at high points of system to release trapped air. Use drains installed at low points for complete draining of liquid.
 - 3. Check expansion tanks to determine that they are not air bound and that system is full of water.
 - 4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the design pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed either 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A of ASME B31.9, "Building Services Piping."
 - 5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components and repeat hydrostatic test until there are no leaks.
 - 6. Prepare written report of testing.

4.8 ADJUSTING

- A. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.

- B. Perform these adjustments before operating the system:
 - 1. Open valves to fully open position. Close coil bypass valves.
 - 2. Check pump for proper direction of rotation.
 - 3. Set automatic fill valves for required system pressure.
 - 4. Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
 - 5. Set temperature controls so all coils are calling for full flow.
 - 6. Check operation of automatic bypass valves.
 - 7. Check and set operating temperatures of boilers, chillers, and cooling towers to design requirements.
 - 8. Lubricate motors and bearings.

4.9 CLEANING

- A. Flush hydronic piping systems with clean water. Remove and clean or replace strainer screens. After cleaning and flushing hydronic piping systems, but before balancing, remove disposable fine-mesh strainers in pump suction diffusers.

END OF SECTION 232113

SECTION 232125 - CLEANING AND FLUSHING WATER CIRCULATING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish labor and materials to thoroughly clean water circulating systems as described in Contract Documents.
- B. Mechanical contractor shall procure the services of an independent treatment contractor as described in this specification.

1.3 QUALITY ASSURANCE

- A. System Additives: This Contractor shall not add any water treatment chemicals or "stop-leak" compounds to the system.

PART 2 - EXECUTION

2.1 FIELD QUALITY ASSURANCE

- A. Water circulating systems for project shall be thoroughly cleaned before placing in operation to rid system of dirt, piping compound, mill scale, oil, and other materials foreign to water being circulated.
- B. During construction extreme care shall be exercised to prevent dirt and other foreign matter from entering pipe or other parts of system. Pipe stored on project shall have open ends capped and equipment shall have openings fully protected. Before erection, each piece of pipe, fittings, or valve shall be visually examined and dirt removed.
- C. Hydronic Heat Pump Closed Loop Cleaning
 1. Prior to any introduction of fluids to the closed loop system the Mechanical Contractor shall close isolation valves at each heat pump and open the bypass valve to prevent flow through the strainer, flow control device and heat pump during the initial flushing and subsequent cleaning. The side stream filter bag shall be removed during the initial flushing process.
 2. The Mechanical Contractor shall fill each hydronic system with clean fresh water prior to cleaning and thoroughly leak check system piping. A cleaning and passivating agent supplied by the Chemical Treatment Contractor shall be added to the system at the direction of the Treatment Contractor during the leak check process to minimize initial corrosion. If the system is filled multiple times during the leak check and repair process the Mechanical Contractor shall coordinate with the Treatment Contractor to maintain this initial protection. The Treatment Contractor is responsible for providing chemical for up to two refills of the system. If additional chemical is required due to multiple refillings the Mechanical Contractor shall be responsible for the additional time and chemical.
 3. Following leak check the closed system shall be flushed by the Mechanical Contractor until the leaving water runs clear. All primary runs shall be flushed at their ends to obtain maximum sweep of debris from the system. The inlet screens on the circulating pumps must be kept clear during this initial cleaning process and inspected following cleaning. When flushing is complete the system is to be left full.

4. Prior to flushing the Mechanical Contractor shall coordinate with Treatment Contractor so that the Treatment Contractor can be available immediately following flush and final refill to add cleaning chemical within 4 hours to prevent initial corrosion.
5. Following initial flushing the Chemical Treatment Contractor shall refill all systems with cleaning and passivating agents raising the PH to a minimum of 10, circulate and flush until thoroughly clean. All primary piping runs shall be flushed at the ends during this cleaning process. When boiler operation is available the loop temperature should be raised to 110 to 120° to accelerate cleaning. Cleaning with availability of boiler operation should be anticipated to last 7 to 10 days or longer depending on initial loop conditions. If boiler operation is unavailable loop cleaning duration should be expected to double. The Chemical Treatment Contractor shall verify and adjust cleaning chemistry, and inspect side stream filter bags at a minimum of every two days, exception for weekends. Filter bags shall be changed as required during this cleaning process. Cleaning shall continue until these bags no longer show signs of debris.
6. Following cleaning process the Treatment Contractor shall close the bypass valves at each heat pump and open isolation valves for normal operation and check for leaks of local piping connections. Any leaks found shall be referred to the Mechanical Contractor for repair. The bypass valve handle shall be removed and tied to the valve. The system shall then be charged with final operating chemical to control long term corrosion and a clean bag filter shall be installed in the system.
7. The Treatment Contractor shall provide final inspection report for inclusion in the Operation and Maintenance Manual. Additionally the Treatment Contractor shall take loop samples approximately 12 months following completion, add or adjust chemical as required and provide a post construction report to the owner prior to warranty closeout. Chemical required is the responsibility of the Treatment Contractor.

END OF SECTION 232125

SECTION 232200 - WATER SOURCE HEAT PUMP SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install water source heat pump system as described in Contract Documents.

1.3 QUALITY ASSURANCE

- A. Units of the type furnished shall have been in successful operation at least five years.
- B. Units shall be UL listed and ARI certified, and shall be in accordance with the Canadian Standards Association (CSI).
- C. The units shall have ARI, UL, and CSI labels.
- D. All units shall be factory tested under normal operation conditions and normal water flow rates. Units that are tested without water flow are not acceptable.
- E. Units shall be Climate Master, Trane or Mammoth or approved equal.

1.4 WARRANTY

- A. Compressors shall be provided with five-year warranties.

PART 2 - PRODUCTS

2.1 GENERAL

- A. System shall consist of water-to-air reverse cycle air conditioning units of the type, size, capacity, and style scheduled on the drawings.
- B. Units shall be interconnected thru a non-refrigerated central water system, maintained within an approximate temperature range of 40 degrees F. to 110 degrees F. by means of a supplementary heat source and closed circuit evaporative type water cooler.
- C. Piping system shall be two-pipe reverse-return as shown on the plans complete with primary and standby circulating pumps.
- D. Individual room temperature control including necessary safety and operating controls shall be furnished as integral or accessory parts of the air conditioning units.

2.2 ELECTRO-HYDRONIC WATER SOURCE HEAT PUMPS

- A. Refrigeration Circuit:
 - 1. Units shall have a sealed refrigerant circuit including:
 - a. A hermetic compressor.
 - b. A refrigerant metering device.
 - c. A finned tube refrigerant to air heat exchanger.
 - d. A reversing valve.

- e. A coaxial (tube in tube) refrigerant to water heat exchanger.
 - f. Safety controls including a high pressure switch, a low pressure sensor, and a low water temperature (thermostat) switch.
2. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service.
 3. Activation of any safety device shall prevent compressor operation via a lock out relay. The lockout relay shall be reset at the thermostat or at the contract furnished disconnect switch. Units which may be reset at the disconnect switch only are not acceptable.
 4. Hermetic compressors shall be internally sprung, externally isolated, with thermal overload protection and shall be located in an insulated compartment to minimize sound transmission. Units above 15,000 BTUH shall have the compressor mounted on spring isolators to reduce noise and vibration transmission. Rubber mounts for these larger units are not acceptable.
 5. Refrigerant to air heat exchangers shall utilize enhanced aluminum fins and rifled copper construction rated to withstand 425 psi refrigerant working pressure.
 6. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 450 psi working refrigerant pressure and 400 psi working water pressure.
 7. Refrigerant metering shall be accomplished by capillary tubes for units intended for use in standard operating ranges, or expansion valves for units intended for use in expanded operating ranges.
 8. Reversing valves shall be four-way solenoid activated refrigerant valves which shall fail to heating operation should the solenoid fail to function.
- B. Fan and Motor Assembly:
1. Units rated 60,000 BTUH and under shall have a direct drive centrifugal fan. The fan motor shall be 3-speed permanently lubricated, PSC type with thermal overload protection. Units supplied without permanently lubricated motors must provide external oilers for easy service. The fan motor shall be isolated from the fan housing by torsionally flexible isolation. Units 72,000 BTUH and above shall have a belt drive fan assembly. The assembly shall include a forward curved fan wheel, housing, solid steel fan shaft encased in ball bearings, fan pulley and adjustable motor sheave. The motor shall be a three phase, open type with external thermal overload protection. The motor shall be mounted on an adjustable base for proper belt tension. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. External static pressure rating of the unit shall be based on a wet coil. Ratings based on dry coil shall not be acceptable.
- C. Electrical:
1. A control box shall be located within the unit and shall contain a transformer, controls for compressor, reversing valve and fan motor operation and shall have a terminal block for low voltage field wiring connections. Open controls in the air stream will not be acceptable. Units shall be name plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 volts and shall provide heating or cooling as required by the wall thermostat. Two compressor units shall have a solid state time delay to prevent both compressors from starting simultaneously. Provide integral interface for DDC control.
- D. Solid State Control System:
1. Units shall have a solid state control system. The control shall interface with any type of wall thermostat mechanical or electronic. The control system shall have the following features:
 - a. Anti-short cycle time delay on compressor operation, time delay shall be five (5) minutes minimum.
 - b. Random start on power up mode or return from night setback.
 - c. Minimized reversing valve operation for extended life and quiet operation.

- d. Night setback override from low temperature thermostat.
- e. Two (2) hour override initiated by a signal from wall thermostat.
- f. Low voltage protection.
- g. High voltage protection.
- h. Ability to work with any thermostat.
- i. Single grounded wire to initiate night setback, demand load shed, or emergency shutdown.
- j. Unit shutdown on high or low refrigerant pressures.
- k. Unit shutdown on low water temperature.
- l. Option to reset unit at thermostat or disconnect.
- m. Automatic intelligent reset. Unit shall automatically reset the unit 10 minutes after trip if the fault has cleared. Should a fault re-occur within 30 minutes after reset, the permanent lockout will occur.
- n. Ability to defeat time delays for servicing.
- o. Light emitting diodes (LED) to indicate high pressure, low pressure, low voltage, high voltage, freeze protection, condensate overflow and control voltage status.
- p. Control logic shall only move the reversing valve when cooling is called for the first time. The reversing valve shall be held in this position until the first call for heating. This scheme ensures quiet operation and increased valve life. Only control schemes that provide this reduced reversing valve operation will be accepted.
- q. Control board shall have an eight (8) pin plug to allow the future addition of RS485 DDC circuitry. Control boards that cannot be upgraded to DDC by plugging in a module shall not be allowed.
- r. Control board shall allow up to three (3) units to be operated from one thermostat without any auxiliary controls.
- s. Optional 24 volt relay shall be required to provide dry contact alarm when used with a DDC system.

E. Basic Construction:

- 1. Horizontal units shall be fabricated from heavy gauge (GS90) galvanized sheet metal. All interior surfaces shall be lined with 1/2 inch, 1 1/2 lb. acoustic type glass fiber insulation. All fiberglass shall be coated and have exposed edges tucked under flanges to prevent the introduction of glass fibers into the airstream. All insulation must be NFPA 90A. Vertical unit shall be as above except the cabinet will have a painted baked enamel finish.
- 2. All units must have an insulated panel separating the fan compartment from the compressor compartment. Units with the compressor in the airstream are not acceptable. Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. Supply and return water connections shall be copper FPT fittings and shall be securely mounted flush to the cabinet allowing for connection to a flexible hose without the use of a back-up wrench. Water connections which protrude through the cabinet or require the use of a backup wrench shall not be allowed.
- 3. To facilitate installation in minimal space requirements, units rated 30,000 BTUH and under shall have all electrical and water connections on the end of the cabinet opposite the duct connections. Contractor shall be responsible for any extra costs involved in the installation of units which do not have this feature. Contractor must also ensure that non-specified units can be easily removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.
- 4. Units shall have the air flow arrangements as shown on plans.
- 5. Sound attenuation:
 - a. All units 15,000 BTUH and up must have a compressor discharge muffler.
 - b. Compressor side panels and base pan must have closed cell insulation rated at 5 lb/cu. ft. density.
 - c. All reciprocating compressors must have high density damping material applied to the compressor shell.
 - d. All units 15,000 BTUH and up shall have the compressors mounted on springs.

- F. Air Filters:
 - 1. Units shall have a factory installed two (2) inch thick filter bracket for side filter removal. Units shall have a two (2) inch thick pleated 30% efficient filter. Contractor shall be furnished one (1) set of spare filters to be turned over to Owner on completion of start-up. Filters shall be standard filter sizes. If units utilize non-standard filter sizes, then the contractor shall provide 4 spare sets of filters for each unit.
- G. Units shall be furnished with a condensate overflow switch.
- H. Each individual horizontal or vertical heat pump will have a minimum EER of 10.5 or higher, and a heating COP of 3.8 or higher.

2.3 PIPING, PUMPS AND ACCESSORIES

- A. Water piping system shall be installed in accordance with the accompanying drawings to provide a self-balancing two-pipe reverse return arrangement.
- B. Piping shall be graded to prevent air pockets and to enable any entrained air to rise in the direction of flow. Provide air vents where there is a possibility of collecting air.
- C. Provide supply and return connections at each air conditioning unit location shown, plus any possible future locations as shown, to permit expansion or normal relocation and remodeling requirements.
- D. Provide and install two system pumps of capacity and head scheduled on the drawings; one for continuous operation with the other on standby.
- E. Hose Kits:
 - 1. All units 120,000 BTUH and below shall be connected with hoses. The hoses shall be two (2) feet long, metal braided and fire rated to meet UL 94. Non fire rated hoses are not acceptable. The hose on the supply side of the unit will be complete with a ball valve and strainer. The hose on the return side will be complete with a ball valve and flow control valve that encompasses in one assembly an automatic flow control valve that will guarantee the specified flow rate plus or minus 5% over a wide pressure differential without having any external adjustments. The hose kit and flow control assembly shall be Griswold or Autoflow.
- F. Provide PVC hose or insulated copper condensate connection of each air conditioner to pitched condensate drain system. Connect copper to unit with flexible connection.

2.4 CONTROLS

- A. Manufacturer of electro-hydraulic system components shall furnish the minimum list of system operating and safety controls.
- B. System Safety and Operating Controls:
 - 1. Solid-state components
 - 2. Factory-mounted and wired within a NEMA 1 enclosure with a locking front panel.
 - 3. Controls will monitor the system water loop and protect against malfunction, requiring field installation of just one temperature sensor plus a flow switch.
 - 4. The panel shall include:
 - a. Indicator lights
 - b. Temperature gage
 - c. Control relays
 - d. Alarm with silencer switch
 - e. Terminal board for convenient connection of all field wiring

- f. Pump selector switch to equalize wear by interchanging operation of the primary pump and the standby pump.
5. Controls shall automatically start the standby pump upon failure of the primary pump, with a pilot light indicating that the standby pump is operating.
6. An alarm and pilot light will indicate loss of flow or extreme high or low system water temperature
7. A contact shall open which can be used in a control circuit to interrupt operation of the heat pumps.
8. Three stages of control shall be included to operate the heat rejecter in order to maintain a maximum system water temperature of approximately 90 deg. F.
9. The four stages of control shall be included to operate the water heater as required to maintain a minimum supply temperature to the heat pumps of 60 deg. F.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Complete system shall be installed in accordance with manufacturer's approved instructions and shall be equipped with necessary system operating and safety controls as detailed elsewhere in these specifications.
- B. It is ESSENTIAL that the finished piping system be thoroughly flushed free of foreign material and construction debris.
 1. Install strainer in system line at pump section.
 2. Flush system prior to final connection to any electro-hydraulic conditioner by means of loop bypass between supply to return at each unit location.
 3. The hoses for final connection may first be used for the loop bypass.
- C. Provide factory start-up of each heat pump and factory system operation check out of complete system.

END OF SECTION 232166

SECTION 232600- CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install condensate drain piping as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 23 0501: Common HVAC Requirements.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM B 88-03, 'Standard Specification for Seamless Copper Water Tube.'

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Materials:
 - 1. Condensate Drains:
 - a. Schedule 40 PVC for condensate drains from furnace combustion chambers and furnace cooling coils, and auxiliary drain pans.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Condensate Drains:
 - 1. Support piping and protect from damage.
 - 2. Do not combine PVC condensate drain piping from furnace combustion chamber with copper condensate drain piping from cooling coil.
 - 3. Do not combine auxiliary drain pan piping with furnace / Cooling Coil Condensate drain piping.

END OF SECTION 232600

SECTION 233114 - LOW-PRESSURE STEEL DUCTWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install above-grade ductwork and related items as described in Contract Documents.

PART 2 - PRODUCTS

2.1 DUCTS

- A. Fabricate of zinc-coated lockforming quality steel sheets meeting requirements of ASTM 653A/653M, "Specification for Sheet Steel Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock Forming Quality", with G 60 coating.
- B. Use of aluminum, non-metallic, or round ducts is not permitted. [Specification writer: Use of aluminum ducts in areas with high chlorine content (eg.: ventilation for pools, spas, etc.) should be considered on a per job basis.]

2.2 DUCT JOINTS

- A. Ducts with sides up to and including 36 inches shall be as detailed in the SMACNA manual.
- B. Duct sizes over 36 inches shall be fabricated using SMACNA T-24 flange joints or pre-fabricated systems as follows:
 - 1. Ducts with sides over 36 inches to 48 inches:
 - a. transverse duct joint system by Ductmate/25, Nexus, Ward, or WDCI (Lite) (SMACNA "E" or "G" Type connection).
 - 2. Ducts 48 inches & larger:
 - a. Ductmate/35, Nexus, or WDCI (Heavy) (SMACNA "J" Type connection).
 - 3. Approved Manufacturers:
 - a. Ductmate Industries Inc, 10760 Bay Meadows Drive, Sandy, UT 84092 (801) 571-5308
 - b. Nexus, Exanno Corp, P O Box 729, Buffalo, NY 14206 (716) 849-0545
 - c. Ward Industries Inc, 1661 Lebanon Church Road, Pittsburg, PA 15236 (800) 466-9374
 - d. WDCI, P O Box 10868, Pittsburg, PA 15236 (800) 245-3188

2.3 FLEXIBLE EQUIPMENT CONNECTIONS

- A. 30 oz closely woven UL approved glass fabric, double coated with neoprene.
- B. Fire retardant, waterproof, air-tight, resistant to acids and grease, and withstand constant temperatures of 250 deg F.
- C. Approved Manufacturers:
 - 1. Cain - N-100
 - 2. Duro Dyne - MFN

3. Elgen - ZLN
4. Ventfabrics - Ventglas

2.4 VOLUME DAMPERS

- A. In Main Ducts:
1. 16 gauge galvanized steel, opposed blade type with 3/8 inch pins and end bearings. Blades shall have 1/8 inch clearance all around.
 2. Damper shall operate within acoustical duct liner.
 3. Provide channel spacer equal to thickness of duct liner.
 4. Approved Manufacturers:
 - a. Air Balance - Model AC-2
 - b. Air Control Products - CD-OB
 - c. American Warming - VC-2-AA
 - d. Greenheck - VCD-1100
 - e. NCA, Safe Air
 - f. Vent Products - 5100
- B. In Sheet Metal Branch Ducts:
1. Extruded aluminum, opposed blade type. When in open position, shall not extend beyond damper frame.
 2. Maximum blade length 12 inches.
 3. Damper Regulator shall be concealed type with operation from bottom or with 90 deg miter gear assembly from side.
 4. Approved Manufacturers:
 - a. Air Control Products - TCD-OB
 - b. Air Guide - OB
 - c. Arrow - OBDAF-207
 - d. CESCO - CDA
 - e. Reliable Metals - OBD-RO
 - f. Tuttle & Bailey - A7RDDM
 - g. Safe Air
 - h. Young - 820-AC
- C. Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, provide concealed ceiling damper regulator and cover plate.

2.5 MOTORIZED OUTSIDE AIR DAMPERS

- A. Damper Blades:
1. 18 gauge galvanized steel or equivalent aluminum with replaceable rubber blade edges, 9 inches wide maximum.
 2. End seals shall be flexible metal compression type.
 3. Opposed blade type.
- B. Make provision for damper actuators and actuator linkages to be mounted external of air flow.
- C. Approved Manufacturers & Models:
1. Air Balance - AC-2
 2. American Warming - VC-2-AAVA
 3. Arrow - OBDAF-207
 4. Greenheck - VCD-2100
 5. Honeywell - D641
 6. Johnson - D1300
 7. Louvers & Dampers - TSD400
 8. Ruskin - CD36 or CD60

9. Safe Air - 610
10. Vent Products - 5800

2.6 DUCT HANGERS

- A. 1" x 18 gauge galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 8 feet apart. Do not use wire hangers.
- B. Attaching screws at trusses shall be 1-1/2 inch No. 10 round head wood screws. Nails not allowed.

2.7 DUCT SEALER

- A. Cain - Duct Butter or Butter Tak
- B. Design Polymerics - DP 1010
- C. DSC - Stretch Coat
- D. Duro Dyne - S2
- E. Hardcast - #601 Iron-Grip or Peel-N-Seal Tape
 1. Kingco - 15-325
 2. Mon-Eco - 44-41
 3. Trans-Continental Equipment Co - Multipurpose Duct Sealant
 4. United - Sheet Metal duct-sealer

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Ducts:
 1. Straight and smooth on inside with joints neatly finished unless otherwise directed.
 2. Duct panels through 48 inch dimension having acoustic duct liner need not be crossbroken or beaded.
 3. Crossbreak unlined ducts and duct panels larger than 48 inch or bead 12 inches on center.
 4. Securely anchor ducts to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger.
 5. Brace and install ducts so they shall be free of vibration under all conditions of operation.
 6. Ducts shall not bear on top of structural members.
 7. Make duct take-offs to branches, registers, grilles, and diffusers as detailed on Drawings.
 8. Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
 9. Properly flash where ducts protrude above roof.
 10. Install internal ends of slip joints in direction of flow. Make joints air tight using specified duct sealer.
 11. Cover horizontal and longitudinal joints on exterior ducts with two layers of Hardcast tape installed with Hardcast HC-20 adhesive according to Manufacturer's recommendations.
 12. Paint ductwork visible through registers, grilles, and diffusers flat black.
- B. Install flexible inlet and outlet duct connections to each furnace, fan, fan coil unit, and air handling unit.
- C. Install concealed ceiling damper regulators.
 1. Paint cover plates to match ceiling tile.

2. Damper regulators will not be required for dampers located directly above removable ceilings or in Mechanical Rooms.
- D. Provide each take-off with an adjustable volume damper to balance that branch.
1. Anchor dampers securely to duct.
 2. Install dampers in main ducts within insulation.
 3. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
 4. Where concealed ceiling damper regulators are installed, provide a cover plate.
- E. Install grilles, registers, and diffusers. Level floor registers and anchor securely into floor.
- F. Air Turns:
1. Permanently installed, consisting of single thickness curved metal blades with one inch straight trailing edge to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
 2. 4-1/2 inch wide minimum vane rail. Do not use junior vane rails.
 3. Double thickness vanes not acceptable.
 4. Quiet and free from vibration when system is in operation. See SMACNA Manual
- G. Install motorized dampers

END OF SECTION 233114

SECTION 233346 - FLEX DUCT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.

PART 2 - PRODUCTS

2.1 DUCTS

- A. Formable, flexible, circular duct which shall retain its cross-section, shape, rigidity, and shall not restrict air flow after bending.
- B. Nominal 1-1/2 inches thick, 3/4 lb/cu ft density fiberglass insulation with air-tight, polyethylene or polyester core, sheathed in seamless vapor barrier jacket factory installed over flexible assembly.
- C. Assembly, including insulation and vapor barrier, shall meet Class I requirement of NFPA 90A and be UL 181 rated, with flame spread of 25 or less and smoke developed rating of 50 or under.
- D. Length of flexible ductwork shall not exceed 8'-0".

2.2 APPROVED MANUFACTURERS

- A. ANCO-FLEX - 4625
- B. Flex-Aire - PF/UPC #090
- C. Hart & Cooley - F114
- D. Thermaflex - G-KM

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct in fully extended condition free of sags and kinks.
- B. Make duct connections by coating exterior of duct collar for 3 inches with duct sealer and securing duct in place over sheet metal collar with 1/2 inch wide metal cinch bands and sheet metal screws.

END OF SECTION 233346

SECTION 233713 - AIR OUTLETS & INLETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

1.2 SUMMARY

- A. Furnish and install wall supply registers, transfer grilles, return air grilles, soffit grilles, ceiling diffusers, louvers connected to ductwork, and registers as described in Contract Documents.

PART 2 - PRODUCTS

2.1 GRILLES & REGISTERS

- A. Approved Manufacturers:
 - 1. Price
 - 2. Anemostat
 - 3. Krueger
 - 4. Titus
 - 5. Tuttle & Bailey

2.2 SPIN-IN FITTINGS

- A. Low pressure round take-offs to diffusers shall be made with spin-in fittings. They shall incorporate a manual balancing damper. The damper shall be spring loaded and a positive locking wing nut shall secure the damper position.
- B. Approved Manufacturers:
 - 1. Sheet metal fittings: Genflex DB-1DEL, Hercules

2.3 LOUVERS

- A. Extruded aluminum, with blades welded or screwed into frames and 1/2 inch mesh 16 gauge aluminum bird screen.
- B. Frames shall have mitered corners.
- C. Louvers shall be recessed, flanged, stationary, or removable as noted on Drawings.
- D. Approved Manufacturers:
 - 1. Airolite
 - 2. American Warming
 - 3. Arrow
 - 4. Industrial Louvers
 - 5. Ruskin
 - 6. Vent Products

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor securely into openings.

- B. Install with screws to match color and finish of grilles and registers.
- C. Touch-up any scratched finish surfaces.
- D. Install in accordance with manufacturer's instructions.
- E. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- F. Install diffusers to ductwork with air tight connection.
- G. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- H. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9000.

END OF SECTION 233713

END OF DIVISION 23

SECTION 312323.43 – EPS GEOFOAM

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes expanded polystyrene (EPS) Geofoam.
- B. Related Sections: Section(s) related to this section include:
 - 1. Earthworks: Division 31 Earthworks sections.

1.02 REFERENCES

- A. ASTM D6817 - Standard Specification for Rigid, Cellular Polystyrene Geofoam.

1.03 SUBMITTALS

- A. Submit EPS Geofoam manufacturer's product literature and TechData, including:
 - 1. Physical properties in compliance with ASTM D6817 Type specified.
 - 2. 10-year physical property warranty.
- B. Quality Assurance: Submit the following:
 - 1. Test Compliance: Summary of test compliance with specified performance characteristics and physical properties.

1.04 DELIVERY, STORAGE & HANDLING

- A. Deliver EPS Geofoam labeled with material Type.
- B. Store above ground, and protected from moisture and sunlight prior to installation.
- C. Product should not be exposed to open flame or other ignition sources.
- D.

1.05 WARRANTY

- A. Provide EPS Geofoam 10-year warranty covering the long-term physical property of expanded polystyrene Geofoam.

PART 2 PRODUCTS

2.01 EPS GEOFOAM

- A. Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to:
 - 1. ACH Foam Technologies, LLC
- B. Foam-Control EPS Geofoam in compliance with ASTM D6817.

- C. Select one or more of the Foam-Control EPS Geofoam Types from the listings as follows, as required by the project:
 - 1. Foam-Control EPS Geofoam: ASTM D6817 [Type EPS12], [Type EPS15], [Type EPS22], [Type EPS29], [Type EPS39].
- D. All Foam-Control EPS Geofoam blocks shall be treated by the manufacturer with a tested and proven termite treatment for below grade applications, 3 year minimum field exposure. The treatment shall be EPA registered, meet requirements of ICC ES EG239, and be recognized in an ICC ES report.

2.02 LATERAL PLATES

- A. Plates shall be used to restrain EPS Geofoam from moving laterally in layer over layer applications. The plate shall be made of galvanized or stainless steel with two-sided multi-barbed design capable of piercing geofoam. Each plate shall be capable of a lateral holding strength of 60 lbs.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's EPS Geofoam product data; including technical bulletins.

3.02 PREPARATION AND INSTALLATION

- A. Site Verification of Conditions: Verify conditions of substrate, grade and other conditions which affect installation of geofoam.
- B. Installation: [Specify instructions to suit project requirements.]

3.03 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction as required.

END OF SECTION



PROJECT:

POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

CLIENT:

Pocatello/Chubbuck School District 25

VICINITY MAP:

H. A. - JOB # 18027

HUMMEL

A 2785 N. Bogus Basin Rd. Boise, ID 83702
P 208.343.7523 W www.hummelarch.com
F 208.343.0940

CONSULTANTS:

ASSOCIATE ARCHITECT

RESIN ARCHITECTURE

a. 520 SHOUP AVE, IDAHO FALLS, ID 83402

MECHANICAL ENGINEER

ENGINEERED SYSTEMS ASSOCIATES

a. 1355 EAST CENTER ST., POCATELLO, ID 83201

ELECTRICAL ENGINEER

PAYNE ENGINEERING

a. 1823 EAST CENTER ST., POCATELLO, ID 83201

CIVIL, LANDSCAPE AND STRUCTURAL ENGINEER

JUB ENGINEERS, INC

a. 275 SOUTH 5TH AVE. #200, POCATELLO, ID 83201

STRUCTURAL ENGINEER

KPFF CONSULTING ENGINEERS, INC

a. 412 EAST PARKCENTER BLVD, SUITE 200, BOISE, ID 83706

DRAWING SET:

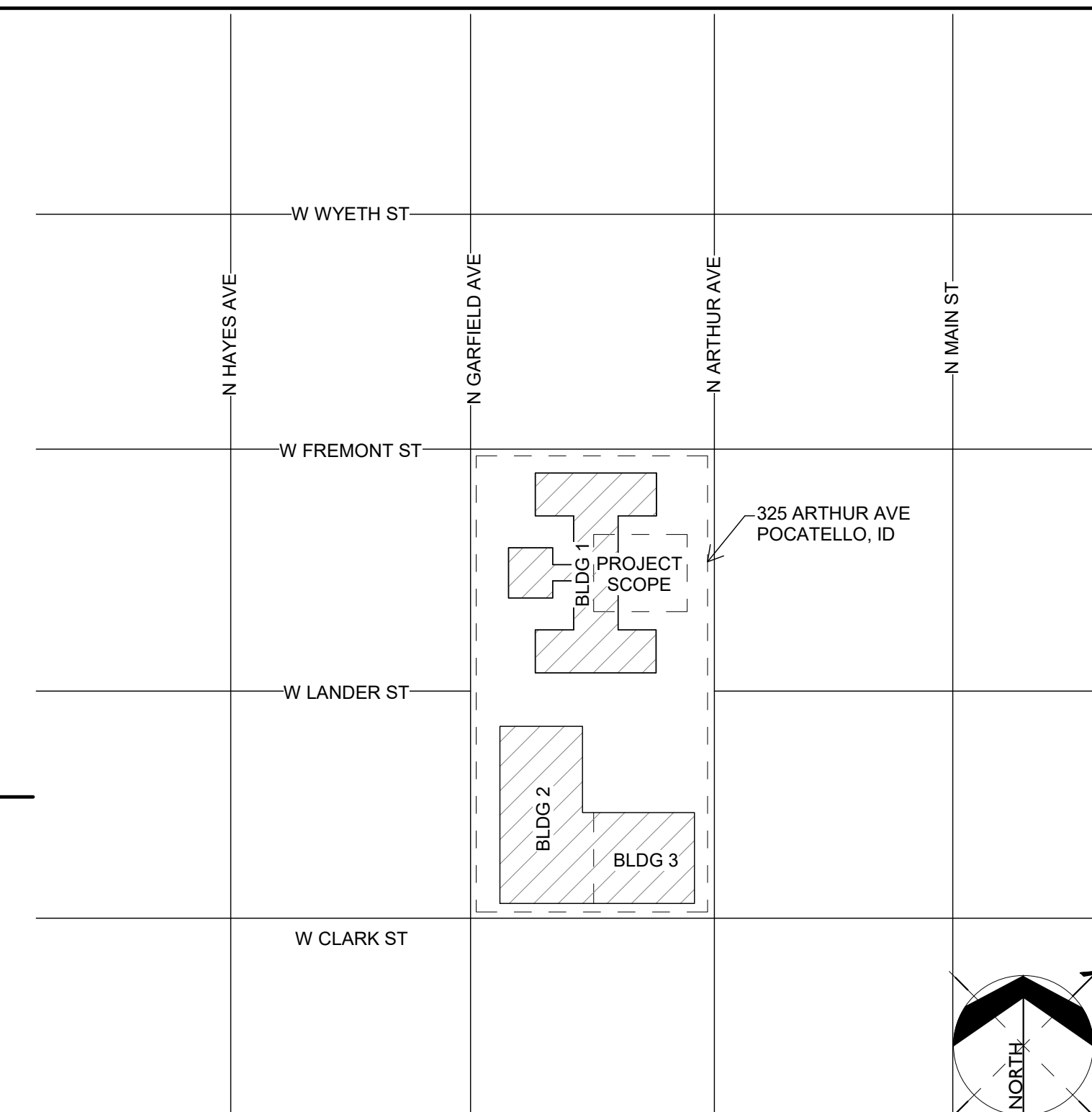
ARCHITECTURAL

CIVIL

STRUCTURAL

MECHANICAL

ELECTRICAL

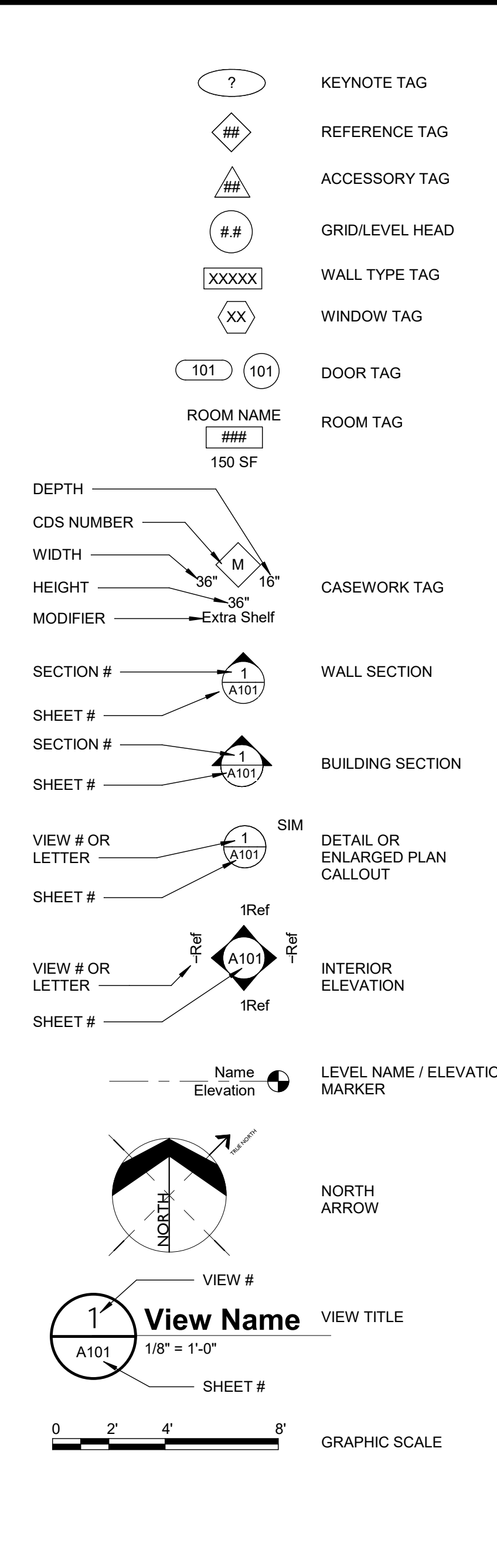


BID SET

DRAWING SET NO.



SYMBOLS:



ABBREVIATIONS:

#	NUMBER OR POUND	JAN	JANITOR	AB	ANCHOR BOLT	MFR	MANUFACTURER
@	AND	JST	JOIST	ACP	ACOUSTICAL CEILING PANEL	MIN	MINIMUM
& C/L	CENTERLINE	LAB	LABORATORY	ADJ	ADJUSTABLE	MISC	MISCELLANEOUS
##	ACCESSORY TAG	LAM	LAMINATE	AFF	ADJUSTABLE ABOVE FINISH FLOOR	MECH	MECHANICAL
###	GRID/LEVEL HEAD	LAV	LAVATORY	ALUM	ALUMINUM	MET	METAL
####	WALL TYPE TAG	MAX	MAXIMUM	ANOD	ANODIZED	MH	MECHANICAL
XXXX	WINDOW TAG	MET	METAL	APPROX	APPROXIMATE	MTG	MOUNTING
XX	DOOR TAG	MISC	MISCELLANEOUS	ASSOC	ASSOCIATED	MTD	MOUNTED
101	DOOR TAG	MW	MASONRY WALL	AWP	ACOUSTICAL WALL PANEL	NOM	NOMINAL
101	DOOR TAG	AWS	ACOUSTICAL WALL SYSTEM	BD	BOARD	NTS	NOT TO SCALE
ROOM NAME	ROOM TAG	BD	BOARD	BFC	BROOM FINISH CONCRETE	BO	BOTTOM OF
150 SF	ROOM TAG	BLKG	BLOCKING	BO	BOTTOM OF	BSMT	BASEMENT
DEPTH	CASEWORK TAG	BT	BOTTOM	BLDG	BUILDING	BTWN	BETWEEN
CDS NUMBER	CASEWORK TAG	BLC	BLOCKING	BLDG	BUILDING		
WIDTH	CASEWORK TAG	BM	BEAM	BLKG	BLOCKING		
HEIGHT	CASEWORK TAG	BO	BOTTOM OF	BLKG	BLOCKING		
MODIFIER	CASEWORK TAG	BO	BOTTOM OF	BLKG	BLOCKING		
SECTION #	WALL SECTION	BO	BOTTOM OF	BLKG	BLOCKING		
SHEET #	WALL SECTION	BO	BOTTOM OF	BLKG	BLOCKING		
SECTION #	BUILDING SECTION	BO	BOTTOM OF	BLKG	BLOCKING		
SHEET #	BUILDING SECTION	BO	BOTTOM OF	BLKG	BLOCKING		
VIEW # OR LETTER	DETAIL OR ENLARGED PLAN CALLOUT	BO	BOTTOM OF	BLKG	BLOCKING		
SHEET #	DETAIL OR ENLARGED PLAN CALLOUT	BO	BOTTOM OF	BLKG	BLOCKING		
VIEW # OR LETTER	INTERIOR ELEVATION	BO	BOTTOM OF	BLKG	BLOCKING		
SHEET #	INTERIOR ELEVATION	BO	BOTTOM OF	BLKG	BLOCKING		
Name	LEVEL NAME / ELEVATION MARKER	BO	BOTTOM OF	BLKG	BLOCKING		
Elevation	LEVEL NAME / ELEVATION MARKER	BO	BOTTOM OF	BLKG	BLOCKING		
NORTH	NORTH ARROW	BO	BOTTOM OF	BLKG	BLOCKING		
VIEW #	VIEW TITLE	BO	BOTTOM OF	BLKG	BLOCKING		
VIEW #	VIEW TITLE	BO	BOTTOM OF	BLKG	BLOCKING		
SHEET #	GRAPHIC SCALE	BO	BOTTOM OF	BLKG	BLOCKING		
SHEET #	GRAPHIC SCALE	BO	BOTTOM OF	BLKG	BLOCKING		

CODE ANALYSIS:

CURRENT BUILDING CODE:
2015 INTERNATIONAL BUILDING CODE

OVERALL PROJECT DESCRIPTION:
RENOVATION OF ADMINISTRATION AREA AT AN EXISTING HIGH SCHOOL. ADDITION OF ACCESSIBLE RAMPS, STAIRS AND MISC. SITE WORK. CODE ANALYSIS OF EFFECTED AREA IN EXISTING BUILDING. ONLY EGRESS IS BEING REROUTED FROM INTERNAL HALLWAY OUT A NEW EXTERIOR DOOR TO PUBLIC WAY. EGRESS AND OCCUPANT LOAD ON HALLWAY AND EXISTING DOORS REEVALUATED.

USE AND OCCUPANCY CLASSIFICATION - CHAPTER 3:
EXISTING SCHOOL - E - EDUCATIONAL
NEW CONSTRUCTION: NO CHANGE

TYPE OF NEW CONSTRUCTION - CHAPTER 4:
IB. NON-SPRINKLERED

FIRE RESISTANCE REQUIREMENTS - CHAPTER 6:
A. BUILDING ELEMENT FIRE RATING
STRUCTURAL FRAME 0 HR
EXTERIOR BEARING WALLS 0 HR
INTERIOR BEARING WALLS 0 HR
INTERIOR NON-BEARING WALLS 0 HR
INTERIOR NON-BEARING PARTITIONS 0 HR
ROOF CONSTRUCTION 0 HR

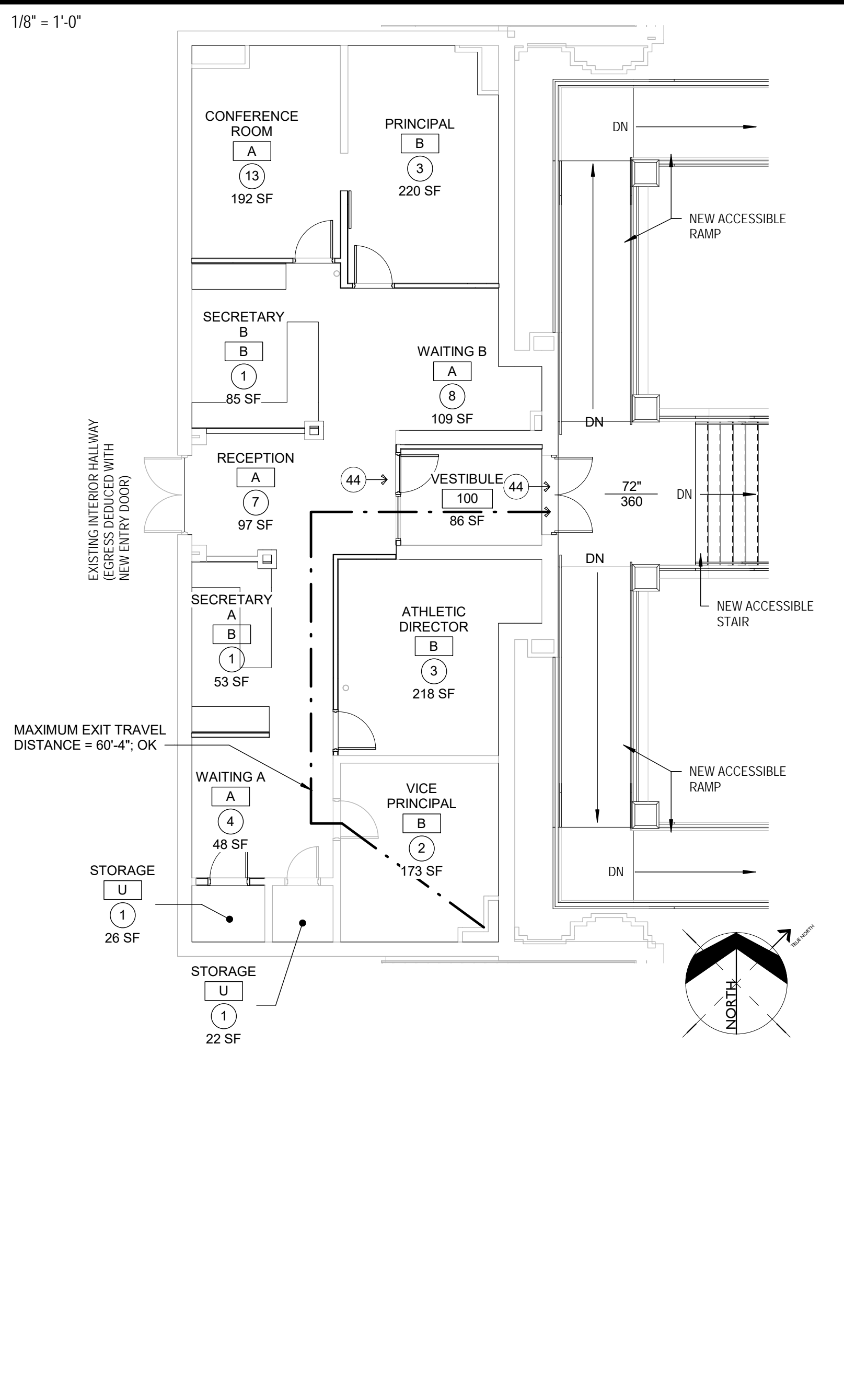
CHAPTER 10 - MEANS OF EGRESS:
A. FOR OCCUPANT LOAD AND EXITING, SEE OCCUPANCY SCHEDULE AND EGRESS PLAN, THIS SHEET.
B. MAX. EXIT ACCESS TRAVEL DISTANCE PER TABLE 1017.2 - 2007-07 ACTUAL EXIT ACCESS TRAVEL DISTANCE - 62'-2" OK

PLUMBING CALCULATIONS:
NO CHANGE IN OCCUPANCY, NO ADDITION TO OCCUPANCY LOAD; NO PLUMBING CHANGE REQUIRED.

OCCUPANCY SCHEDULE

Room #	Room or Area	Occupancy Type	Occupant Type Tag	Floor Area	S.F. Per Person	Occupant Load
BLDG 1 - FIRST F.						
100	VESTIBULE	(none)	B	86 SF		
101	RECEPTION	A-3: Assembly without fixed seats (Unconcentrated (tables and chairs))	A	97 SF	15	7
102	ATHLETIC DIRECTOR	B: Business areas	B	218 SF	100	3
103	VICE PRINCIPAL	B: Business areas	B	173 SF	100	2
104	STORAGE	U: Accessory Storage areas, mechanical equipment room	U	22 SF	300	1
105	STORAGE	U: Accessory Storage areas, mechanical equipment room	U	26 SF	300	1
106	WAITING A	A-3: Assembly without fixed seats (Unconcentrated (tables and chairs))	A	48 SF	15	4
107	SECRETARY A	B: Business areas	B	53 SF	100	1
108	SECRETARY B	B: Business areas	B	85 SF	100	1
109	CONFERENCE ROOM	A-3: Assembly without fixed seats (Unconcentrated (tables and chairs))	A	192 SF	15	13
110	PRINCIPAL	B: Business areas	B	220 SF	100	3
111	WAITING B	A-3: Assembly without fixed seats (Unconcentrated (tables and chairs))	A	109 SF	15	8
				1220 SF		44
				GROSS SF - 1,992		44

EXITING AND OCCUPANCY PLAN:



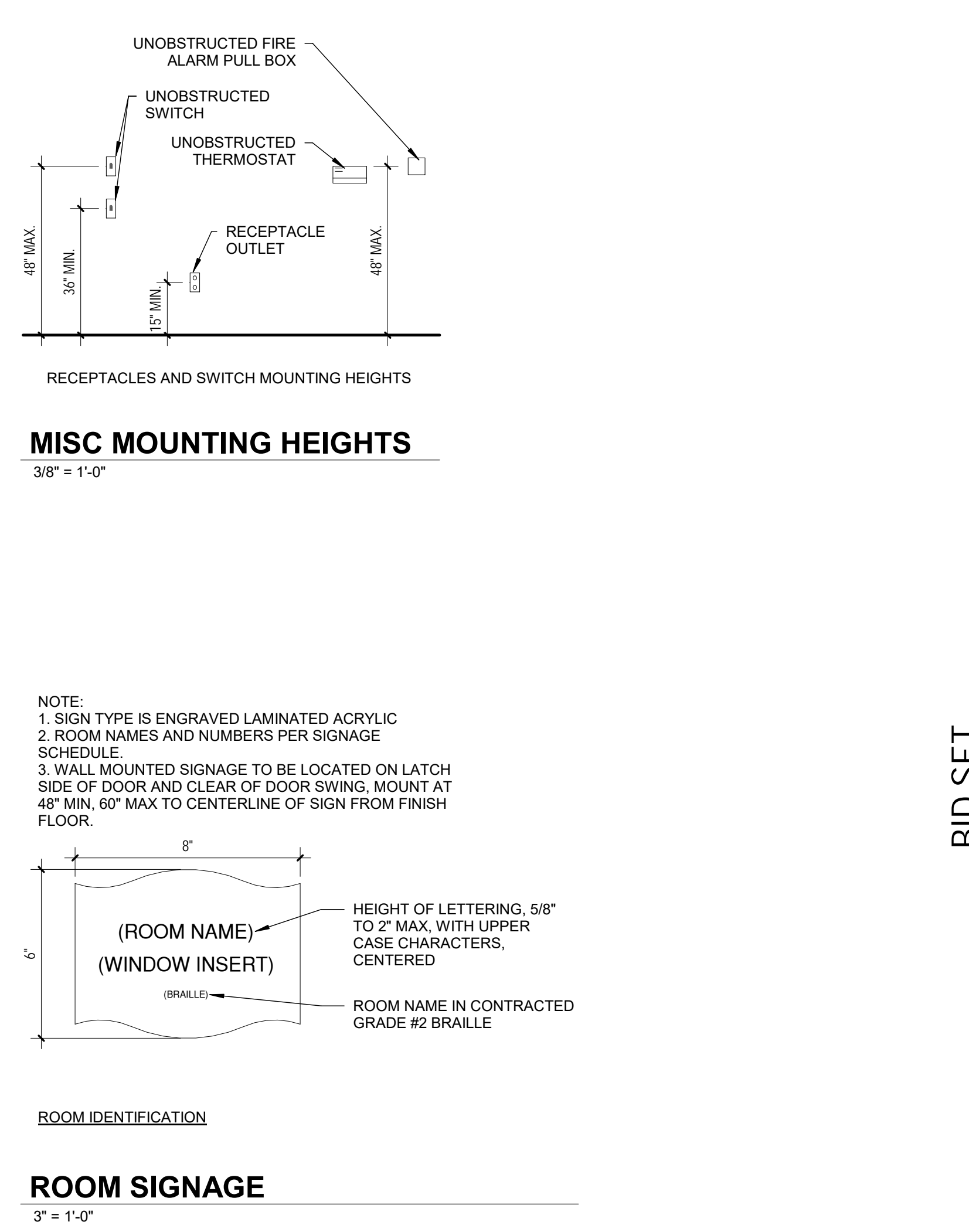
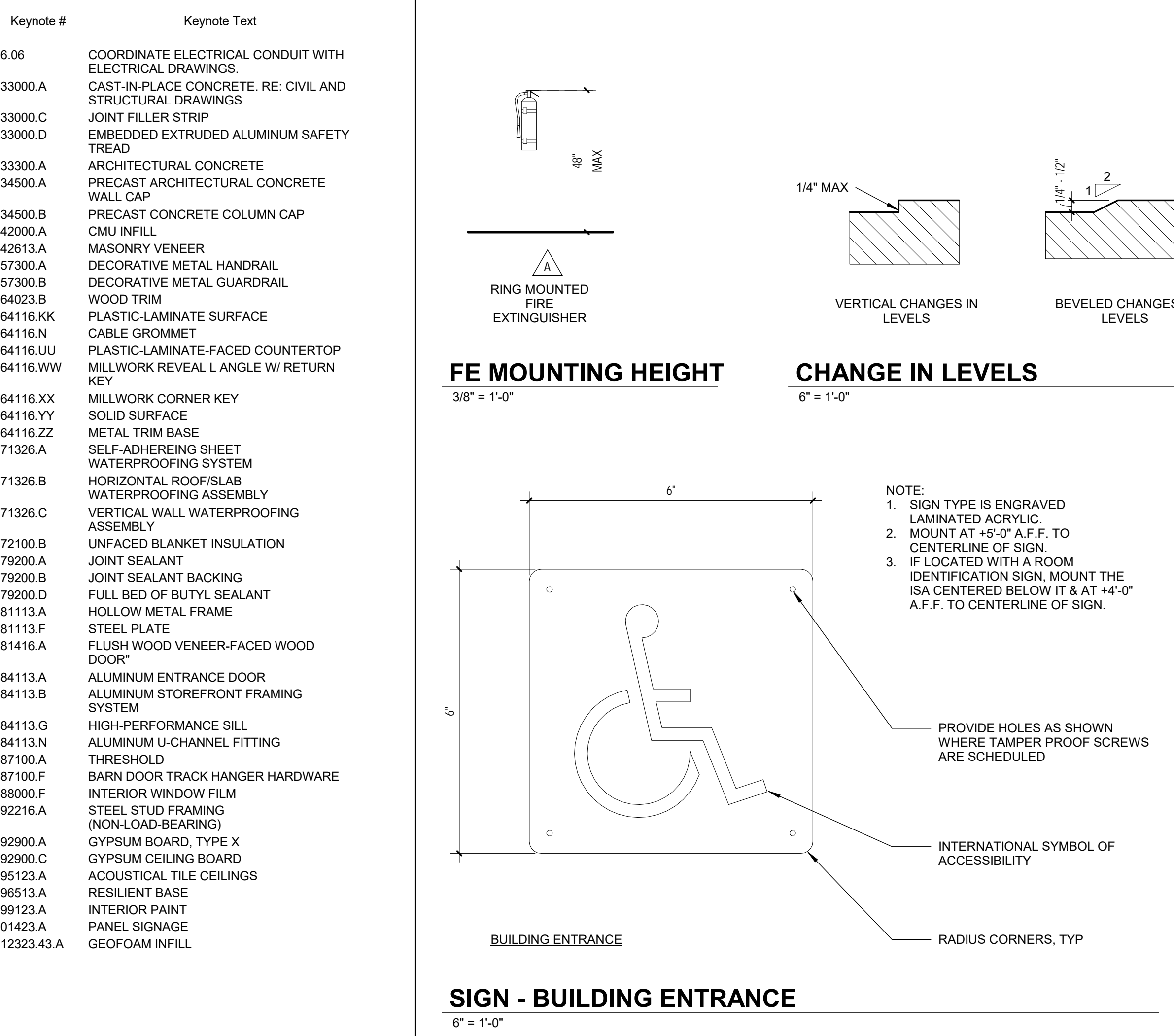
DRAWING INDEX:

GENERAL	COVER SHEET
G0.00	DRAWING INDEX AND INFORMATION
DEMOLITION	
D1.01	DEMO SITE PLAN
D2.01	DEMO PLANS AND ELEVATION
CIVIL	
C1.01	CIVIL SITE PLAN INFORMATION
C1.02	GRADING PLAN INFORMATION
ARCHITECTURAL	
A1.01	COMPOSITE SITE PLAN
A1.11	PARTIAL SITE PLAN AND ELEVATIONS
A1.51	SITE SECTIONS
A1.52	SITE SECTIONS
A1.91	SITE DETAILS
A2.01	COMPOSITE FIRST FLOOR & CEILING PLANS
A2.10	PARTIAL BASEMENT FLOOR AND CEILING PLANS
A2.11	PARTIAL FIRST FLOOR PLAN, CEILING PLAN & WALL TYPES
A4.11	DETAILS
A7.01	DOOR SCHEDULE & TYPES
A7.91	FRAME DETAILS
A8.01	FINISH SCHEDULE, PLAN AND CASEWORK DETAILS
A8.51	INTERIOR ELEVATIONS
STRUCTURAL	
S1.01	GENERAL STRUCTURAL NOTES AND SPECIAL INSPECTION
S1.11	OVERALL BUILDING PLAN
S2.01	ENLARGED RAMP AND ENTRANCE PLAN
S3.01	WALL SECTIONS
S3.11	STRUCTURAL DETAILS
MECHANICAL	
M0.1	MECHANICAL DEMOLITION PLAN
M1.1	MECHANICAL FLOOR PLAN
ELECTRICAL	
E1.0	EXISTING ELECTRICAL, SCHEDULES AND SPECS.
E2.0	ELECTRICAL FLOOR PLANS

MASTER REFERENCE NOTES & KEYNOTES:

Reference Note #	Reference Note Text	Reference Note #	Reference Note Text
1.05	COORDINATE WITH CIVIL DRAWINGS.	2.29	EXISTING CONCRETE TO REMAIN. PROTECT IN PLACE.
1.06	BASE AND FILL. RE: CIVIL DRAWINGS.	2.30	REINSTALL EXISTING BENCHES.
2.01	EXISTING CONSTRUCTION. PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.	2.31	EXISTING TURF TO REMAIN. PROTECT IN PLACE. SEE LANDSCAPE PLANS FOR RELOCATED IRRIGATION SCOPE.
2.02	EXISTING CONSTRUCTION. FIELD VERIFY. REMOVE AND DISPOSE OF EXISTING WINDOW/DOOR SYSTEM. TAKE CARE TO PRESERVE EXTERIOR STONE WORK TRIM IN PLACE. COORDINATE WITH NEW CONSTRUCTION SCOPE OF WORK.	2.32	REMOVE EXISTING STONE DETAIL TO BE RELOCATED IN NEW WORK.
2.05	EXISTING CONSTRUCTION. FIELD VERIFY. REMOVE AND DISPOSE OF EXISTING WINDOW/DOOR SYSTEM. TAKE CARE TO PRESERVE EXTERIOR STONE WORK TRIM IN PLACE. COORDINATE WITH NEW CONSTRUCTION SCOPE OF WORK.	2.33	EXISTING WINDOW. PROTECT IN PLACE. EXISTING SHELVING TO REMAIN. PAINT P-1.
2.09	EXISTING LANDSCAPE. PROTECT IN PLACE.	2.34	EXISTING METAL BENCHES TO BE REMOVED WITH CARE FOR REINSTALLATION IN NEW WORK.
2.10	DEMO EXISTING SOD AND IRRIGATION. VERIFY ALL EXISTING CONDITIONS BEFORE BIDDING. RE: DEMO CIVIL AND LANDSCAPE DRAWINGS.	2.36	EXISTING BRICK. PROTECT IN PLACE. TYP. EXISTING STONE DETAIL. PROTECT IN PLACE, TYP.
2.11	DEMO EXISTING CONCRETE AREA. COORDINATE EXTENTS WITH NEW WORK. RE: DEMO CIVIL DRAWINGS.	2.38	EXISTING CONCRETE. PROTECT IN PLACE, TYP.
2.12	DEMO EXISTING CURB. RE: DEMO CIVIL DRAWINGS.	2.39	EXISTING SIDEWALK.
2.13	REMOVE EXISTING DOOR, DOOR FRAME AND ALL ASSOCIATED ITEMS TO BE REINSTALLED. COORDINATE WITH SCOPE OF NEW WORK.	2.41	RELOCATE IRRIGATION CONTROL BOX. COORDINATE WITH LANDSCAPE AND ELECTRICAL DRAWINGS.
2.14	REMOVE EXISTING WINDOW AND ALL ASSOCIATED ITEMS.	2.42	RELOCATE EXISTING HISTORIC REGISTRATION PLAQUE.
2.16	REMOVE SPEAKER WITH CARE. REINSTALL IN NEW WORK. SEE ELECTRICAL.	2.43	EXISTING CEILING. PROTECT IN PLACE. REMOVE WALL PAPER IN EXISTING PRINCIPAL'S OFFICE.
2.17	DEMO EXISTING CEILING SUSPENSION SYSTEM AND ANCHORS IN ITS ENTIRETY. PREPARE FOR NEW WORK.	2.46	EXISTING DIRT AREA. PREP FOR NEW WORK.
2.18	REMOVE WALL INFILL TO PREVIOUS WINDOW OPENING IN PREPARATION OF NEW WORK.	2.47	REMOVE AND DISPOSE OF EXISTING DOOR SYSTEM. COORDINATE WITH NEW CONSTRUCTION SCOPE OF WORK.
2.19	EXISTING COLUMN. PROTECT IN PLACE. FIELD VERIFY EXACT LOCATION.	3.01	COORDINATE WITH CIVIL DRAWINGS. CONCRETE CONTROL JOINT, TYP. NEW RAMP.
2.20	EXISTING DOOR TO REMAIN. PROTECT IN PLACE.	3.02	NEW STAIR.
2.21	EXISTING MAILBOXES TO BE REMOVED BY OWNER.	3.05	ALIGN CHAMFER TOP OF CAST IN PLACE CONCRETE WALL, TYP.
2.22	EXISTING FIRE EXTINGUISHER TO BE REMOVED WITH CARE FOR REINSTALLATION IN NEW WORK.	3.07	LINE OF RAMPLANDING BEYOND CONCRETE FOOTING AND STEM WALL. RE: STRUCTURAL.
2.23	EXISTING DEFIBRILLATOR TO REMAIN. REMOVE WITH CARE FOR REINSTALLATION IN EXISTING LOCATION.	3.09	SAWCUT DROP EDGE LENGTH OF CAP, EACH SIDE.
2.24	EXISTING CASEWORK TO BE REMOVED IN ITS ENTIRETY.	5.01	CORE DRILL, SLEEVE AND EPOXY GUARDRAIL INTO CAST IN PLACE CONCRETE. RE: STRUCTURAL.
2.26	REMOVE AND REINSTALL IRRIGATION CONTROL BOX IN NEW WORK. RELOCATE IRRIGATION LINE AS NEEDED FOR NEW WORK. VERIFY EXISTING LOCATION AND ROUTING IN FIELD. SEE LANDSCAPE AND ELECTRICAL DRAWINGS.	5.02	RETURN END OF HANDRAIL TO WALL AND CAP OFF.
5.04	2 INCH BY 2 INCH TUBE STEEL	5.03	HANDRAIL SURFACE MOUNTED AT POST, BEYOND.
5.05	3/4 INCH BY 3/4 INCH TUBE STEEL	5.06	2 INCH BY 2 INCH TUBE STEEL
5.06	1-1/2 INCH O.D. HANDRAIL, BEYOND	6.01	INCLUDE BACKSPASH
6.01	REMOVE AND REINSTALL HISTORIC REGISTRY PLAQUE IN NEW WALL.	6.02	14" CLEAT
8.01	REMOVE AND DISPOSE OF EXISTING FRESH AIR INTAKE AS NECESSARY FOR NEW WORK. COORDINATE WITH MECHANICAL DRAWINGS.	8.02	DOORS AS SCHEDULED. REFER TO WINDOW TYPES FOR GLAZING.

ACCESSIBILITY COMPLIANCE:



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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

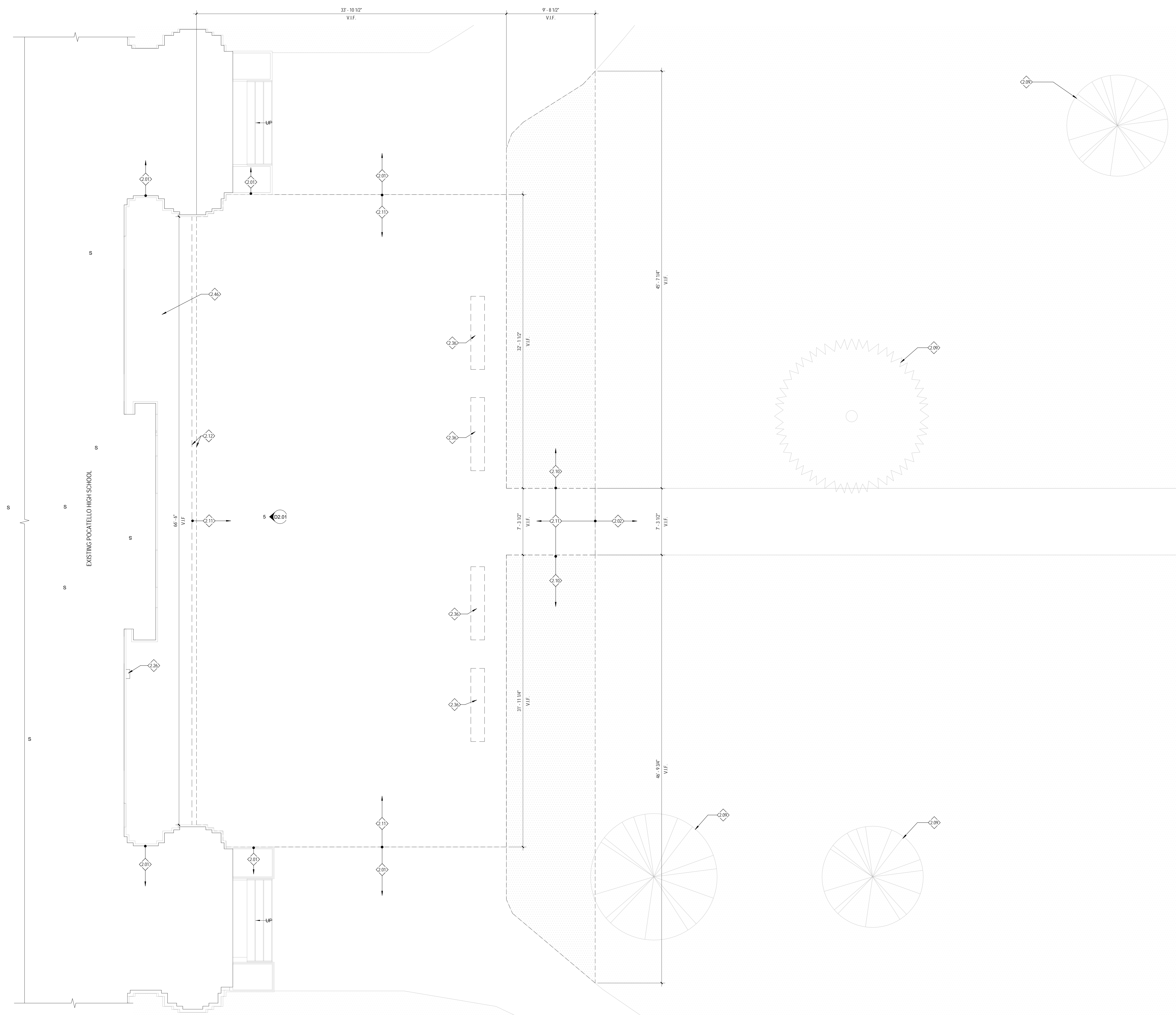
Sheet:
DRAWING INDEX AND INFORMATION

Revisions: △

BID SET

Project No: 18027
Drawn By: LEJH
Checked By: GAJH
Date: 3/19/19

Sheet No:
G0.01



PROPERTY LINE

N ARTHUR AVE

BID SET

KEYNOTES

REFERENCE NOTES

- 2.01 EXISTING CONSTRUCTION. PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- 2.02 EXISTING CONSTRUCTION. FIELD VERIFY.
- 2.09 EXISTING LANDSCAPE. PROTECT IN PLACE.
- 2.10 DEMO EXISTING SOD AND IRRIGATION. VERIFY ALL EXISTING CONDITIONS BEFORE BIDDING. RE: DEMO CIVIL AND LANDSCAPE DRAWINGS.
- 2.11 DEMO EXISTING CONCRETE AREA. COORDINATE EXTENTS WITH NEW WORK. RE: DEMO CIVIL DRAWINGS.
- 2.12 DEMO EXISTING CURB. RE: DEMO CIVIL DRAWINGS.
- 2.26 REMOVE AND REINSTALL IRRIGATION CONTROL BOX IN NEW WORK. RELOCATE IRRIGATION LINE AS NEEDED FOR NEW WORK. VERIFY EXISTING LOCATION AND ROUTING IN FIELD. SEE LANDSCAPE AND ELECTRICAL DRAWINGS.
- 2.36 EXISTING METAL BENCHES TO BE REMOVED WITH CARE FOR REINSTALLATION IN NEW WORK.
- 2.46 EXISTING DIRT AREA. PREP FOR NEW WORK.

GENERAL NOTES

1. BUILDING IS A REGISTERED HISTORIC LANDMARK. CONTRACTORS TO TAKE CARE WORKING AROUND AND IN THE BUILDING. ANY DAMAGE TO EXISTING BUILDING WILL BE REPLACED AND REPAIRED AS OUTLINED BY THE NATIONAL HISTORIC PRESERVATION GUIDELINES, AS OUTLINED BY THE NATIONAL PARK SERVICE, AT NO EXPENSE TO OWNER.
2. PARTIAL SITE PLAN SHOWN AT AREA OF WORK. FOR FULL SITE PLAN RE: COMPOSITE SITE PLAN.
3. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE TO THE FACE OF STUDS FOR GWB WALLS/PARTITIONS.
4. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE TO FACE OF FINISHED MASONRY FOR CMU.
5. SCREENED LINES REPRESENT EXISTING WALLS, DOORS, WINDOW, ETC TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION ACTIVITIES.
6. SEE ELECTRICAL FOR ADDITIONAL DEMOLITION WORK.
7. REPAIR OR REPLACE ANY ITEMS DAMAGED DURING CONSTRUCTION TO INCLUDE BUT NOT LIMITED TO TURF, ASPHALT, SIDEWALKS, IRRIGATION, AND PLAY EQUIPMENT.
8. COORDINATE EXTENTS OF DEMOLITION WITH NEW WORK.

LEGEND

SCALE = 1/8"

- EXISTING WALL SYSTEM TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING WALL SYSTEM TO BE REMOVED.
- EXISTING DOOR SYSTEM TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING DOOR/FRAME SYSTEM TO BE REMOVED.
- EXISTING CONCRETE TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING CONCRETE TO BE REMOVED.
- EXISTING TURF TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING TURF TO BE REMOVED.

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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
 POCATELLO, ID 83204

Sheet:
DEMO SITE PLAN

Revisions:

Project No: 18027
 Drawn By: LEJH
 Checked By: GAJH
 Date: 3-19-19

Sheet No:
D1.01

LEGEND

- EXISTING GYPSUM BOARD CEILING TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING CEILING SYSTEM TO BE REMOVED.
- VERTICAL SERVICE DROP/CHASE. COORDINATE WITH MECHANICAL DRAWINGS.
- EXISTING LIGHTING FIXTURES TO BE REMOVED AND DISPOSED OF. COORDINATE WITH ELECTRICAL DRAWINGS.
- EXISTING MECHANICAL FIXTURES TO BE REMOVED WITH CARE FOR REINSTALLATION IN NEW WORK. COORDINATE WITH MECHANICAL DRAWINGS.
- EXISTING SPEAKER TO BE REMOVED WITH CARE. REINSTALL IN NEW WORK. COORDINATE WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS.
- EXISTING WIRELESS ACCESS POINT TO BE REMOVED WITH CARE. REINSTALL IN NEW WORK. COORDINATE WITH ELECTRICAL DRAWINGS.
- EXISTING LIGHTING FIXTURES TO REMAIN. COORDINATE WITH ELECTRICAL DRAWINGS.
- EXISTING MECHANICAL FIXTURES TO REMAIN. COORDINATE WITH MECHANICAL DRAWINGS.

LEGEND

SCALE = 1/8"

- EXISTING WALL SYSTEM TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING WALL SYSTEM TO BE REMOVED.
- EXISTING DOOR SYSTEM TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING DOOR/FRAME SYSTEM TO BE REMOVED.
- EXISTING CONCRETE TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING CONCRETE TO BE REMOVED.
- EXISTING TURF TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION.
- EXISTING TURF TO BE REMOVED.

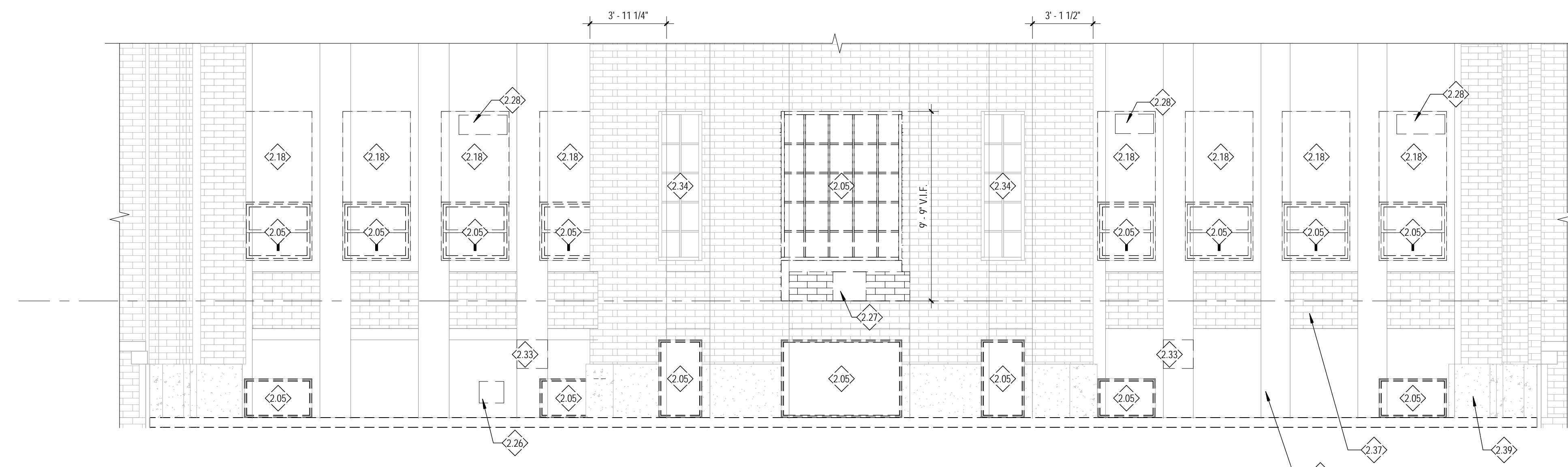
KEYNOTES

REFERENCE NOTES

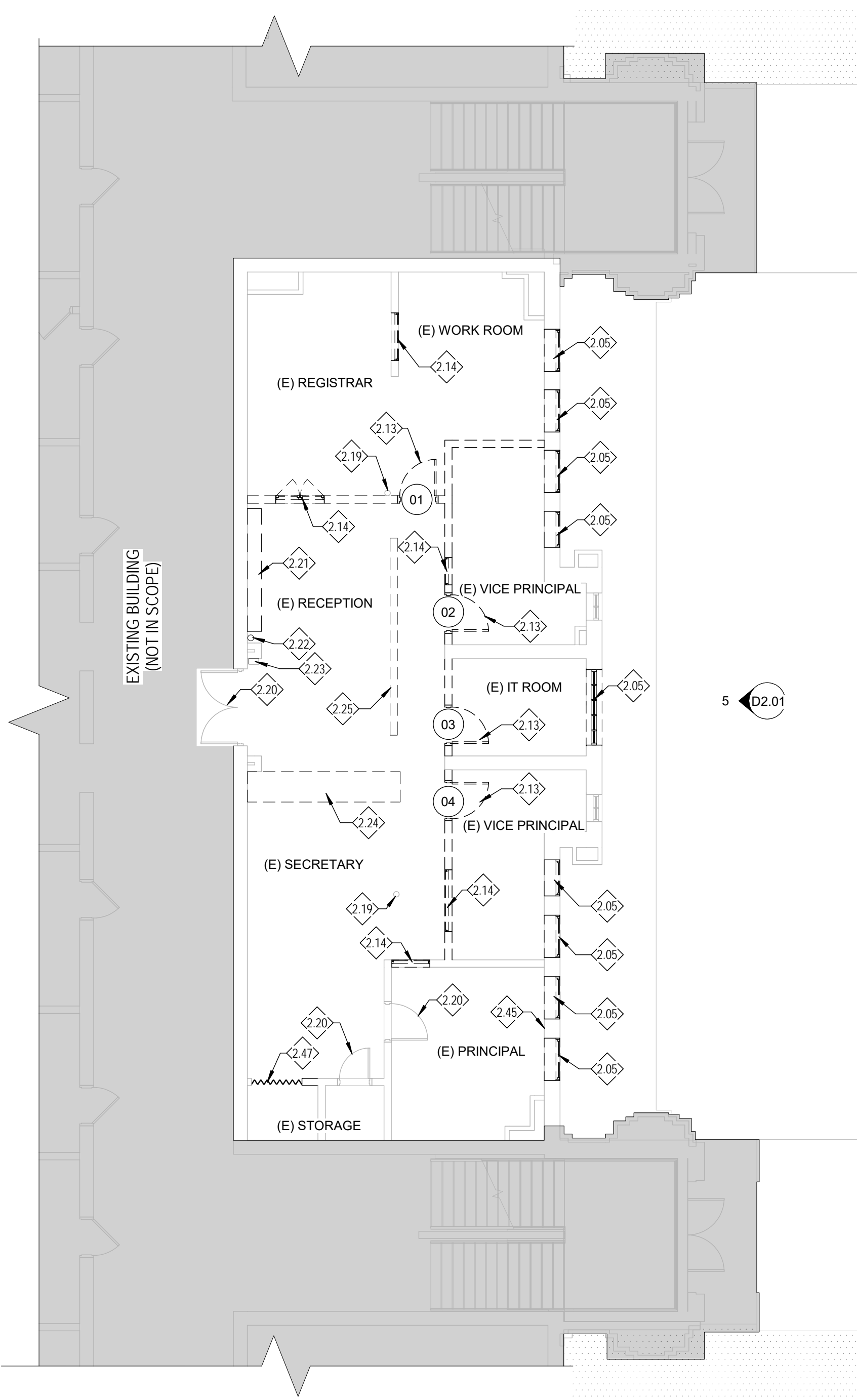
- 2.05 REMOVE AND DISPOSE OF EXISTING WINDOW/DOOR SYSTEM. TAKE CARE TO PRESERVE EXTERIOR STONE WORK TRIM IN PLACE. COORDINATE WITH NEW CONSTRUCTION SCOPE OF WORK.
- 2.13 REMOVE EXISTING DOOR, DOOR FRAME AND ALL ASSOCIATED ITEMS TO BE REINSTALLED. COORDINATE WITH SCOPE OF NEW WORK.
- 2.14 REMOVE EXISTING WINDOW AND ALL ASSOCIATED ITEMS.
- 2.16 REMOVE SPEAKER WITH CARE. REINSTALL IN NEW WORK. SEE ELECTRICAL.
- 2.17 DEMO EXISTING CEILING SUSPENSION SYSTEM AND ANCHORS IN ITS ENTIRETY. PREPARE FOR NEW WORK.
- 2.18 REMOVE WALL INFILL TO PREVIOUS WINDOW OPENING IN PREPARATION OF NEW WORK.
- 2.19 EXISTING COLUMN. PROTECT IN PLACE. FIELD VERIFY EXACT LOCATION.
- 2.20 EXISTING DOOR TO REMAIN. PROTECT IN PLACE.
- 2.21 EXISTING MAILBOXES TO BE REMOVED BY OWNER.
- 2.22 EXISTING FIRE EXTINGUISHER TO BE REMOVED WITH CARE FOR REINSTALLATION IN NEW WORK.
- 2.23 EXISTING DEFIBRILLATOR TO REMAIN. REMOVE WITH CARE FOR PAINTING. REINSTALL IN EXISTING LOCATION.
- 2.24 EXISTING CASEWORK TO BE REMOVED IN ITS ENTIRETY.
- 2.25 EXISTING PONY WALL TO BE REMOVED IN ITS ENTIRETY.
- 2.26 REMOVE AND REINSTALL IRRIGATION CONTROL BOX IN NEW WORK. RELOCATE IRRIGATION LINE AS NEEDED FOR NEW WORK. VERIFY EXISTING LOCATION AND ROUTING IN FIELD. SEE LANDSCAPE AND ELECTRICAL DRAWINGS.
- 2.27 REMOVE AND REINSTALL HISTORIC REGISTRY PLAQUE IN NEW WALL.
- 2.28 REMOVE AND DISPOSE OF EXISTING FRESH AIR INTAKE AS NECESSARY FOR NEW WORK. COORDINATE WITH MECHANICAL DRAWINGS.
- 2.33 REMOVE EXISTING STONE DETAIL TO BE RELOCATED IN NEW WORK.
- 2.34 EXISTING WINDOW. PROTECT IN PLACE.
- 2.37 EXISTING BRICK. PROTECT IN PLACE, TYP.
- 2.38 EXISTING STONE DETAIL. PROTECT IN PLACE, TYP.
- 2.39 EXISTING CONCRETE. PROTECT IN PLACE, TYP.
- 2.45 REMOVE WALL PAPER IN EXISTING PRINCIPAL'S OFFICE.
- 2.47 REMOVE AND DISPOSE OF EXISTING DOOR SYSTEM. COORDINATE WITH NEW CONSTRUCTION SCOPE OF WORK.

GENERAL NOTES

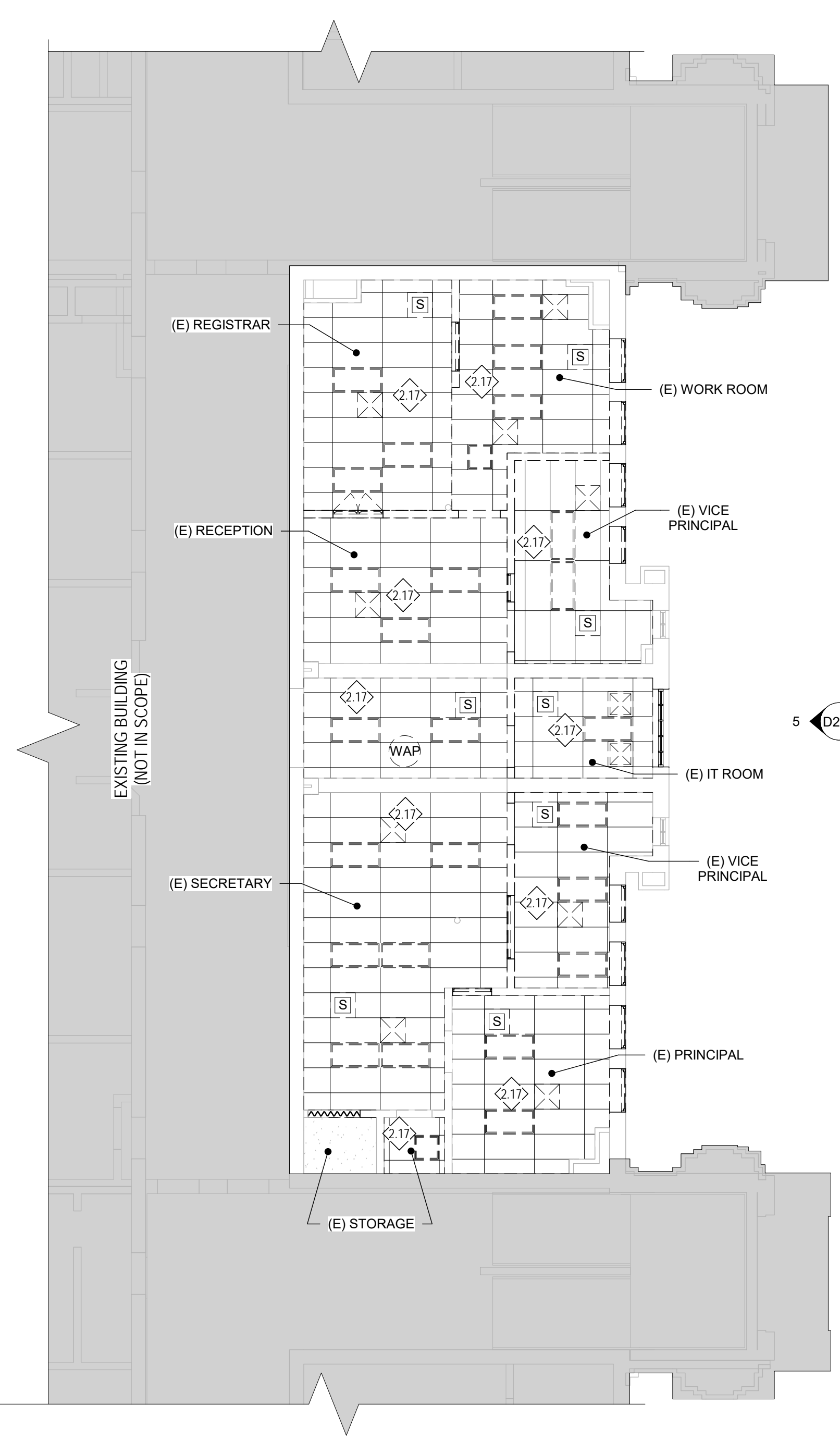
1. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE TO THE FACE OF STUDS FOR GWB WALLS/PARTITIONS.
2. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE TO FACE OF FINISHED MASONRY OR CMU.
3. SCREENED LINES REPRESENT EXISTING WALLS, DOORS, WINDOWS, ETC TO REMAIN. PROTECT FROM DAMAGE DURING CONSTRUCTION ACTIVITIES.
4. FOR DIMENSIONAL EXTENTS OF EXISTING WALL DEMOLITION, CUTTING AND PATCHING, SEE NEW FLOOR PLANS.
5. PROTECT FROM DAMAGE ALL EXISTING TO REMAIN CASEWORK, EQUIPMENT, FLOOR FINISHES AND CEILING FINISHES DURING CONSTRUCTION.
6. PROTECT FROM DAMAGE DURING DEMOLITION, MOVING AND CONSTRUCTION ALL EXISTING CASEWORK, EQUIPMENT, FURNITURE AND ARTWORK THAT IS TO BE RE-USED.
7. SEE CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL DEMOLITION WORK.
8. COORDINATE THE DEMOLITION OF EXISTING CEILING WITH NEW PLANS, REFLECTED CEILING PLANS AND ROOM FINISH SCHEDULE.
9. WHERE EXISTING CARPET/CARPET TILE ARE TO REMAIN, CUT AND PATCH CARPET AS REQUIRED TO FACILITATE NEW CONSTRUCTION.
10. REMOVE ALL ANCHORS COMPLETELY FROM ASSEMBLIES/SYSTEMS NOTED FOR DEMOLITION.



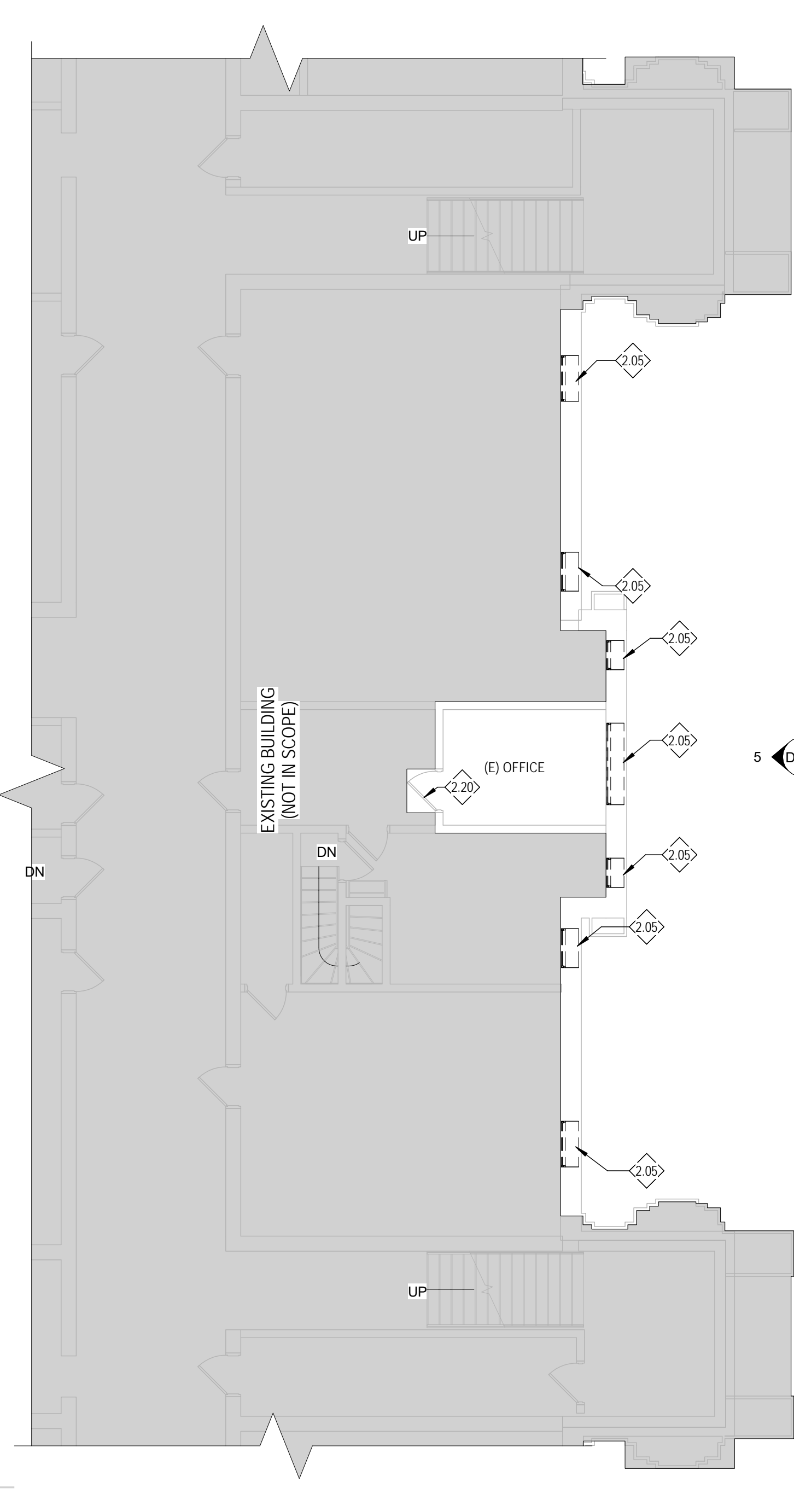
5 PARTIAL EAST DEMO ELEVATION
D2.01 1/4" = 1'-0"



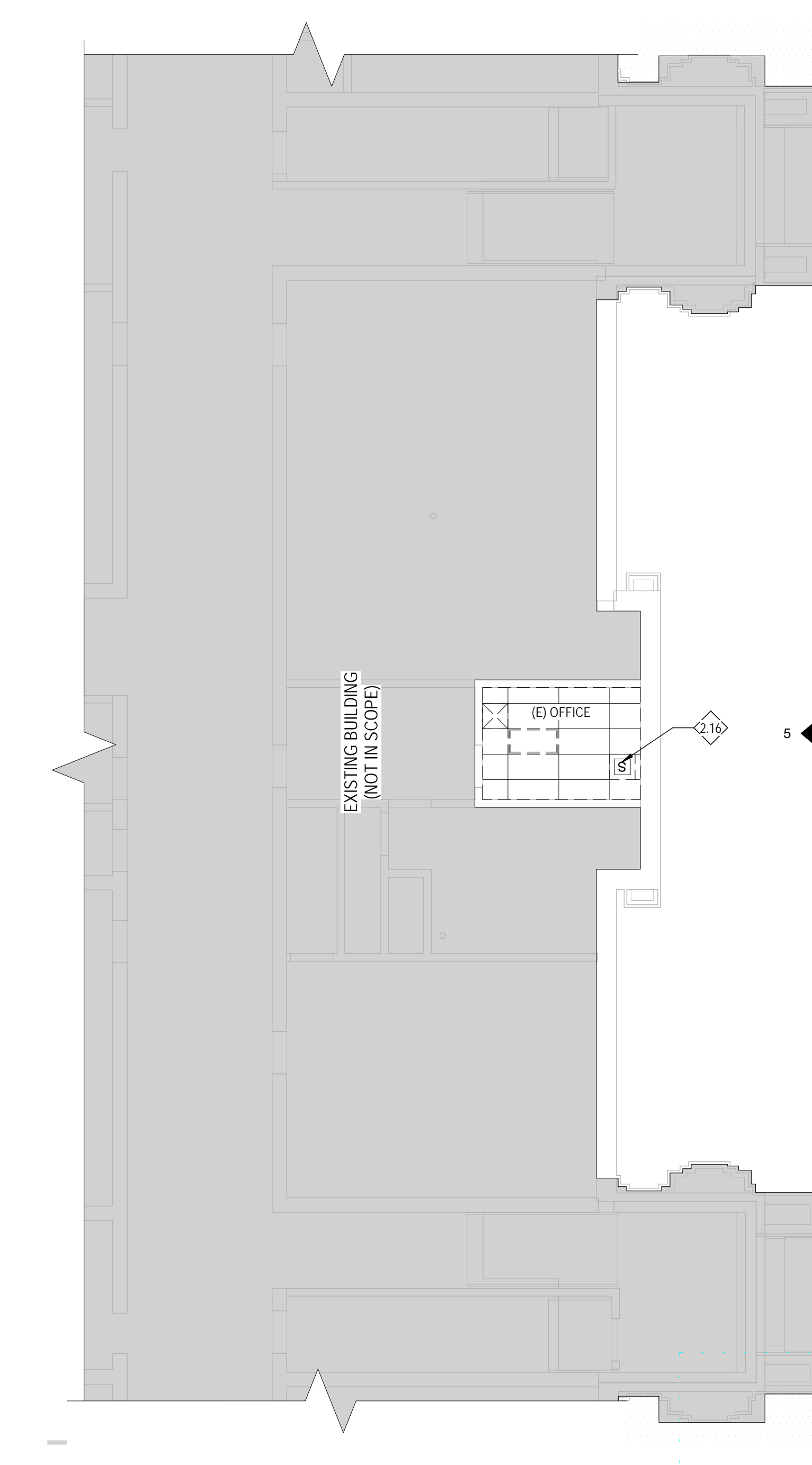
1 LEVEL 1 DEMO FLOOR PLAN
D2.01 1/8" = 1'-0"



2 LEVEL 1 DEMO CEILING PLAN
D2.01 1/8" = 1'-0"



3 BASEMENT DEMO FLOOR PLAN
D2.01 1/8" = 1'-0"



4 BASEMENT DEMO CEILING PLAN
D2.01 1/8" = 1'-0"

BID SET

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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

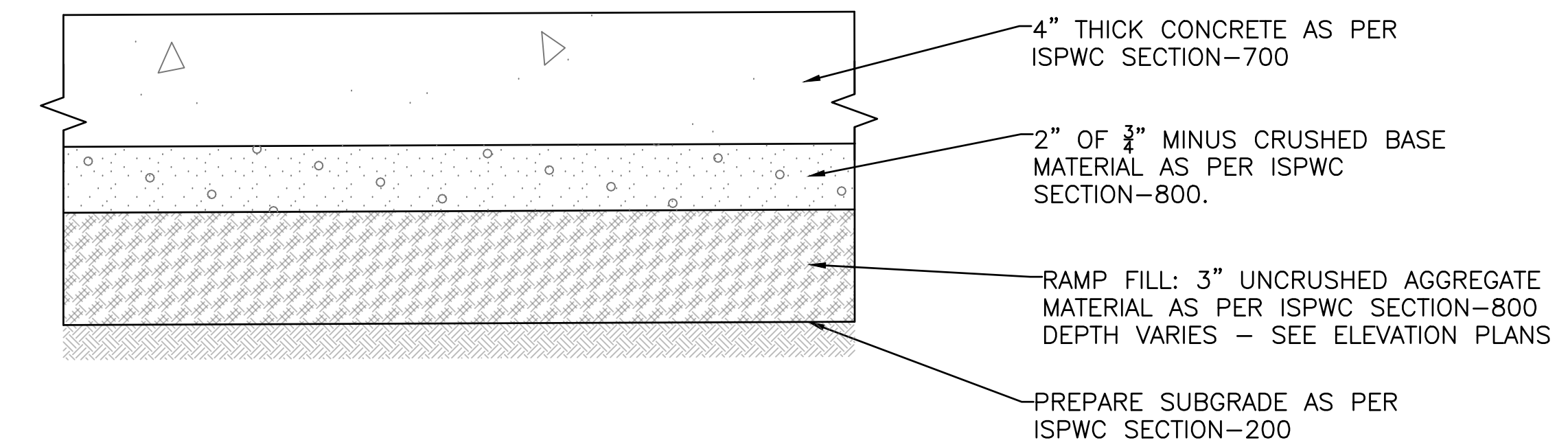
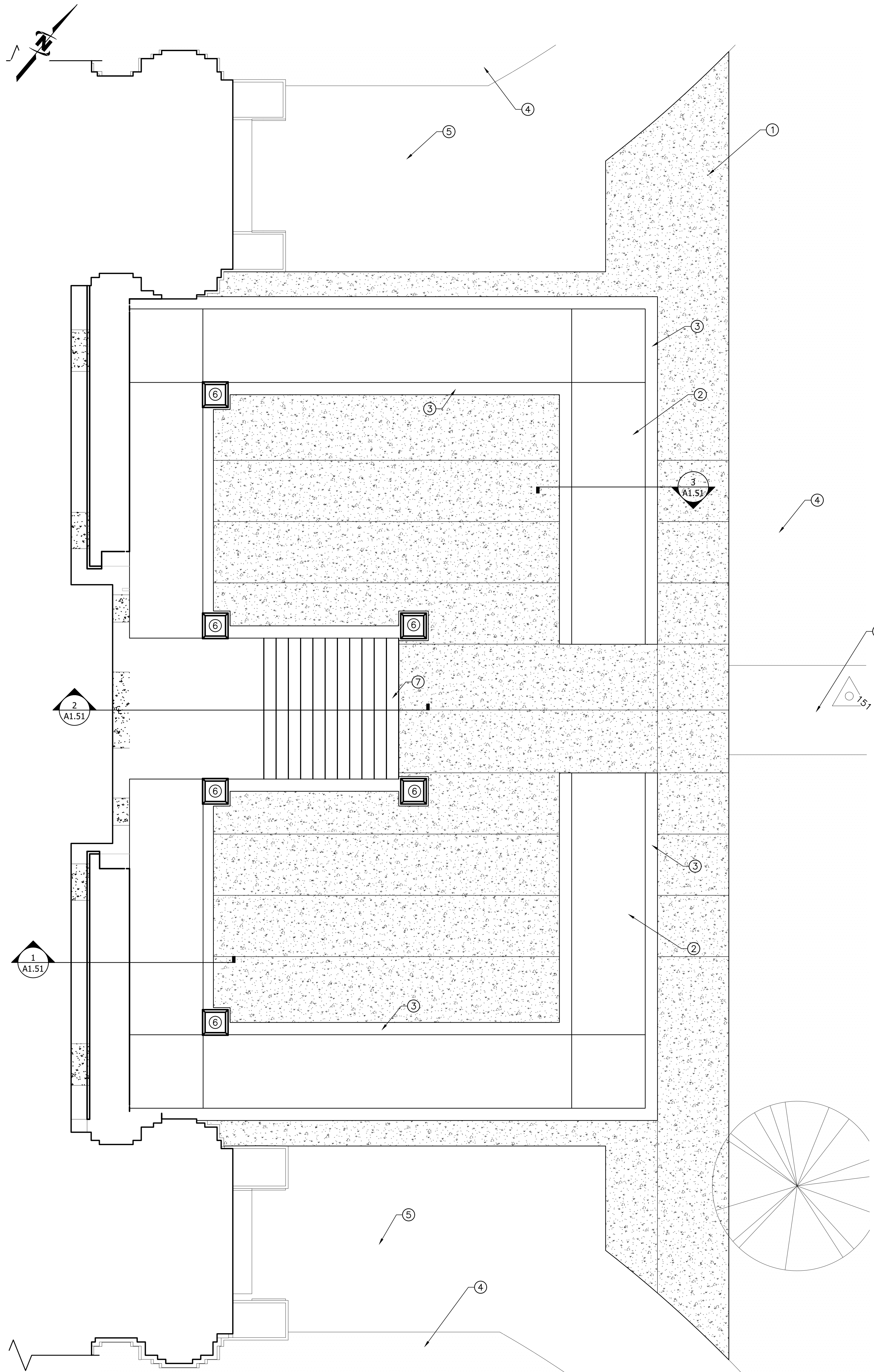
325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
DEMO PLANS AND ELEVATION

Revisions:

Project No: 18027
Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

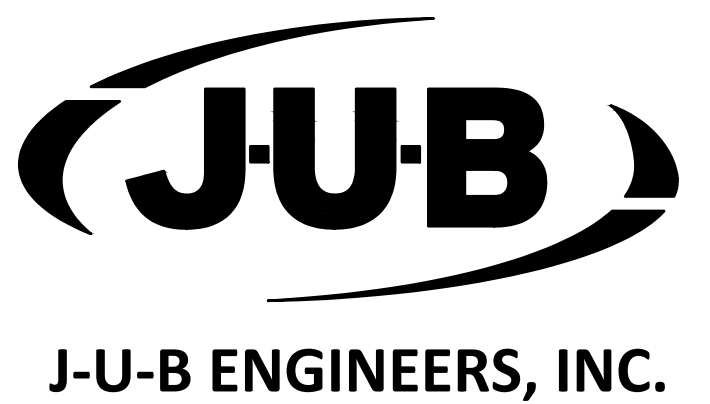
Sheet No:
D2.01



- NOTES:
- A. BROOM FINISH CONCRETE SURFACE.
 - B. BASE AND PIT RUN TO BE COMPACTED TO EXCEED 95% OF STANDARD DENSITY.
 - C. SCORE SIDEWALK AT INTERVALS NOT TO EXCEED 5 FEET SPACING IN BOTH DIRECTIONS.
 - D. PLACE $\frac{1}{2}$ " PREFORMED BITUMINOUS JOINT WHERE SIDEWALK IS PLACED ADJACENT TO A STRUCTURE. PLACE $\frac{1}{2}$ " EXPANSION JOINT MATERIAL ALONG THE BACK OF WALK THE FULL LENGTH.
 - E. SIDEWALK CONSTRUCTION JOINTS SHALL BE CONSTRUCTED APPROXIMATELY $\frac{1}{2}$ " WIDE, $\frac{3}{4}$ " IN DEPTH AND FINISHED AND EDGED SMOOTH. A PREFORMED EXPANSION POINT FILLER SHALL BE PLACED EVERY 40' FOR NEW SIDEWALK CONSTRUCTION.
 - F. ALL CONCRETE SHALL BE CLASS 3000 PER SECTION 703 UNLESS NOTED OTHERWISE.
 - G. MATERIAL TESTING FREQUENCIES SHALL MEET ISPMC REQUIREMENTS.

1 SIDEWALK AND RAMP TYPICAL SECTION
SCALE: NTS

- KEYNOTES
- ① PROPOSED CONCRETE SIDEWALK/COURTYARD. SEE TYPICAL SECTION THIS SHEET.
 - ② PROPOSED CONCRETE PEDESTRIAN RAMP. SEE TYPICAL SECTION THIS SHEET.
 - ③ PROPOSED RETAINING WALL.
 - ④ EXISTING LANDSCAPE AREA. RETAIN AND PROTECT.
 - ⑤ EXISTING SIDEWALK. RETAIN AND PROTECT.
 - ⑥ PROPOSED COLUMN.
 - ⑦ PROPOSED STAIRWAY.



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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
 POCATELLO, ID 83204

Sheet:
CIVIL SITE PLAN INFORMATION

Revisions: Δ

ORIGINAL SIGNED BY:
ANDREA LYNN SHEPPARD
 3/8/19
 STORED AT: 275 S. 8TH AVE., STE. #220, POCATELLO, ID 83201

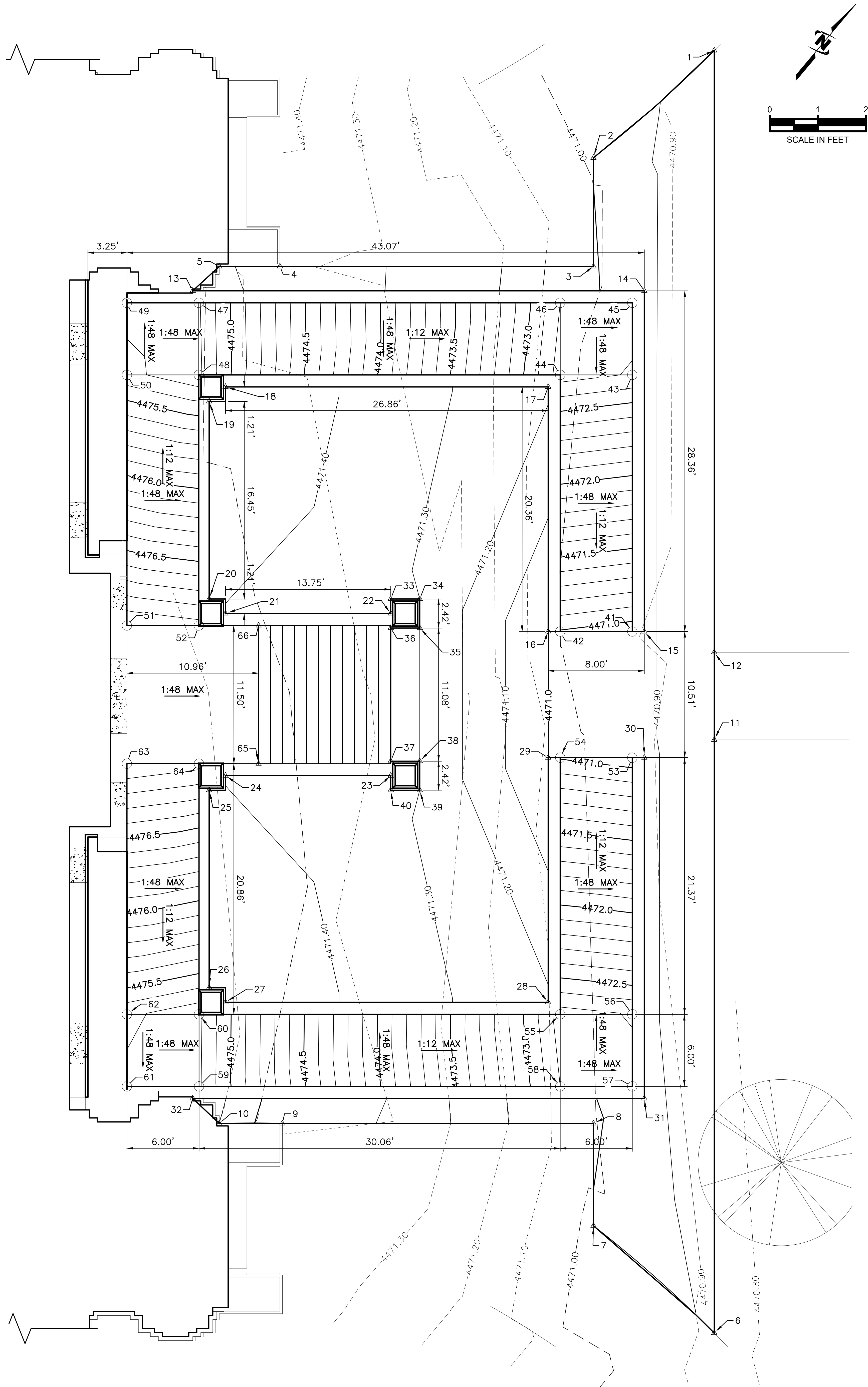
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CONTROL POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
150	436210.29	579209.14	4469.07	CTRL
151	436156.09	579116.33	4470.70	CTRL
152	436301.27	579068.38	4468.92	CTRL

Project No: 18027
 Drawn By: AS
 Checked By: GAMA
 Date: 3/8/2019

Sheet No:

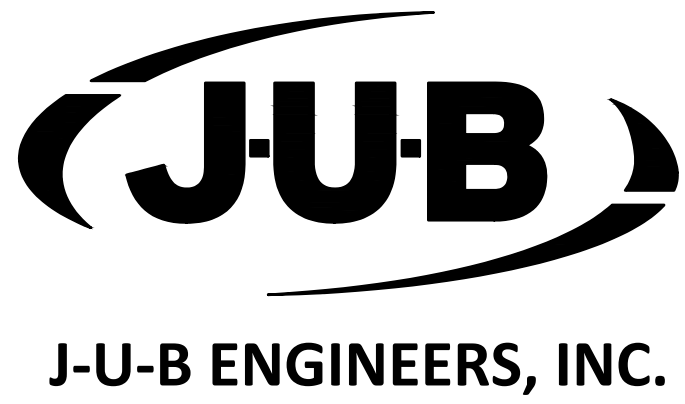
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GRADING POINT TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	436190.01	579074.95	4470.83	MATCH
2	436176.70	579073.01	4470.98	MATCH
3	436169.78	579078.83	4471.01	MATCH
4	436152.98	579058.86	4471.37	MATCH
5	436149.73	579055.00	4471.44	MATCH
6	436108.33	579143.69	4470.87	MATCH
7	436108.69	579130.25	4470.98	MATCH
8	436115.20	579124.76	4471.02	MATCH
9	436098.53	579104.95	4471.43	MATCH
10	436095.15	579100.93	4471.60	MATCH
11	436146.10	579111.90	4470.83	MATCH
12	436151.68	579107.20	4470.81	MATCH
13	436146.76	579054.62	4471.50	RW
14	436170.96	579083.38	4470.92	RW
15	436149.26	579101.64	4470.92	RW
16	436144.11	579095.51	4471.00	RW
17	436159.69	579082.41	4471.22	RW
18	436142.39	579061.86	4471.50	RW
19	436140.59	579061.59	4471.50	RW
20	436128.01	579072.18	4471.41	RW
21	436127.96	579074.00	4471.40	RW
22	436136.81	579084.52	4471.32	RW
23	436126.48	579093.21	4471.32	RW
24	436117.63	579082.69	4471.40	RW
25	436115.83	579082.43	4471.41	RW
26	436103.24	579093.02	4471.50	RW
27	436103.20	579094.84	4471.50	RW
28	436120.49	579115.39	4471.22	RW
29	436136.07	579102.28	4471.00	RW
30	436141.22	579108.40	4470.92	RW
31	436119.52	579126.66	4470.92	RW
32	436095.32	579097.90	4471.65	RW
33	436137.74	579083.74	4471.31	COL
34	436139.29	579085.59	4471.30	COL
35	436137.44	579087.15	4471.30	COL
36	436135.89	579085.30	4471.39	COL
37	436127.41	579092.44	4471.39	COL
38	436128.96	579094.28	4471.30	COL
39	436127.12	579095.84	4471.30	COL
40	436125.56	579093.99	4471.31	COL
41	436148.61	579100.87	4470.93	RAMP
42	436144.75	579096.28	4470.99	RAMP
43	436164.96	579087.12	4472.69	RAMP
44	436161.10	579082.53	4472.75	RAMP
45	436169.55	579083.25	4472.74	RAMP
46	436165.69	579078.66	4472.80	RAMP
47	436146.32	579055.65	4475.21	RAMP
48	436141.72	579059.51	4475.22	RAMP
49	436142.46	579051.07	4475.27	RAMP
50	436137.87	579054.93	4475.33	RAMP
51	436121.91	579068.36	4477.00	RAMP
52	436125.76	579072.94	4476.94	RAMP
53	436140.58	579107.63	4470.93	RAMP
54	436136.72	579103.04	4470.99	RAMP
55	436120.37	579116.80	4472.75	RAMP
56	436124.23	579121.39	4472.69	RAMP
57	436119.64	579125.25	4472.74	RAMP
58	436115.78	579120.66	4472.80	RAMP
59	436096.42	579097.66	4475.21	RAMP
60	436101.01	579093.79	4475.22	RAMP
61	436092.56	579093.07	4475.27	RAMP
62	436097.15	579089.20	4475.33	RAMP
63	436113.11	579075.77	4477.00	RAMP
64	436116.97	579080.36	4476.94	RAMP
65	436120.17	579084.15	4476.89	ST
66	436128.97	579076.75	4476.89	ST

NOTES:
 1. CONSTRUCT PEDESTRIAN RAMP IN ACCORDANCE WITH CURRENT ADA STANDARDS.
 2. ALL ELEVATION CALLOUTS ARE TO THE TOP OF SIDEWALK OR RAMP CONCRETE.
 3. FIELD VERIFY POINTS THAT ARE TO MATCH EXISTING CONCRETE.
 MATCH — MATCH EXISTING CONCRETE
 RW — RETAINING WALL
 COL — COLUMN
 RAMP — PEDESTRIAN RAMP
 ST — STAIRS



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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
 POCATELLO, ID 83204

Sheet:
GRADING PLAN INFORMATION

Revisions: Δ

ORIGINAL SIGNED BY:
 ANDREA LYNN SHEPPARD
 5/2/19
 STORED AT: 275 S. 5TH AVE., STE. #220, POCATELLO, ID 83201

BID SET 3/19/19

Project No: 18027
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 Checked By: GAMA
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KEYNOTES

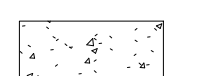
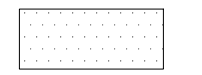

REFERENCE NOTES

- 2.09 EXISTING LANDSCAPE. PROTECT IN PLACE.
- 2.40 EXISTING SIDEWALK
- 3.04 NEW RAMP
- 3.05 NEW STAIR

GENERAL NOTES

1. PRIOR TO START OF CONSTRUCTION, CONTRACTOR TO VERIFY POSITION AND CONDITION OF ALL EXISTING BENCHMARKS.
2. EXISTING BENCHMARKS ARE NOT TO BE DISTURBED.
3. COORDINATE WITH CIVIL FOR GRADING AND DRAINAGE ELEVATIONS.
4. ANY DISCREPANCIES IN ACTUAL FIELD CONDITIONS, IF AT ODDS WITH INDICATIONS IN THESE DOCUMENTS, SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT OR CONSTRUCTION MANAGER.

LEGEND

-  NEW CONCRETE WALKWAY
-  EXISTING TURF
-  SITE LIGHTING (COORDINATE WITH ELECTRICAL DRAWINGS)

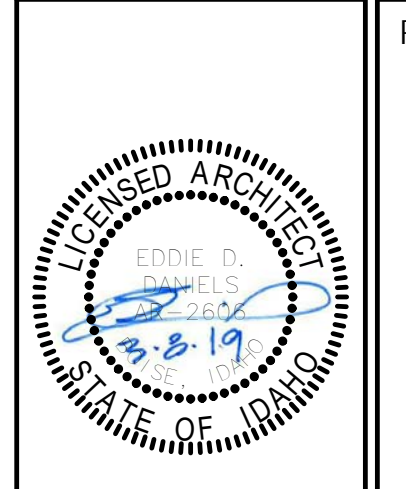
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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
 POCATELLO, ID 83204

Sheet:
COMPOSITE SITE PLAN

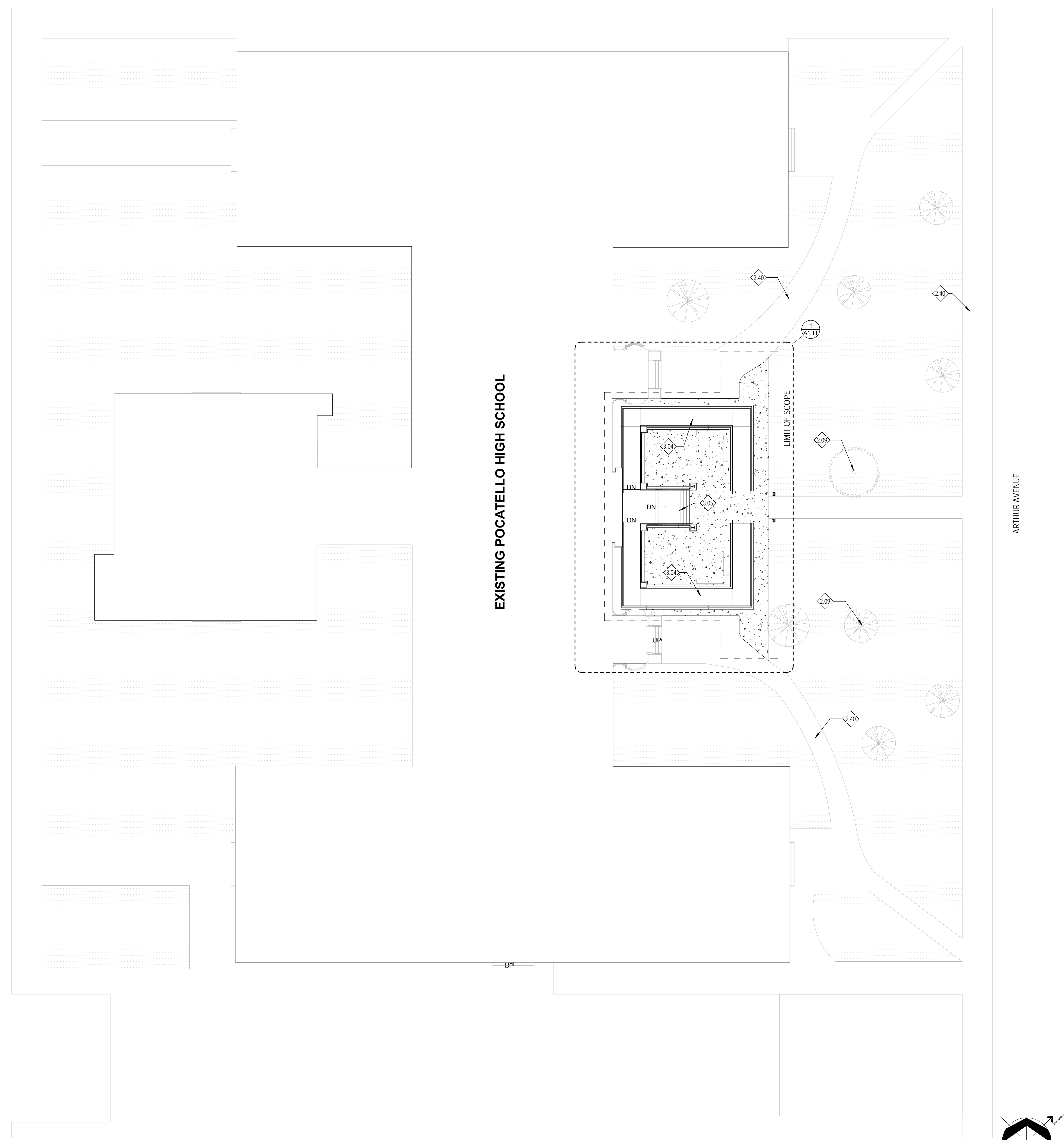
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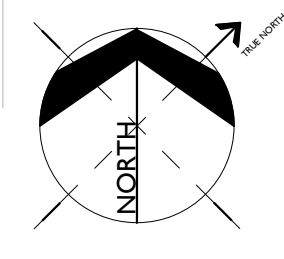
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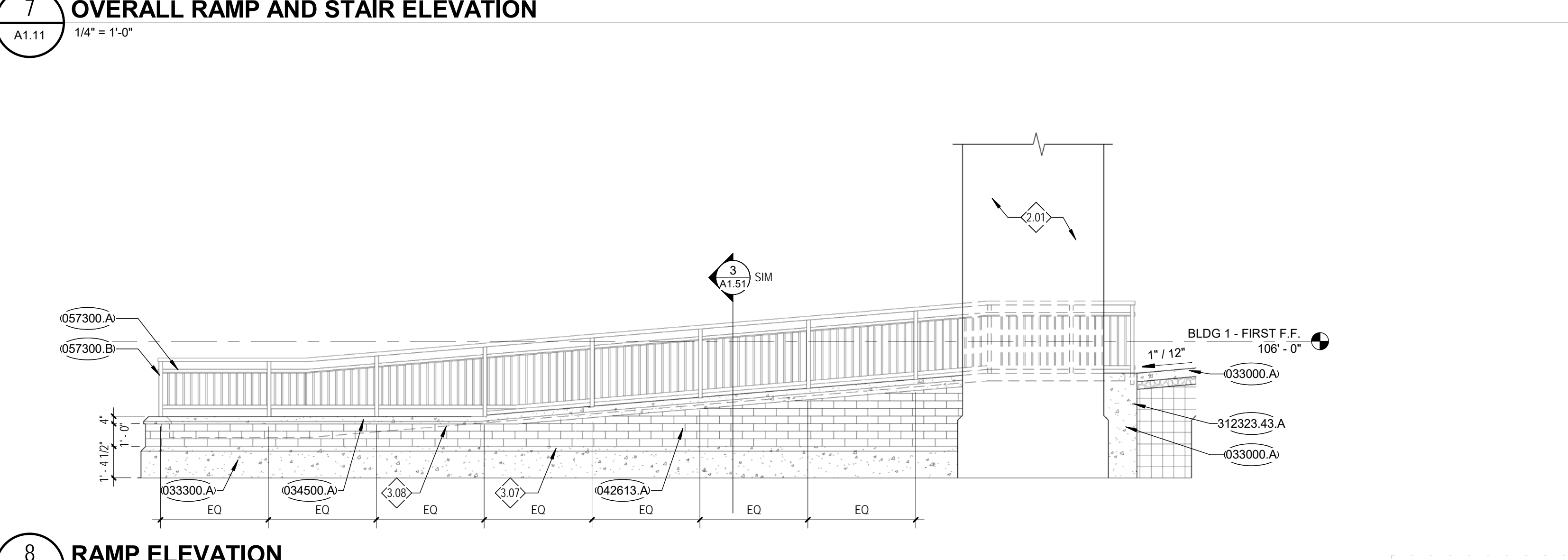
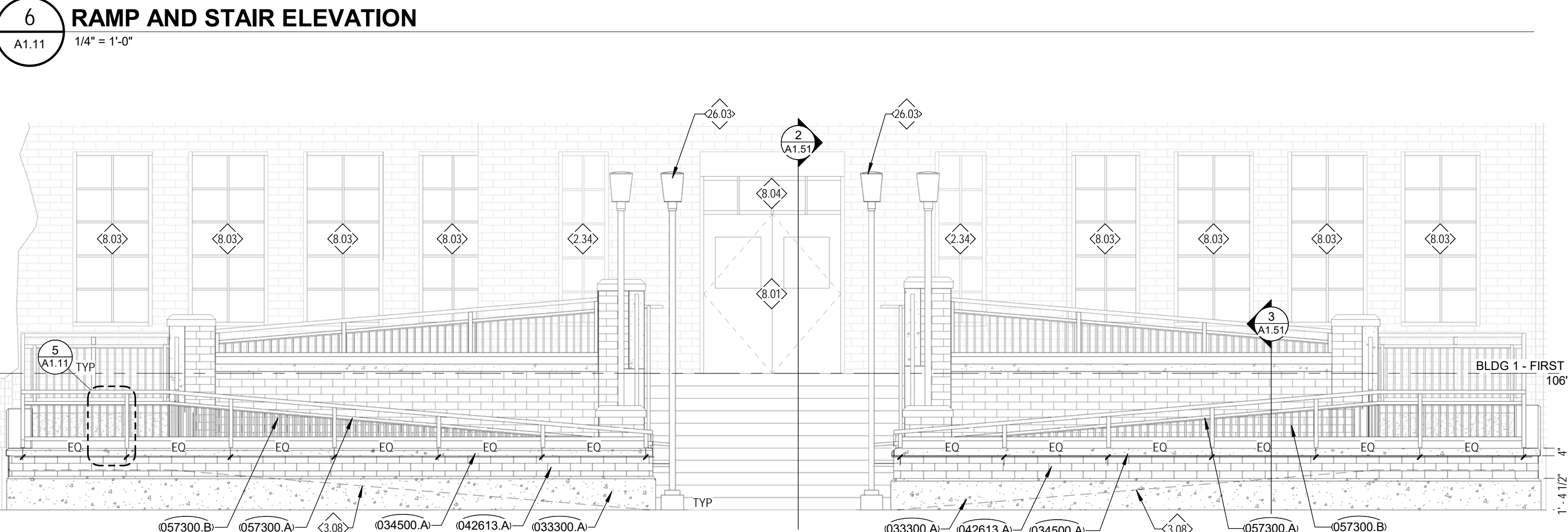
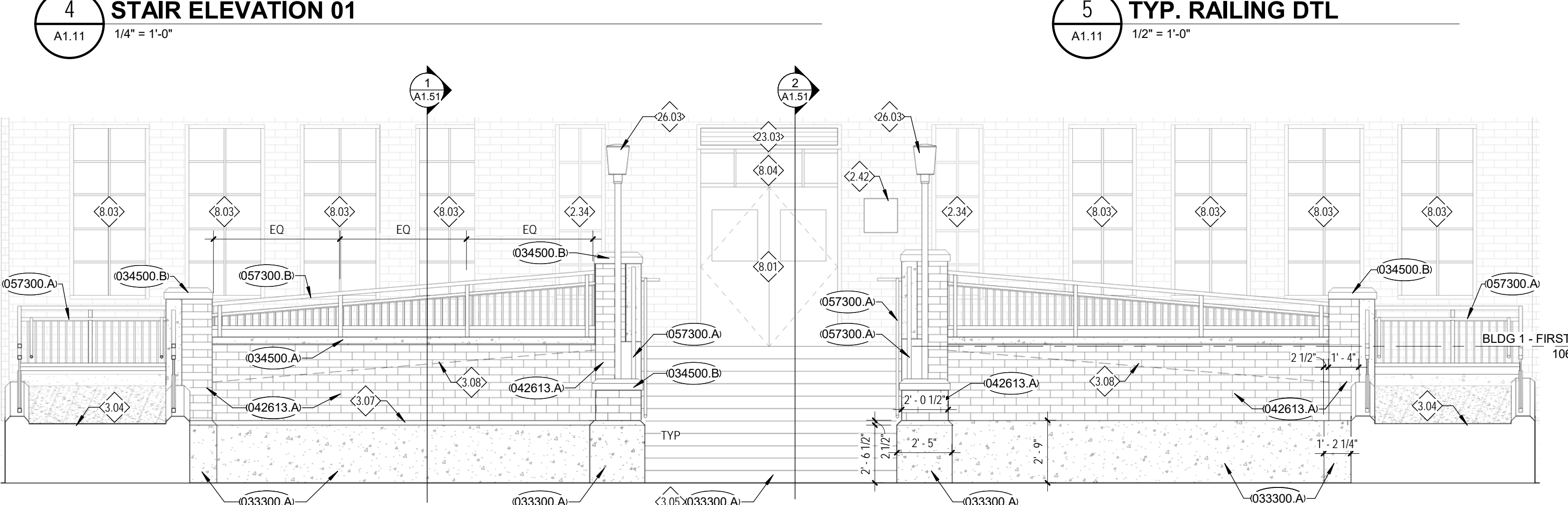
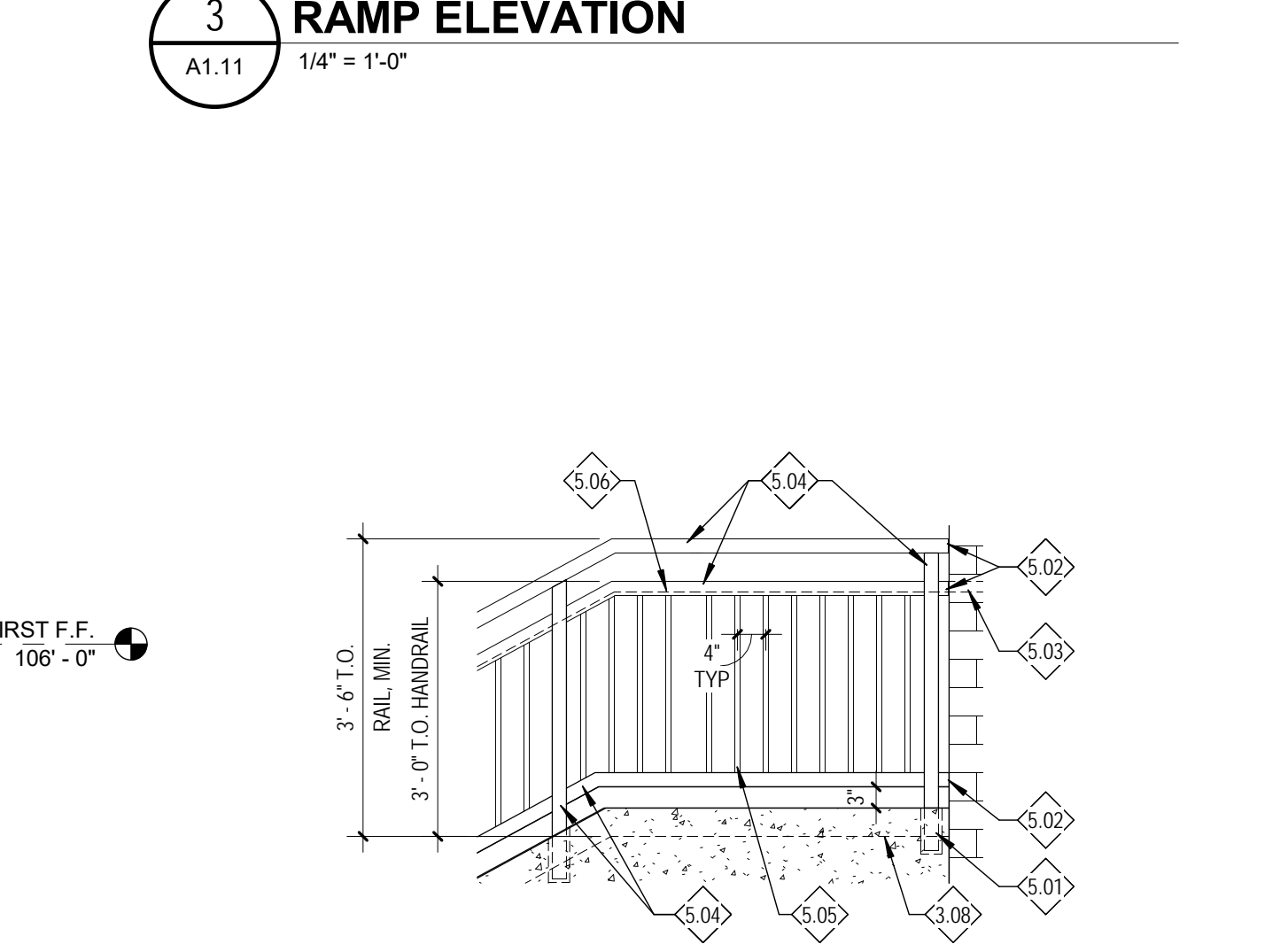
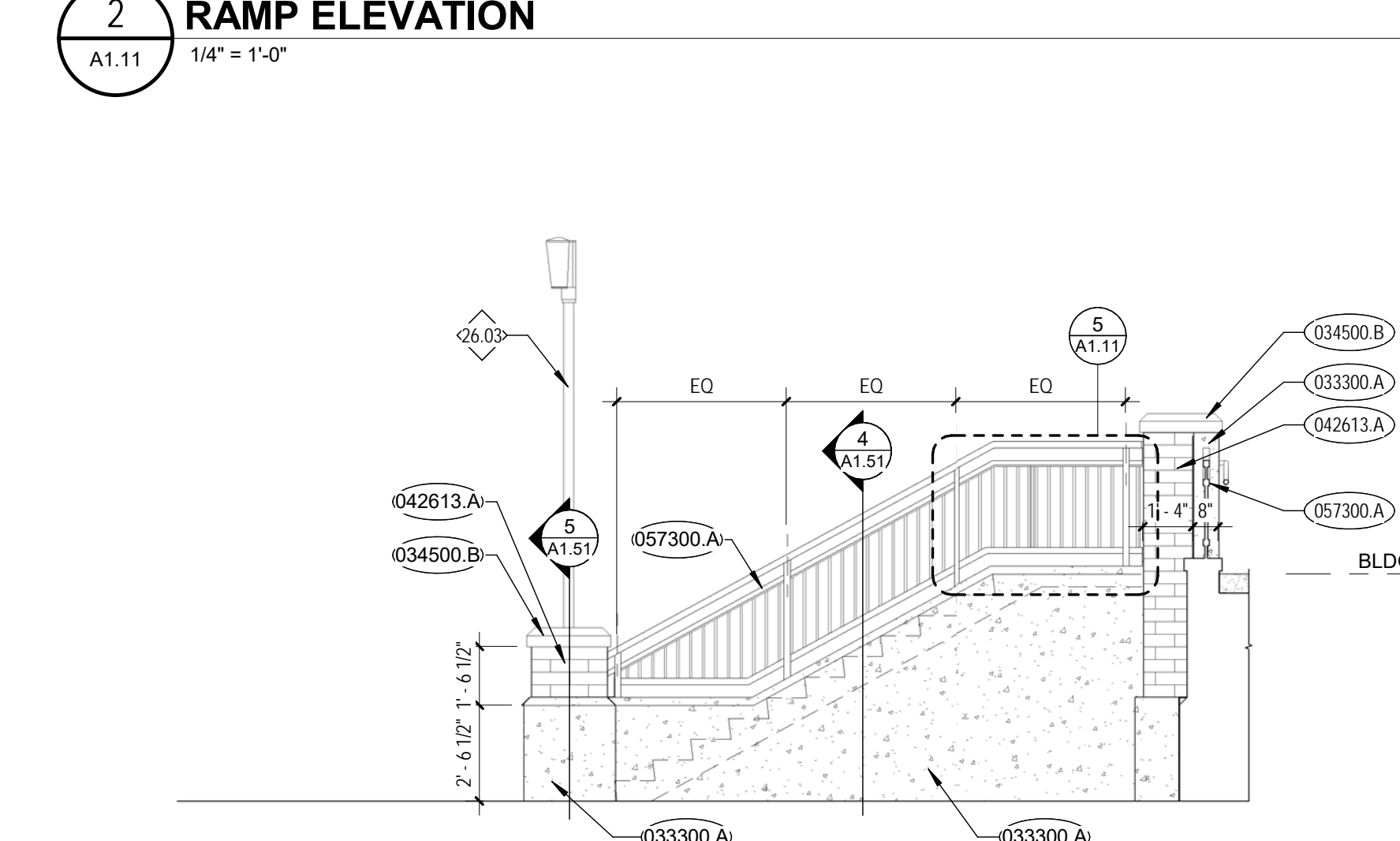
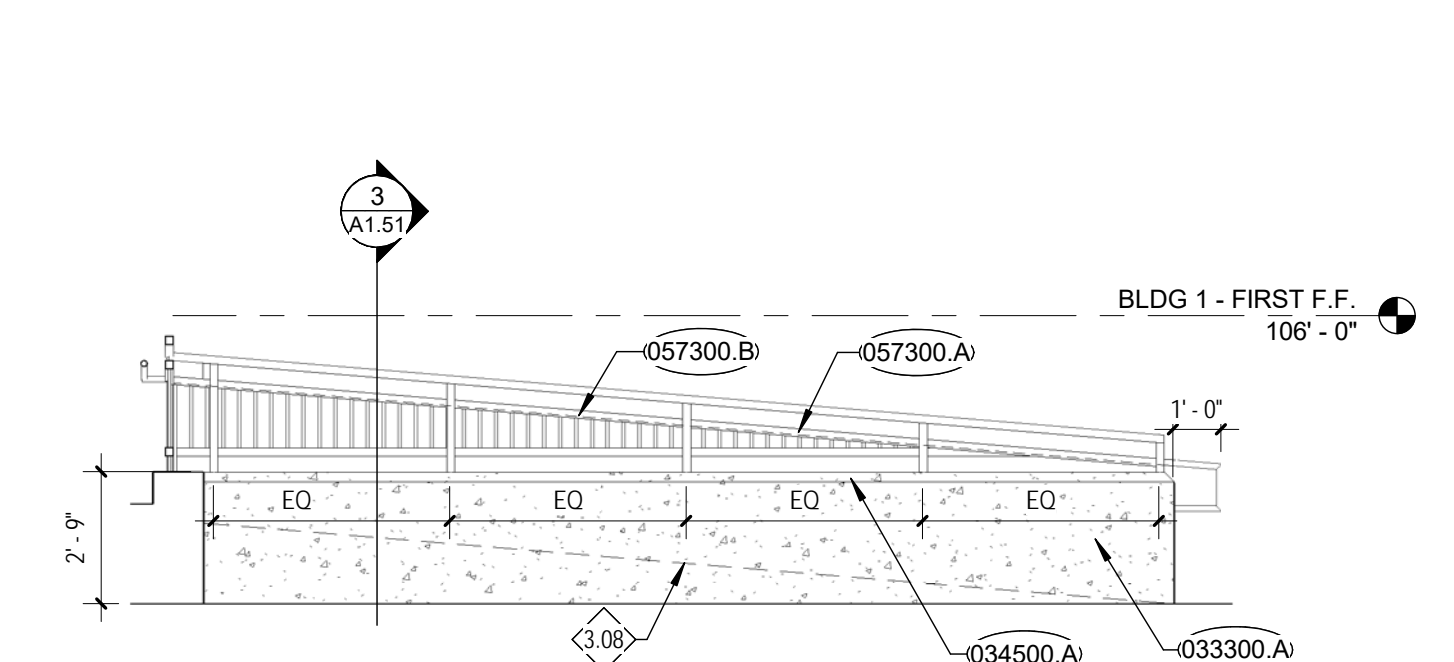
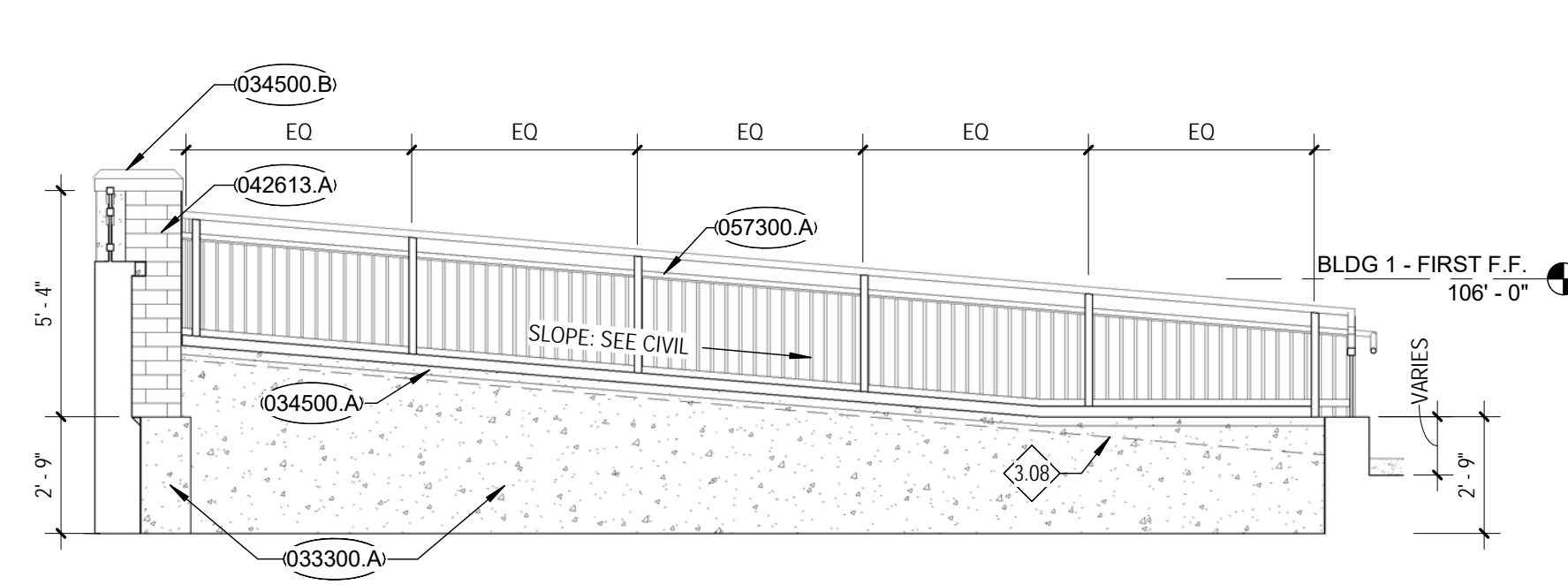
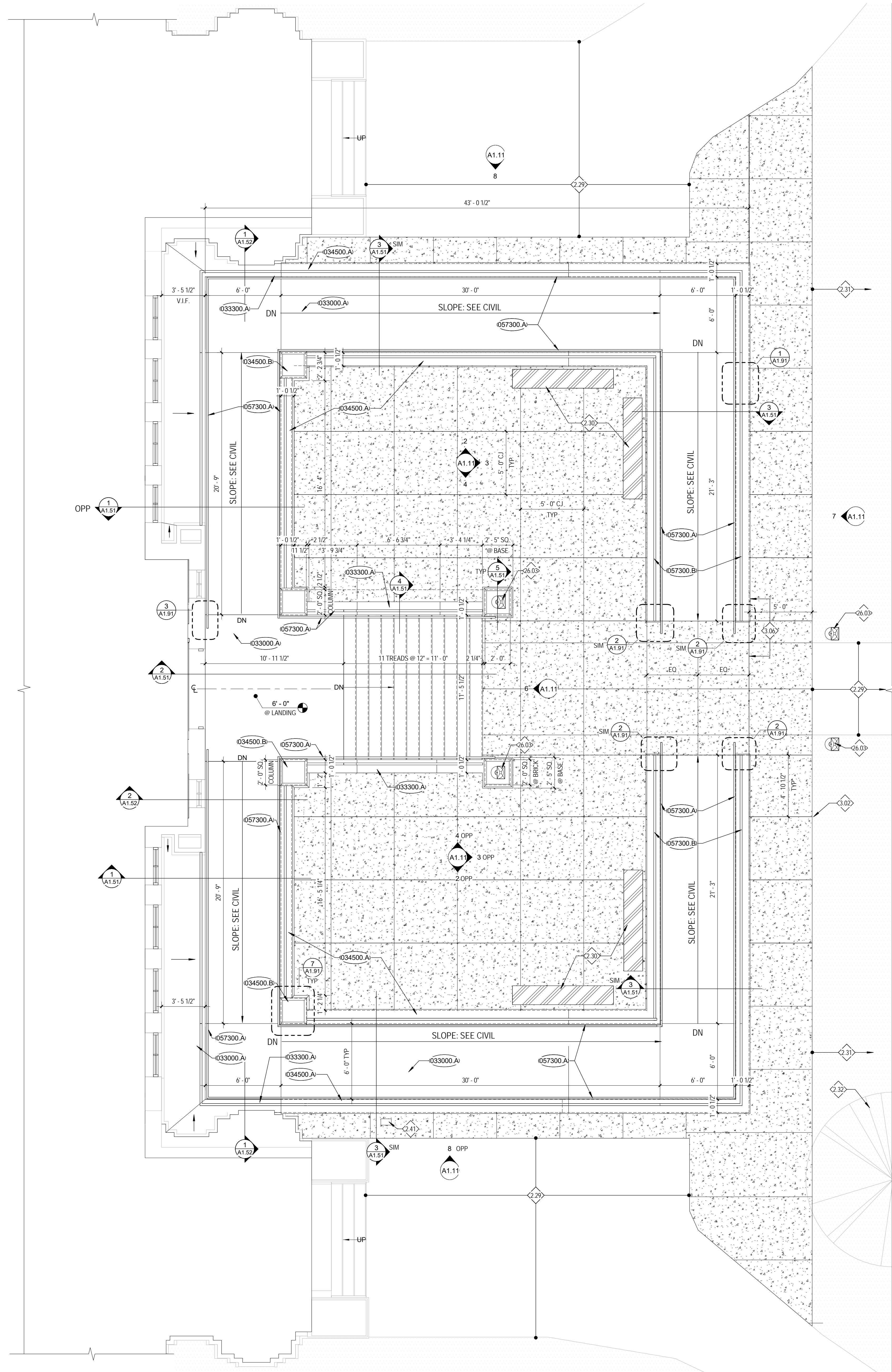
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 Drawn By: LE/JH
 Checked By: GA/JH
 Date: 3-19-19

Sheet No:
A1.01



1 COMPOSITE SITE PLAN
 A1.01 1/16" = 1'-0"





KEYNOTES

- 033000 A CAST-IN-PLACE CONCRETE, RE. CIVIL AND STRUCTURAL DRAWINGS
- 033300 A ARCHITECTURAL CONCRETE
- 034500 A PRECAST ARCHITECTURAL CONCRETE WALL CAP
- 034500 B PRECAST CONCRETE COLUMN CAP
- 042613 A MASONRY VENEER
- 057300 A DECORATIVE METAL HANDRAIL
- 057300 B DECORATIVE METAL GUARDRAIL
- 312323.43 GEOFOM INFILL

REFERENCE NOTES

- 2.01 EXISTING CONSTRUCTION, PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- 2.29 EXISTING CONCRETE TO REMAIN. PROTECT IN PLACE. REINSTALL EXISTING BENCHES.
- 2.31 EXISTING TURF TO REMAIN. PROTECT IN PLACE. SEE LANDSCAPE PLANS FOR RELOCATED IRRIGATION SCOPE.
- 2.32 EXISTING TREE TO REMAIN. PROTECT IN PLACE.
- 2.34 EXISTING WINDOW. PROTECT IN PLACE.
- 2.41 RELOCATE IRRIGATION CONTROL BOX. COORDINATE WITH LANDSCAPE AND ELECTRICAL DRAWINGS.
- 2.42 RELOCATE EXISTING HISTORIC REGISTRATION PLAQUE.
- 3.02 CONCRETE CONTROL JOINT, TYP.
- 3.04 NEW RAMP
- 3.05 NEW STAIR
- 3.06 ALIGN
- 3.07 CHAMFER TOP OF CAST IN PLACE CONCRETE WALL, TYP.
- 3.08 LINE OF RAMPLANDING BEYOND
- 5.01 CORE DRILL, SLEEVE, AND EPOXY GUARDRAIL INTO CAST IN PLACE CONCRETE, RE. STRUCTURAL.
- 5.02 RETURN END OF HANDRAIL TO WALL AND CAP OFF.
- 5.03 HANDRAIL SURFACE MOUNTED AT POST, BEYOND.
- 5.04 2 INCH BY 2 INCH TUBE STEEL
- 5.05 3/4 INCH BY 3/4 INCH TUBE STEEL
- 5.06 1-1/2 INCH O.D. HANDRAIL, BEYOND
- 8.01 DOOR AS SCHEDULED.
- 8.03 WINDOW FRAME - TYPE AS INDICATED PER FLOOR PLANS AND FRAME TYPES
- 8.04 NEW STOREFRONT AS INDICATED PER FLOOR PLANS AND FRAME TYPES
- 23.03 MECHANICAL GRILLE. COORDINATE WITH MECHANICAL DRAWINGS.
- 26.03 LAMP POST. SEE ELECTRICAL.

GENERAL NOTES

- 1. SEE SHEET (A1.01) SITE PLAN FOR COMPOSITE SITE PLAN AND REFERENCE NOTES, DIMENSIONS, ETC., NOT INDICATED ON THIS DRAWING.
- 2. COORDINATE WITH CIVIL DRAWINGS FOR ALL LANDSCAPING.

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POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

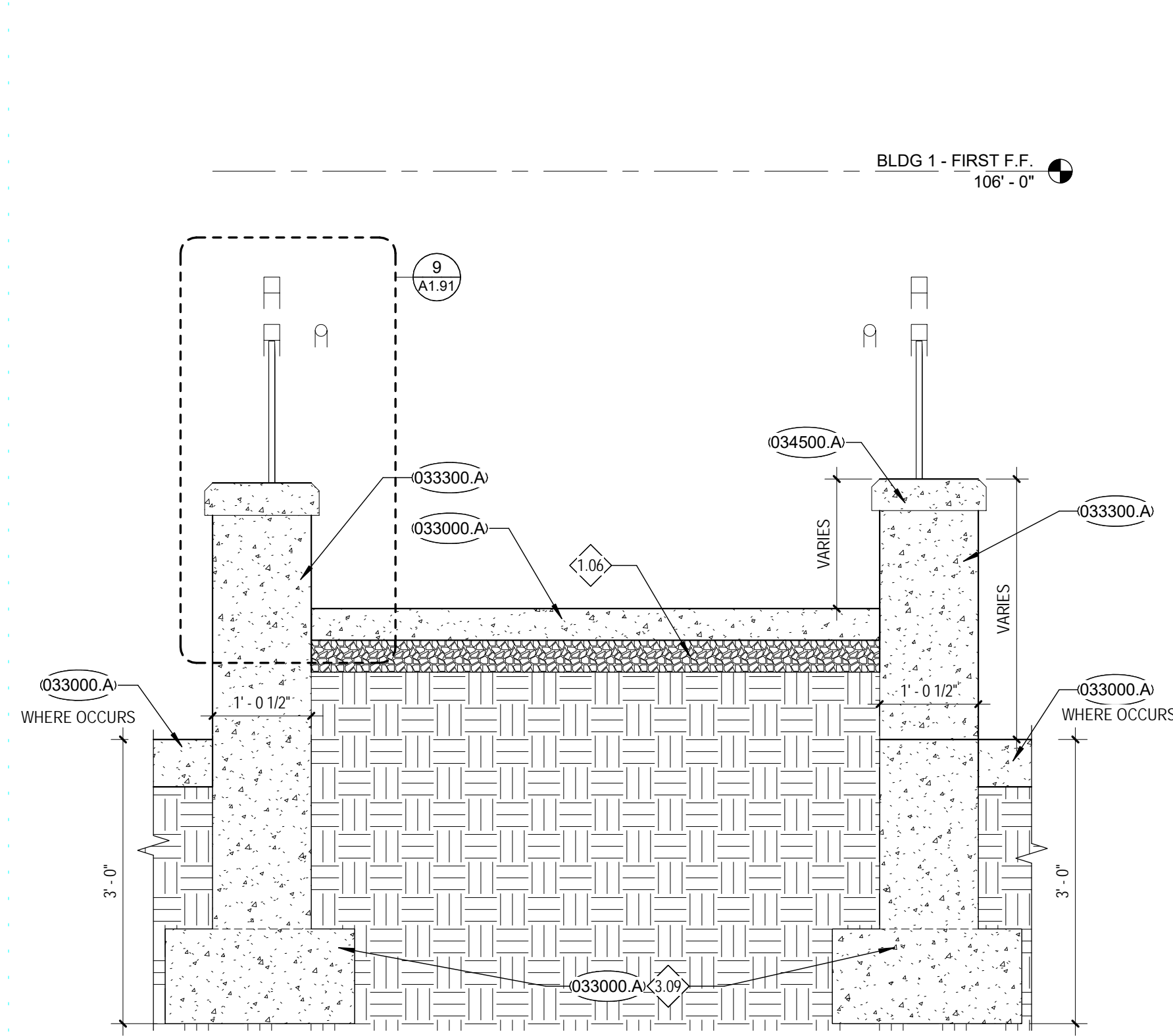
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PARTIAL SITE PLAN AND ELEVATIONS

Revisions:

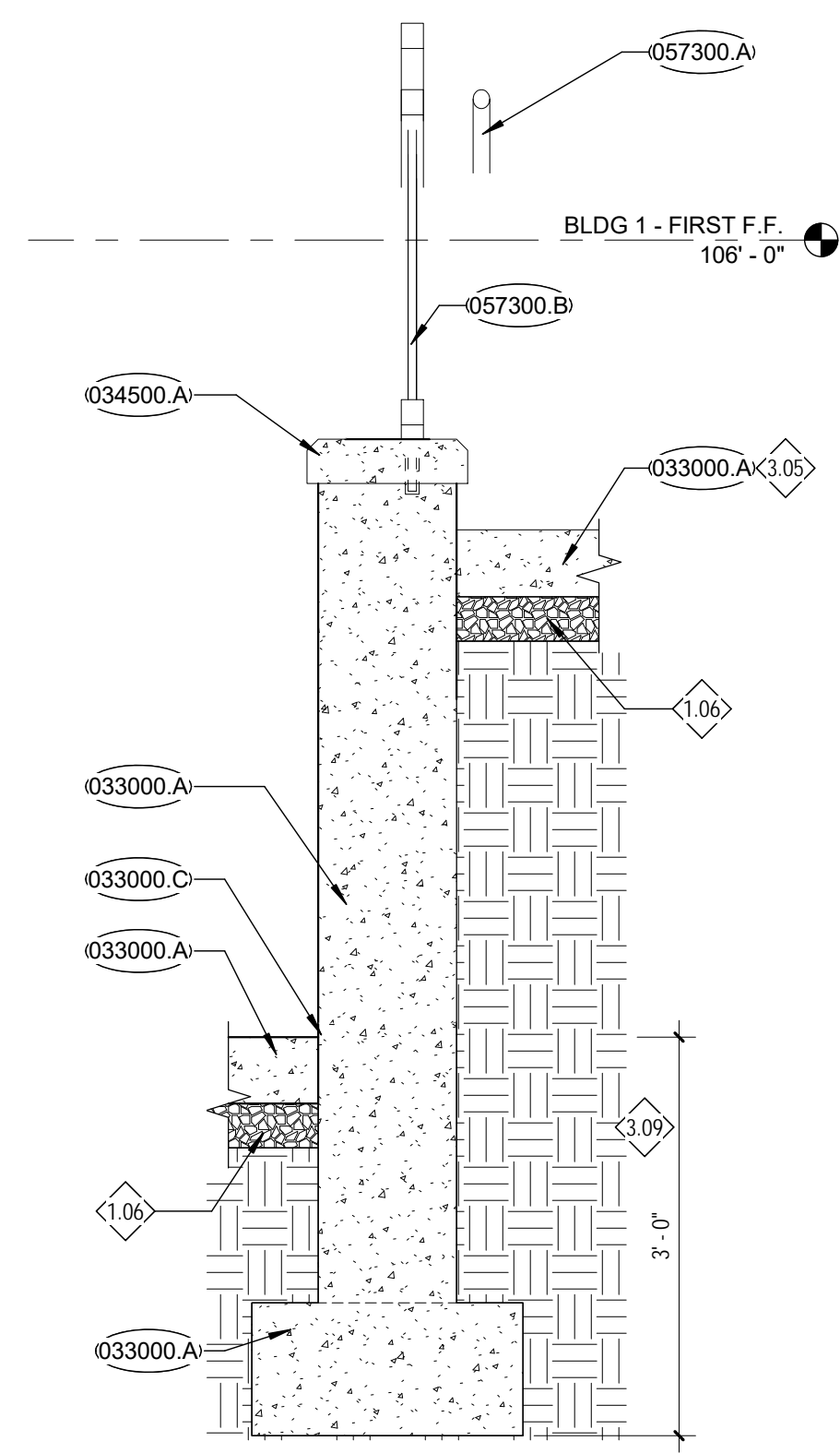
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Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

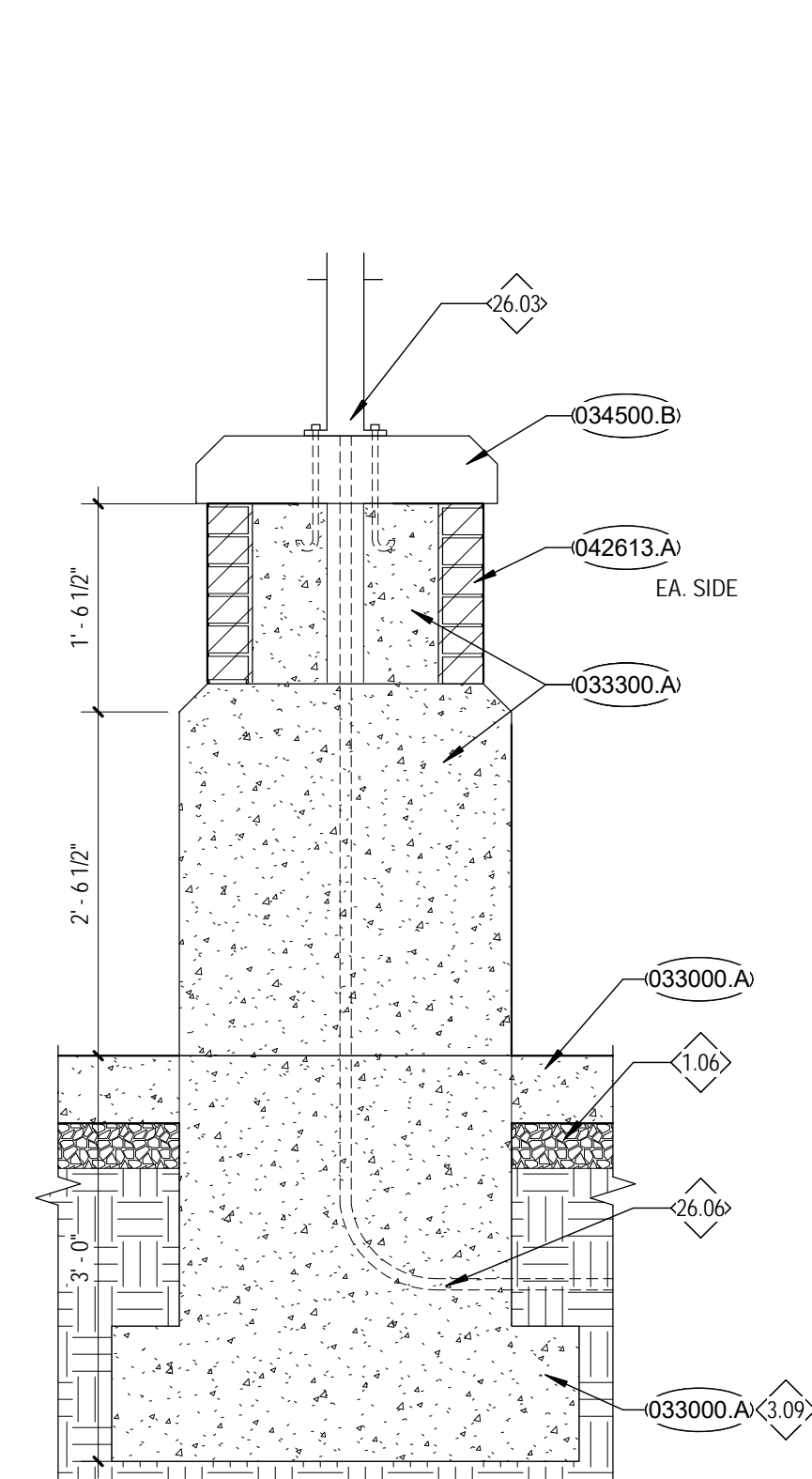
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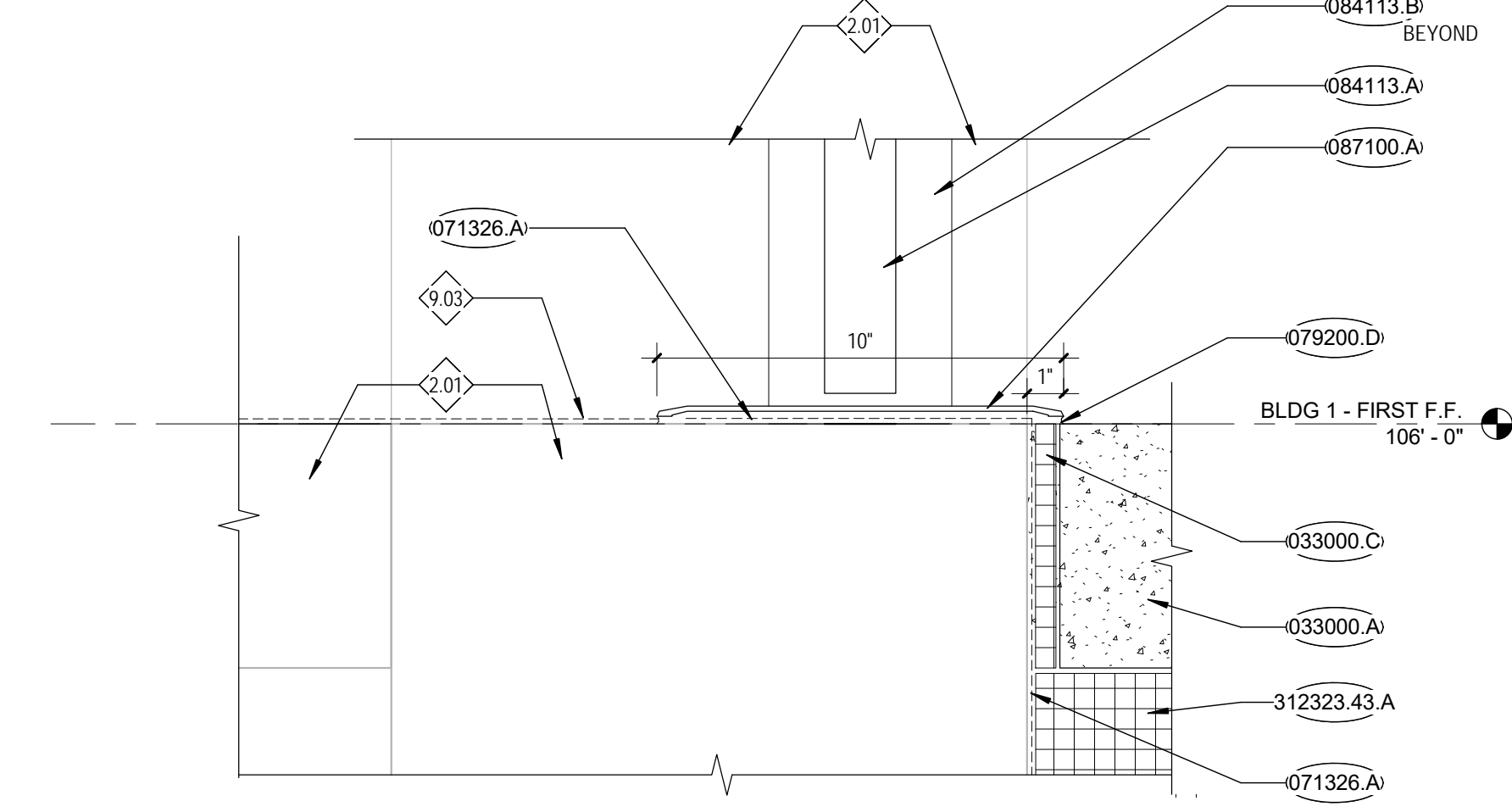
3 SECTION A
A1.51 3/4" = 1'-0"



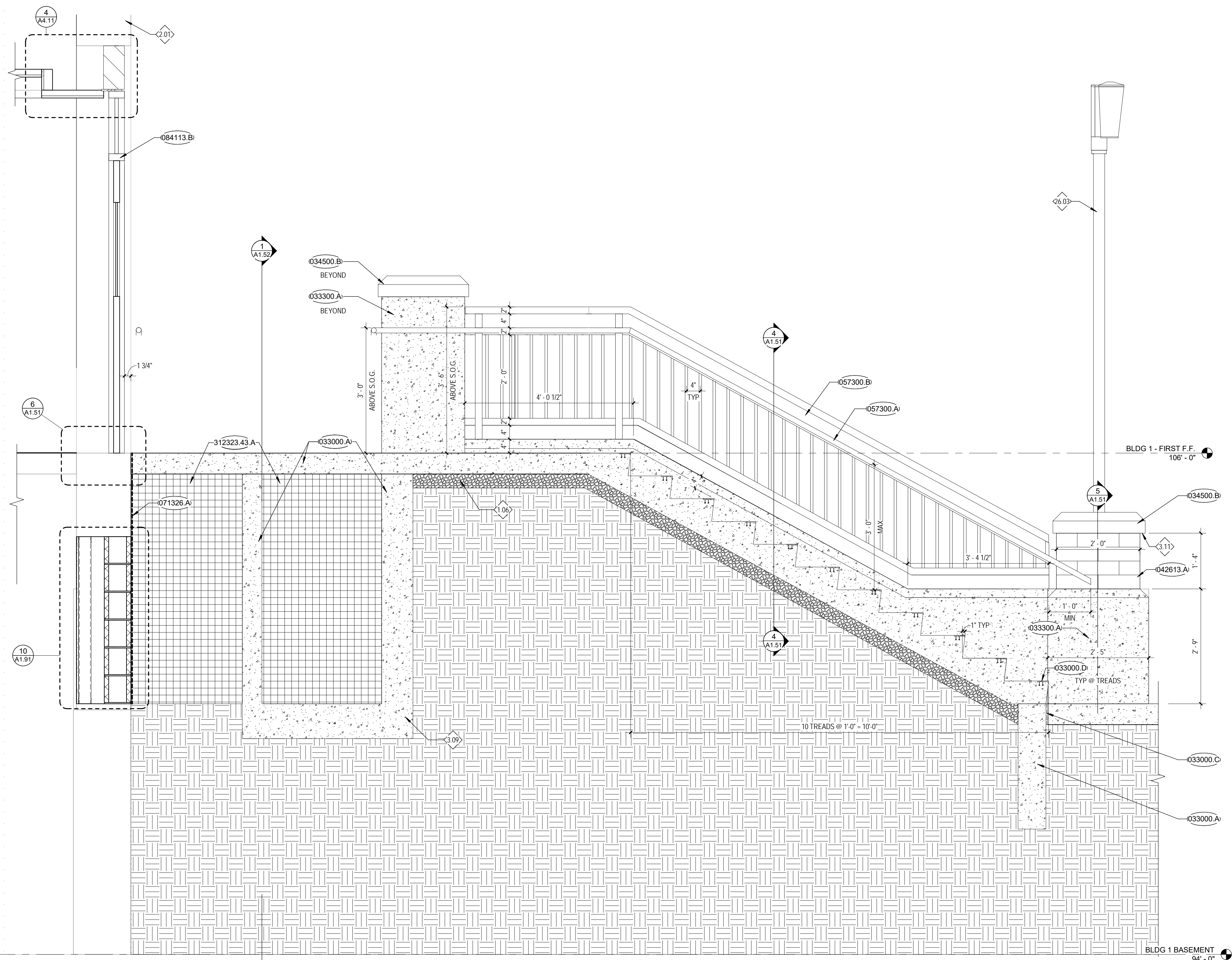
4 STAIR SECTION 01
A1.51 3/4" = 1'-0"



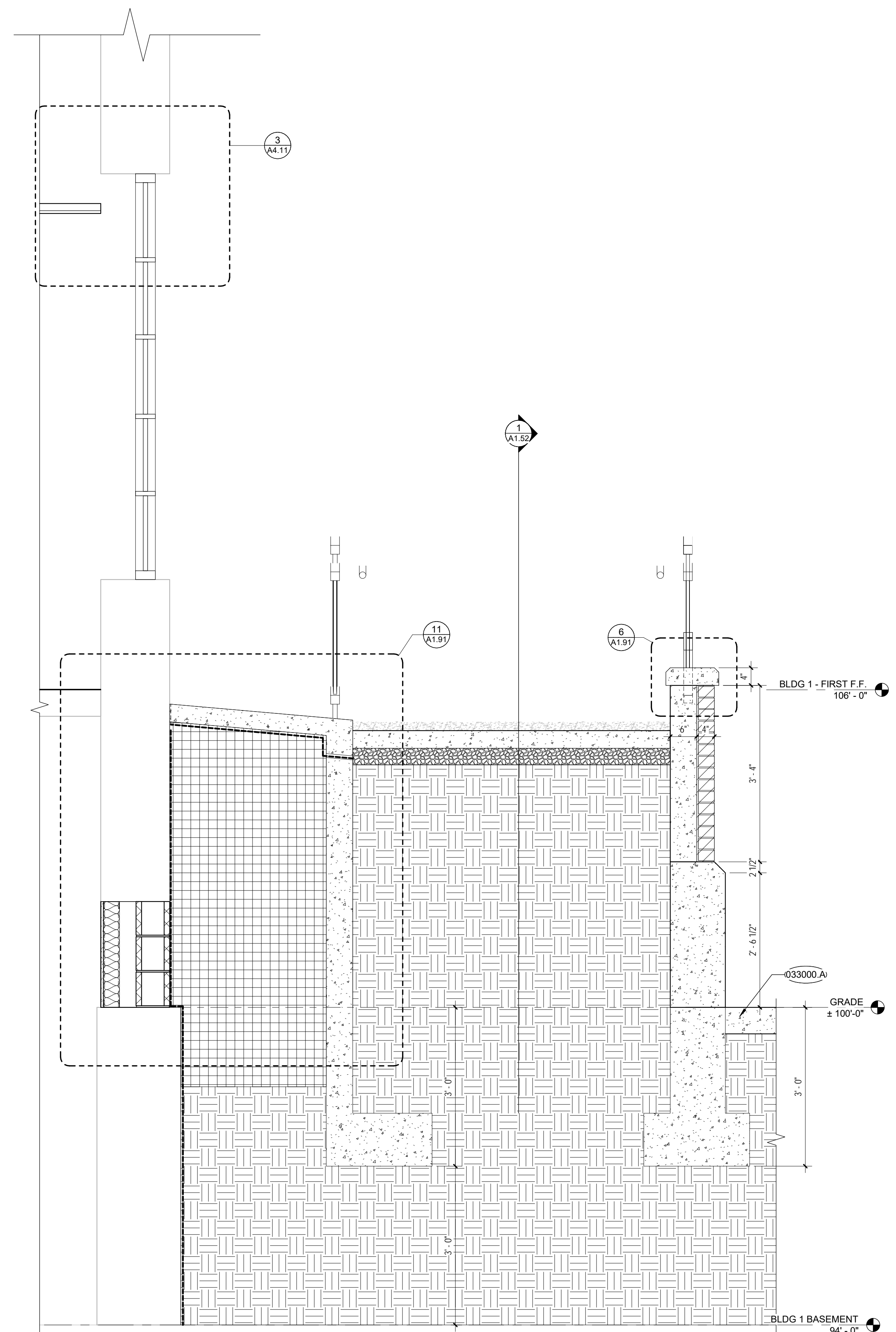
5 COLUMN SECTION
A1.51 3/4" = 1'-0"



6 THRESHOLD DTL @ DOOR
A1.51 3" = 1'-0"



2 STAIR SECTION
A1.51 3/4" = 1'-0"



1 WALL SECTION 03
A1.51 3/4" = 1'-0"

KEYNOTES

- 033000.A CAST-IN-PLACE CONCRETE. RE: CIVIL AND STRUCTURAL DRAWINGS
- 033000.C JOINT FILLER STRIP
- 033000.D EMBEDDED EXTRUDED ALUMINUM SAFETY TREAD
- 033000.A ARCHITECTURAL CONCRETE
- 034500.A PRECAST ARCHITECTURAL CONCRETE WALL CAP
- 034500.B PRECAST CONCRETE COLUMN CAP
- 042613.A MASONRY VENEER
- 057300.A DECORATIVE METAL HANDRAIL
- 057300.B DECORATIVE METAL GUARDRAIL
- 071326.A SELF-ADHERING SHEET WATERPROOFING SYSTEM
- 072000.D FULL BED OF BUTYL SEALANT
- 084113.A ALUMINUM ENTRANCE DOOR
- 084113.B ALUMINUM STOREFRONT FRAMING SYSTEM
- 087100.A THRESHOLD
- 312323.43 GEOFOAM INFILL

REFERENCE NOTES

- 1.06 BASE AND FILL. RE: CIVIL DRAWINGS.
- 2.01 EXISTING CONSTRUCTION. PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- 3.05 NEW STAIR
- 3.09 CONCRETE FOOTING AND STEM WALL. RE: STRUCTURAL.
- 3.11 SAWCUT DRIP EDGE LENGTH OF CAP, EACH SIDE.
- 9.03 FLOOR FINISH. RE: FINISH SCHEDULE A8.01.
- 26.03 LAMP POST. SEE ELECTRICAL.
- 26.06 COORDINATE ELECTRICAL CONDUIT WITH ELECTRICAL DRAWINGS.

GENERAL NOTES

1. SEE SHEETS A1.01 AND A1.11 FOR OVERALL SITE LAYOUT, REFERENCE NOTES, DIMENSIONS, ETC. NOT INDICATED ON THE DRAWING.
2. COORDINATE ALL SITEWORK WITH CIVIL AND STRUCTURAL DRAWINGS.
3. COORDINATE ALL EXTERIOR LIGHTING WITH ELECTRICAL DRAWINGS.

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Project:
**POCATELLO HIGH SCHOOL -
ENTRANCE RENOVATION**

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
SITE SECTIONS

BID SET



Revisions: Δ

Project No: 18027
Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

Sheet No:
A1.51

KEYNOTES

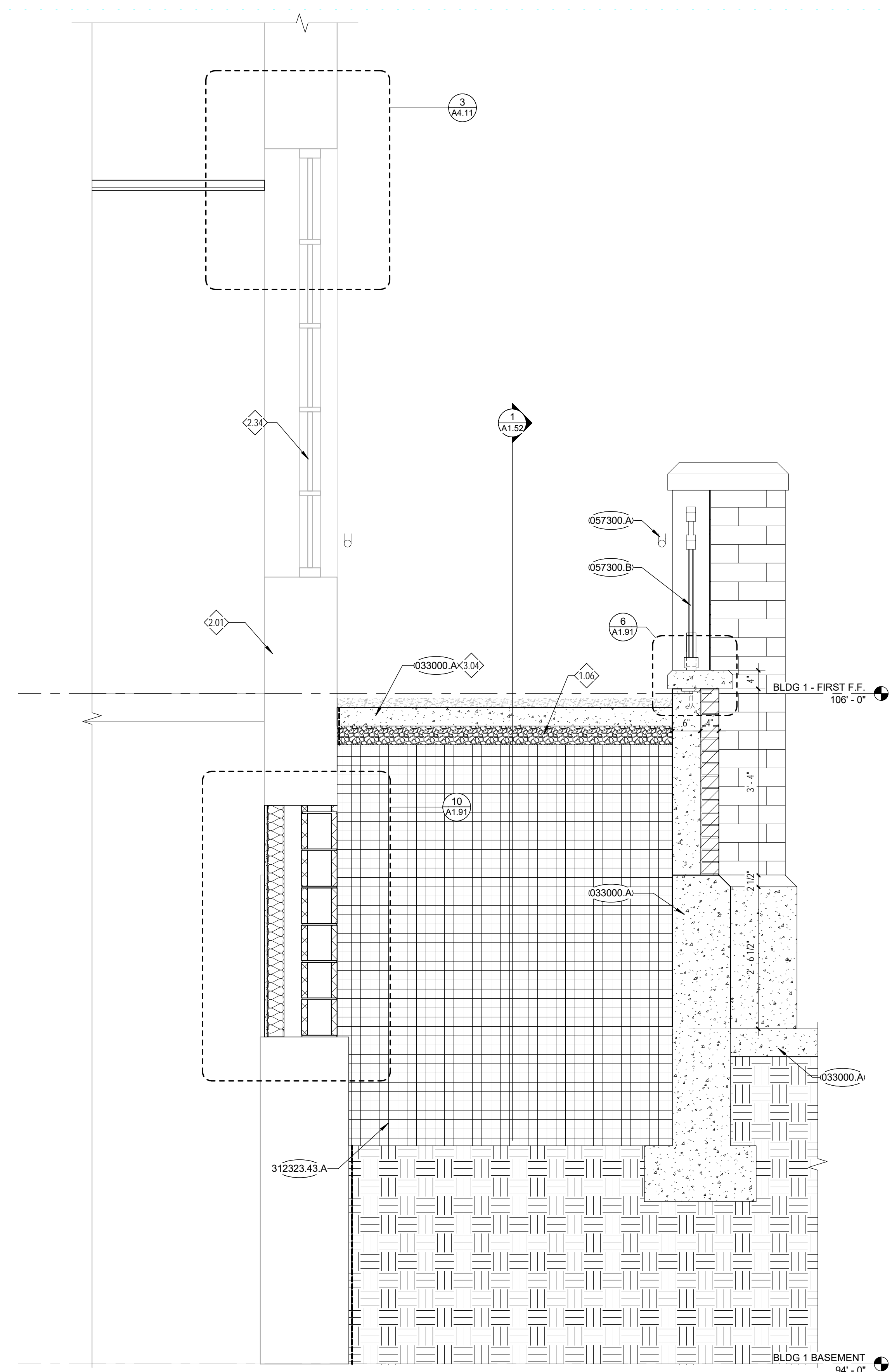
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- 057300.A DECORATIVE METAL HANDRAIL
- 057300.B DECORATIVE METAL GUARDRAIL
- 312323.43 GEOFOAM INFILL

REFERENCE NOTES

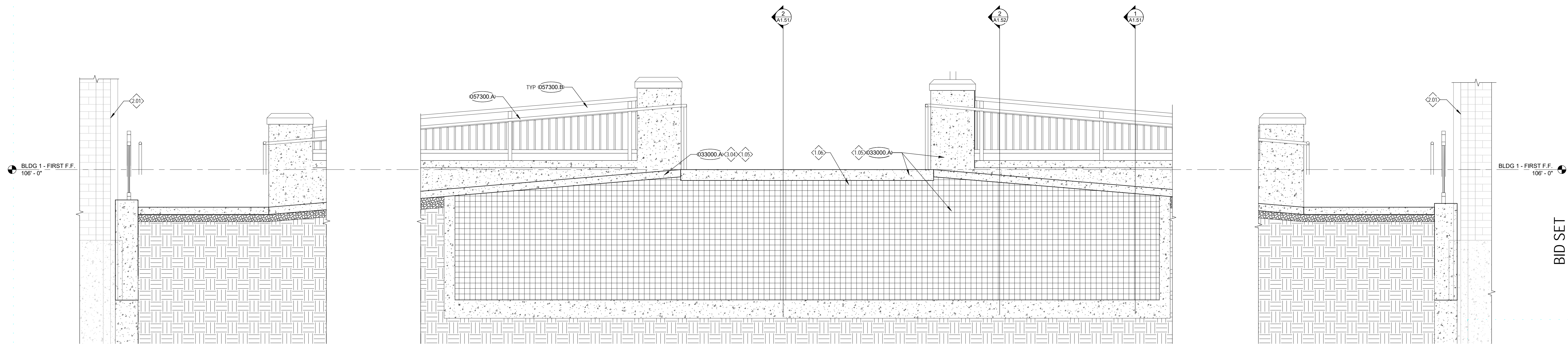
- 1.05 COORDINATE WITH CIVIL DRAWINGS.
- 1.06 BASE AND FILL, RE: CIVIL DRAWINGS.
- 2.01 EXISTING CONSTRUCTION, PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- 2.34 EXISTING WINDOW. PROTECT IN PLACE.
- 3.04 NEW RAMP

GENERAL NOTES

- 1. SEE SHEETS A1.01 AND A1.11 FOR OVERALL SITE LAYOUT, REFERENCE NOTES, DIMENSIONS, ETC., NOT INDICATED ON THE DRAWING.
- 2. COORDINATE ALL SITEWORK WITH CIVIL AND STRUCTURAL DRAWINGS.
- 3. COORDINATE ALL EXTERIOR LIGHTING WITH ELECTRICAL DRAWINGS.



2 WALL SECTION 02
3/4" = 1'-0"



1 UPPER RAMP SECTION
1/2" = 1'-0"

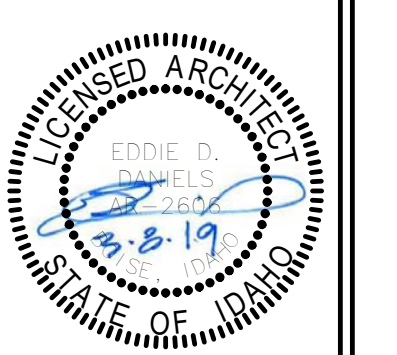
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**POCATELLO HIGH SCHOOL -
ENTRANCE RENOVATION**

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
SITE SECTIONS

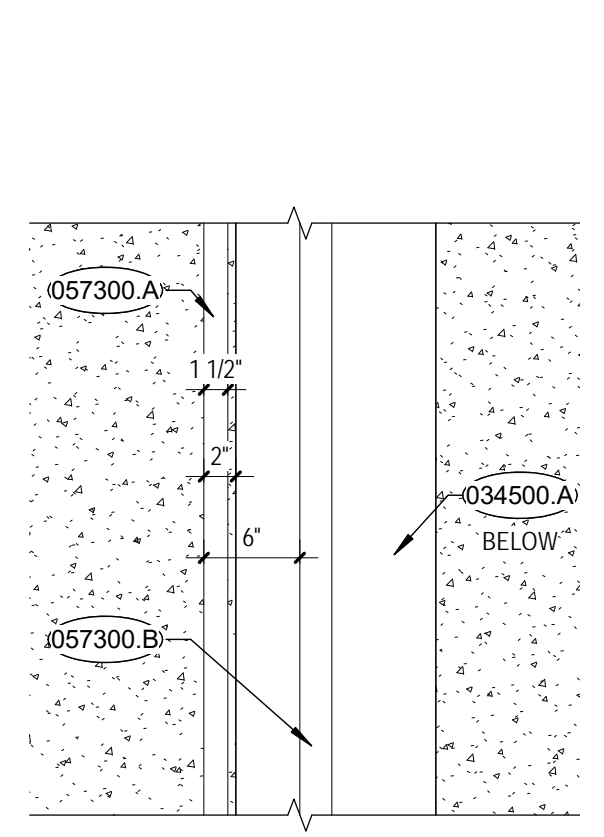
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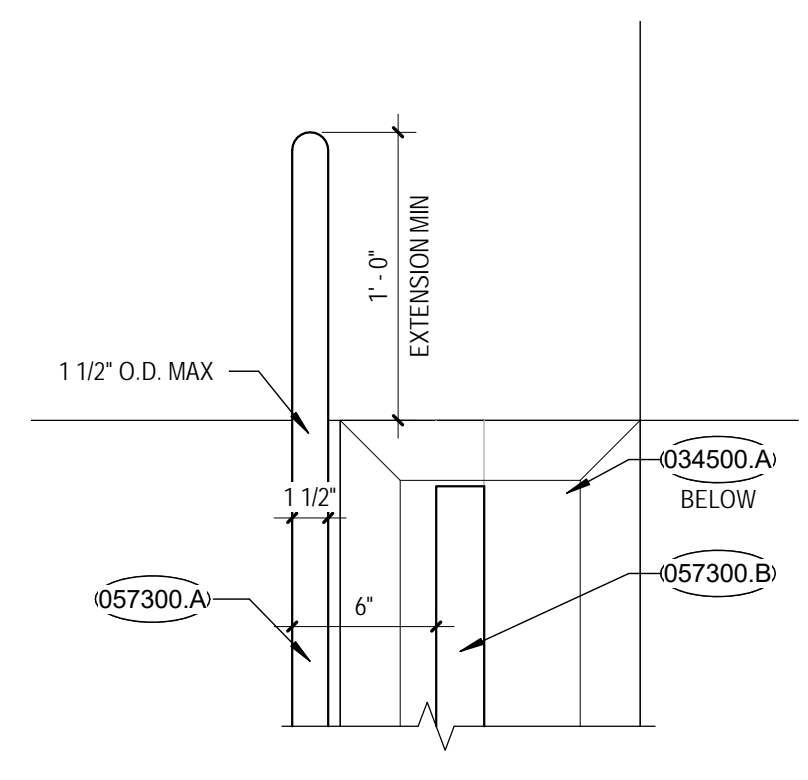
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Drawn By: LEJH
Checked By: GAJH
Date: 3/19/19

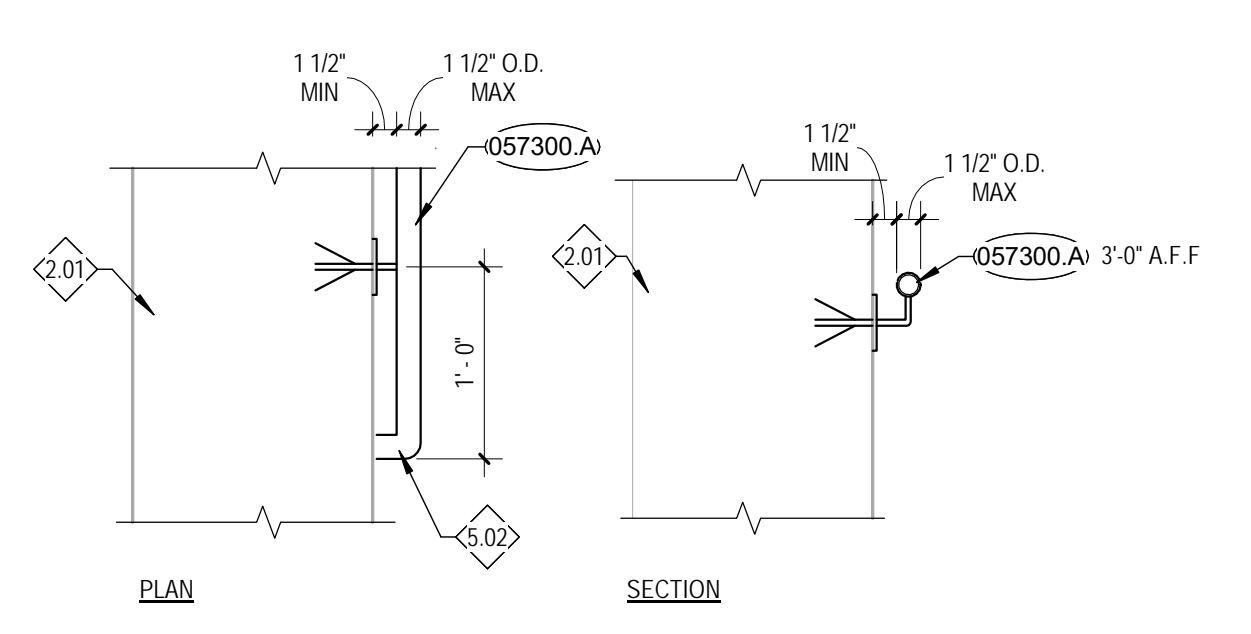
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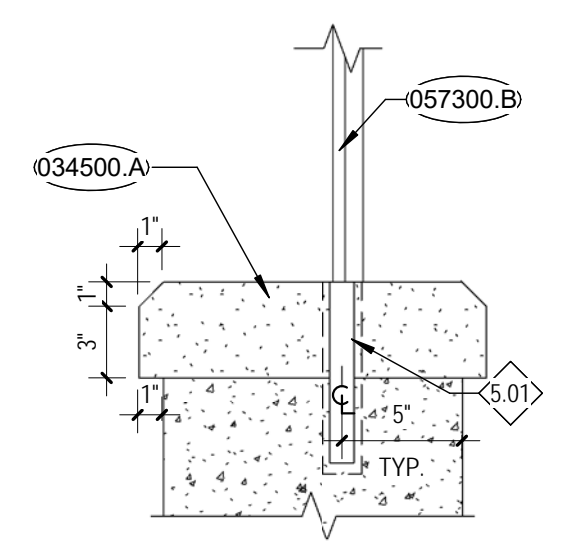
1 TYPICAL ENLARGED RAMP & STAIR PLAN DETAIL
A1.91 1" = 1'-0"



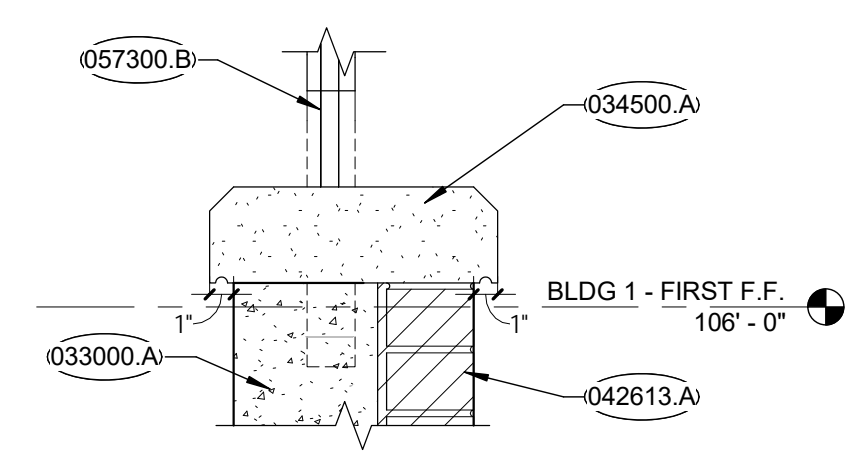
2 ENLARGED RAMP PLAN DETAIL
A1.91 1 1/2" = 1'-0"



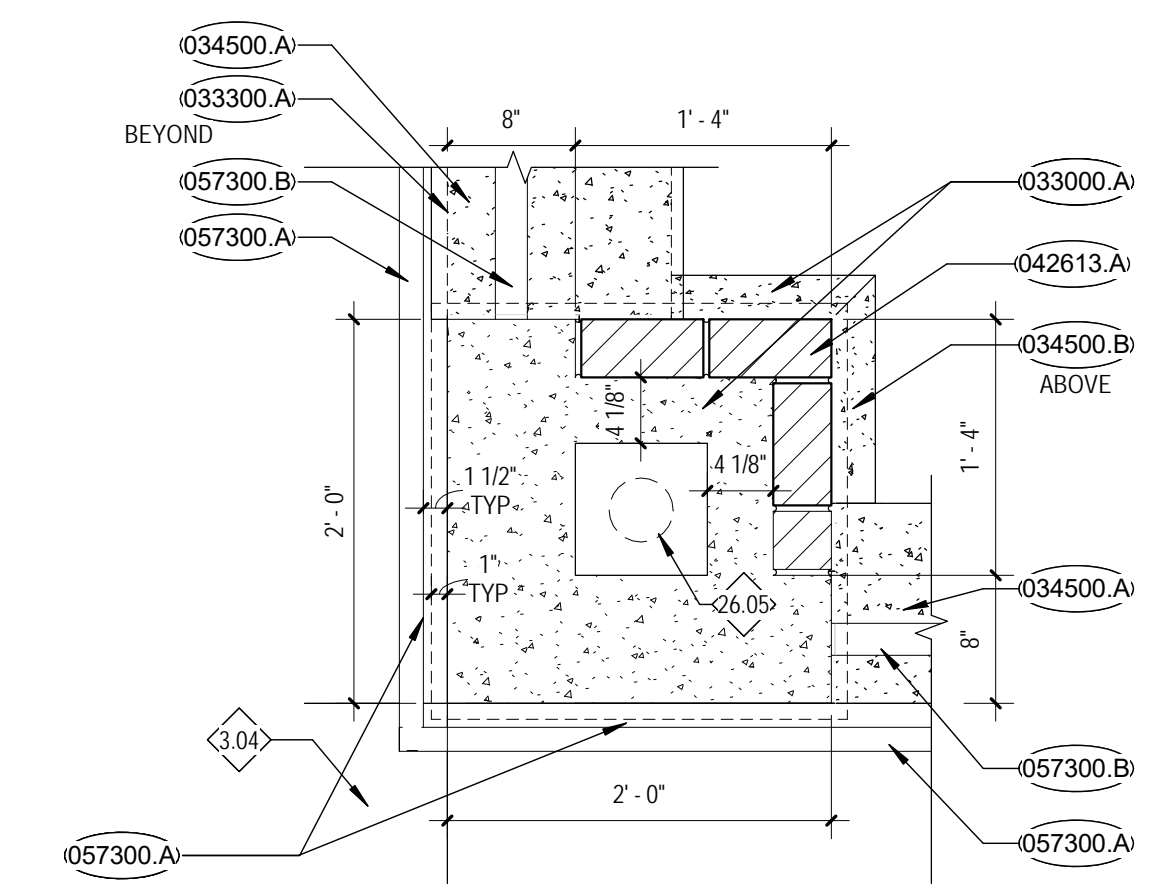
3 TYPICAL HANDRAIL ATTACHMENT AT WALL
A1.91 1" = 1'-0"



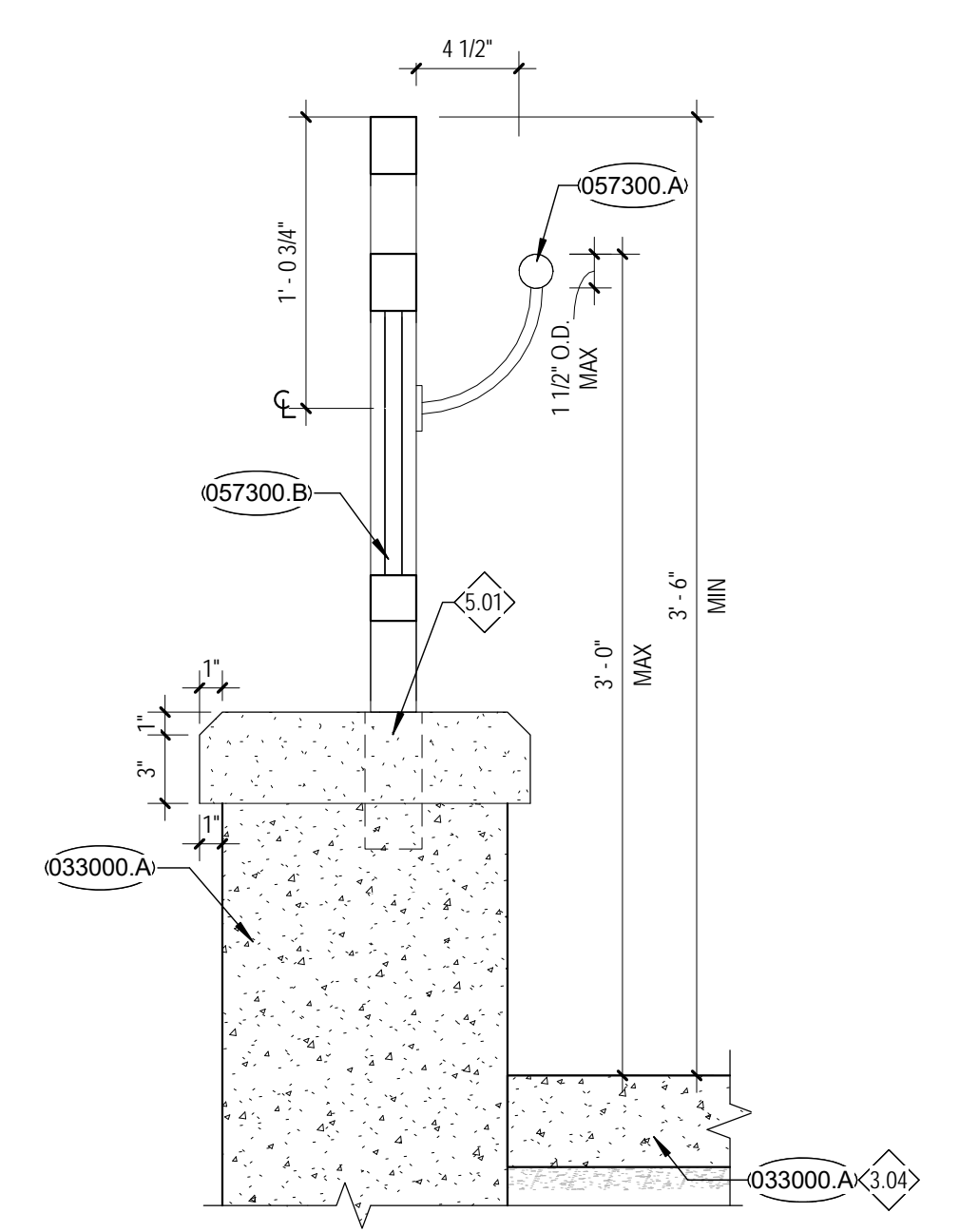
5 RAMP/GUARDRAIL DETAIL
A1.91 1 1/2" = 1'-0"



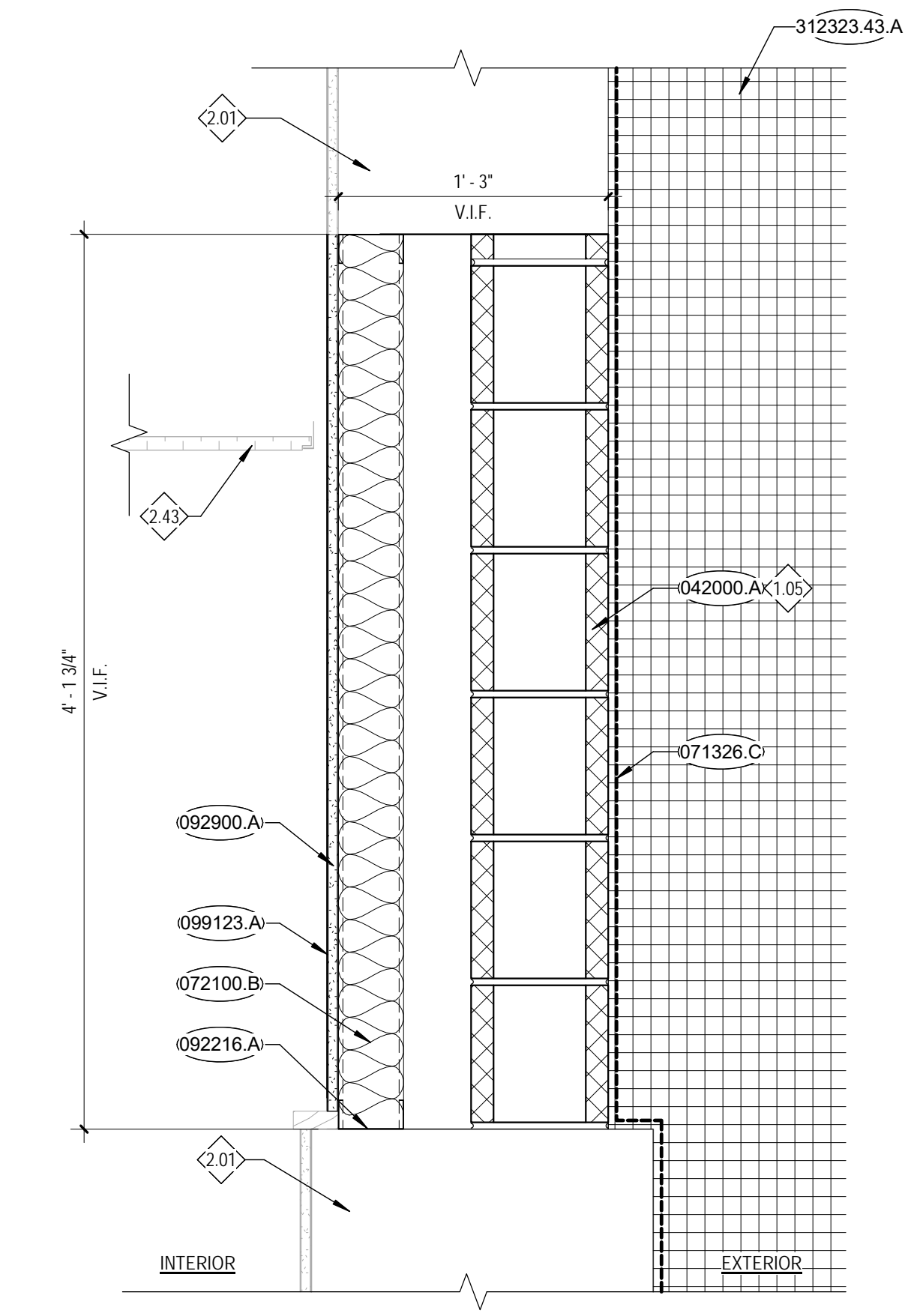
6 WALL DETAIL
A1.91 1 1/2" = 1'-0"



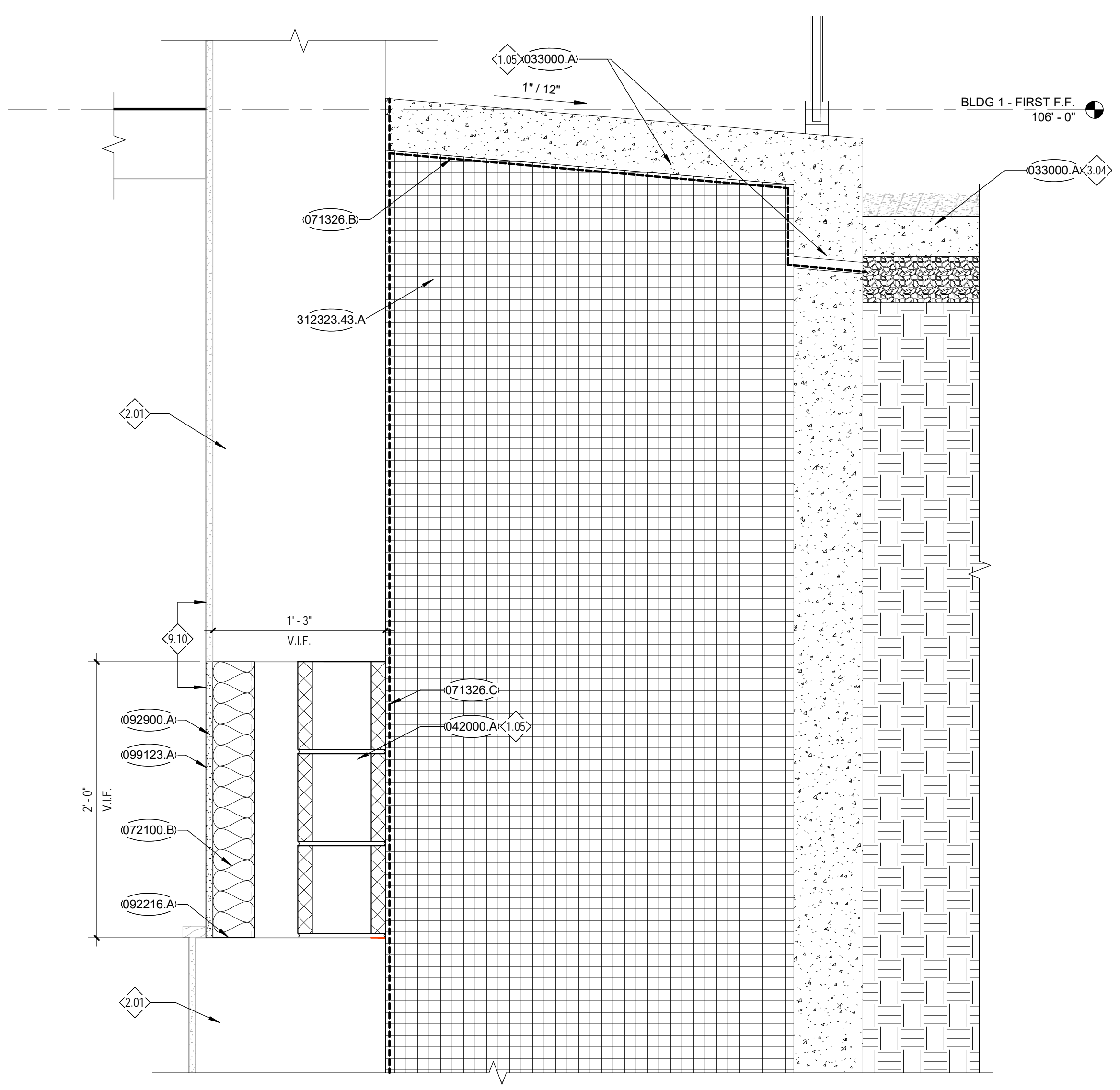
7 TYPICAL COLUMN PLAN DETAIL
A1.91 1" = 1'-0"



9 TYPICAL HAND AND GUARDRAIL DETAIL
A1.91 1 1/2" = 1'-0"



10 INFILL DETAIL 01
A1.91 1 1/2" = 1'-0"



11 WINDOW INFILL / RAMP DETAIL
A1.91 1 1/2" = 1'-0"

KEYNOTES

- 033000.A CAST-IN-PLACE CONCRETE, RE: CIVIL AND STRUCTURAL DRAWINGS
- 033300.A ARCHITECTURAL CONCRETE
- 034500.A PRECAST ARCHITECTURAL CONCRETE WALL CAP
- 034500.B PRECAST CONCRETE COLUMN CAP
- 042000.A CMU INFILL
- 042613.A MASONRY VENEER
- 057300.A DECORATIVE METAL HANDRAIL
- 057300.B DECORATIVE METAL GUARDRAIL
- 071326.B HORIZONTAL ROOF/SLAB WATERPROOFING ASSEMBLY
- 071326.C VERTICAL WALL WATERPROOFING ASSEMBLY
- 072100.B UNFACED BLANKET INSULATION
- 092216.A STEEL STUD FRAMING (NON-LOAD-BEARING)
- 092900.A GYPSUM BOARD, TYPE X
- 099123.A INTERIOR PAINT
- 312323.43 GEOFOAM INFILL

REFERENCE NOTES

- 1.05 COORDINATE WITH CIVIL DRAWINGS.
- 2.01 EXISTING CONSTRUCTION, PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- 2.43 EXISTING CEILING, PROTECT IN PLACE.
- 3.01 COORDINATE WITH CIVIL DRAWINGS.
- 3.04 NEW RAMP
- 5.01 CORE DRILL, SLEEVE, AND EPOXY GUARDRAIL INTO CAST IN PLACE CONCRETE, RE: STRUCTURAL.
- 5.02 RETURN END OF HANDRAIL TO WALL AND CAP OFF.
- 9.10 FLUSH
- 26.05 CONDUIT STUB FOR LIGHT POSTS, WHERE OCCURS.

GENERAL NOTES

- 1. SEE SHEETS A1.01 AND A1.11 FOR OVERALL SITE LAYOUT, REFERENCE NOTES, DIMENSIONS, ETC., NOT INDICATED ON THE DRAWING.
- 2. COORDINATE ALL SITEWORK WITH CIVIL AND STRUCTURAL DRAWINGS.
- 3. COORDINATE ALL EXTERIOR LIGHTING WITH ELECTRICAL DRAWINGS.

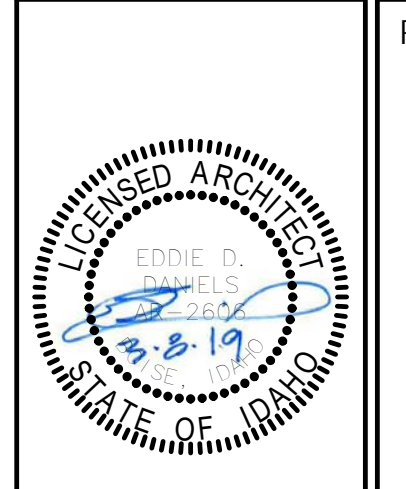
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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
SITE DETAILS

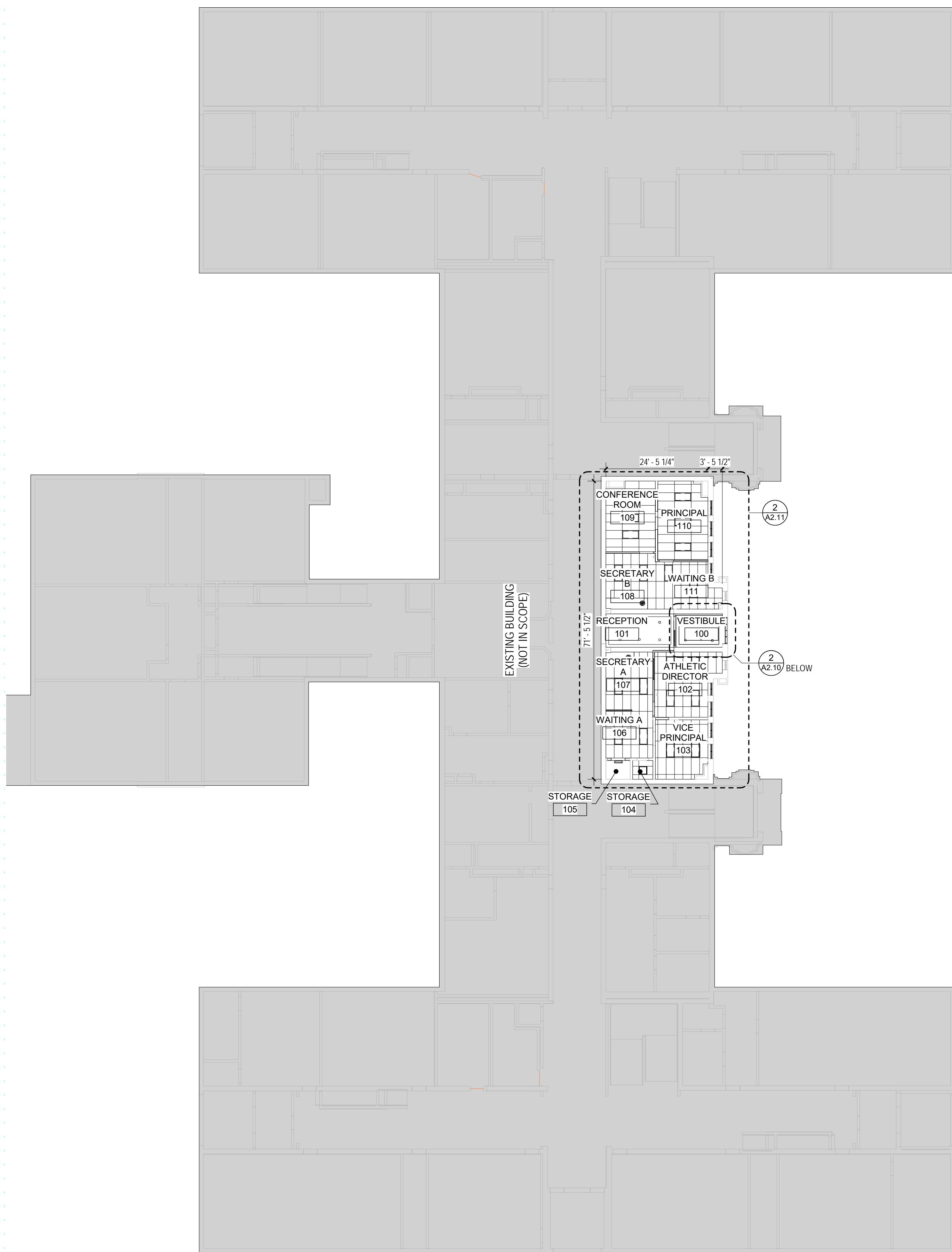
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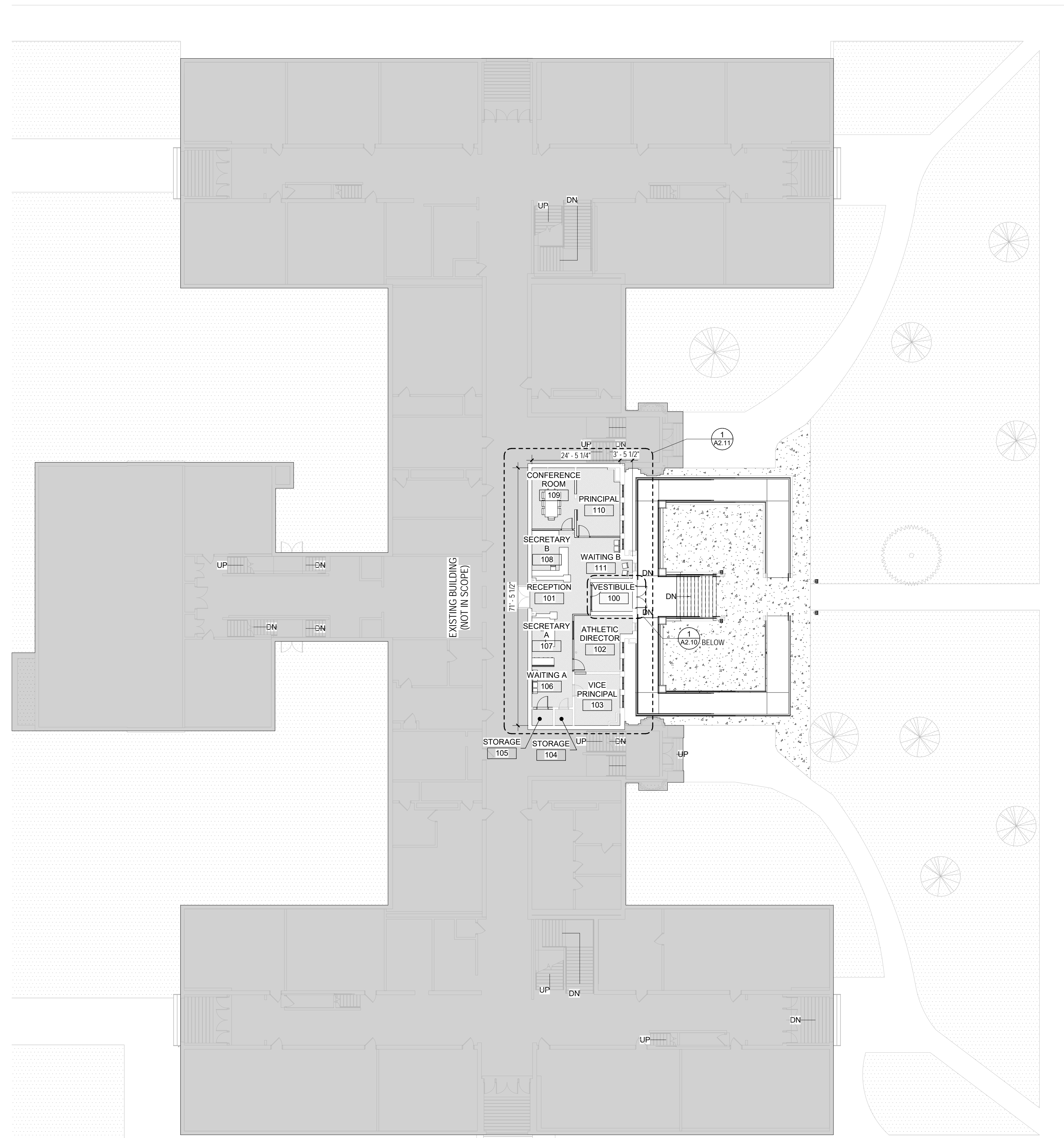
Revisions: Δ

Project No: 16827
Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

Sheet No:
A1.91



2 LEVEL 1 COMPOSITE CEILING PLAN
A2.01 1/16" = 1'-0"



1 LEVEL 1 COMPOSITE FLOOR PLAN
A2.01 1/16" = 1'-0"

RCP LEGEND

- 2 x 4' ACOUSTICAL CEILING METAL SUSPENSION SYSTEM WITH ACOUSTICAL PANEL CEILING UNITS. APC-1, U.O.N. RE: DIVISION 09 - FINISHES IN THE SPECIFICATIONS
- GYPSUM BOARD CEILING ON STEEL FRAMING AND SUPPORT SYSTEM. PAINT - P. U.O.N. RE: DIVISION 09 - FINISHES IN THE SPECIFICATION.
- OPEN TO STRUCTURE
- VERTICAL SERVICE DROP/CHASE. COORDINATE WITH MECHANICAL DRAWINGS.
- LIGHTING FIXTURES. COORDINATE WITH ELECTRICAL DRAWINGS.
- MECHANICAL FIXTURES. COORDINATE WITH MECHANICAL DRAWINGS.
- PENDANT LIGHT. COORDINATE WITH ELECTRICAL DRAWINGS.
- CEILING HEIGHT ABOVE FINISH FLOOR
- EXIT SIGN

FLOOR PLAN LEGEND

- NOT IN SCOPE
- DOOR SYMBOL. RE: DOOR SCHEDULE, SHEET A7.01
- WALL TYPE. RE: SHEET G0.04
- WINDOW TYPE. RE: WINDOW FRAME TYPE SHEETS, SHEET A7.01
- STEEL STUD WALL AND GYPSUM BOARD WALL. RE: WALL TYPES.
- CONCRETE MASONRY UNIT (CMU) WALL. RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS. COORDINATE WITH STRUCTURAL DRAWINGS.
- CONCRETE WALL. RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS. COORDINATE WITH STRUCTURAL DRAWINGS.
- MASONRY VENEER. RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS. COORDINATE WITH STRUCTURAL DRAWINGS.

KEYNOTES

REFERENCE NOTES

PLAN NOTES

1. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE TO THE FACE OF STUDS FOR GWB WALLS / PARTITIONS.
2. FOR FLOOR FINISHES RE: ROOM FINISH SCHEDULE AND FINISH PLANS, SHEETS A8.01.
3. UNLESS NOTED OTHERWISE ALL GWB WALLS SHALL HAVE A 6" STUD FRAME RETURN AT ALL DOOR AND WINDOW JAMBS.
4. RE: SHEETS G0.01 FOR BUILDING OCCUPANCY PLANS.
5. SEE ENLARGED PLANS FOR ADDITIONAL WALL TYPES.

CEILING NOTES

1. COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL ITEMS TO BE PROVIDED AT THE CEILING PLANE AND IN THE WORK.
2. CENTER ALL LIGHT FIXTURES AND SPRINKLER HEADS IN THEIR RESPECTIVE CEILING PANEL.
3. INSTALL ALL SUSPENSION SYSTEMS FOR ACOUSTICAL PANEL CEILINGS PER PROVISIONS OF ASTM C 635 AND ASTM C 636.
4. ALL SOFFIT DIMENSIONS SHOWN ARE TO FACE OF FINISH.
5. COORDINATE WITH MECHANICAL & ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR PHYSICAL SIZES OF ALL CEILING GRILLES, DIFFUSERS, FIXTURES, CANS, AND ALL RELATED ITEMS.
6. SUSPENSION SYSTEMS FOR GYPSUM BOARD CEILINGS SHALL BE INSTALLED PER THE SPECIFICATIONS AND ASTM C754.

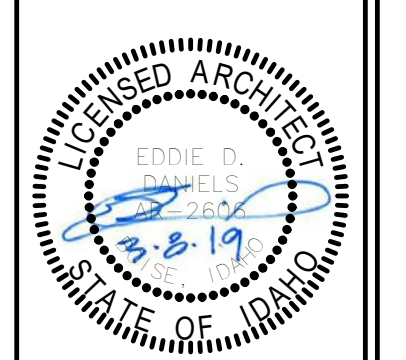
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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
COMPOSITE FIRST FLOOR & CEILING PLANS

BID SET



Revisions:

Project No: 1802
Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

Sheet No:
A2.01

KEYNOTES

REFERENCE NOTES

9.09 PATCH AND REPAIR DEMOLISHED WINDOW AREA TO MATCH ADJACENT WALLS.

PLAN NOTES

1. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE TO THE FACE OF STUDS FOR GWB WALLS / PARTITIONS.
2. FOR FLOOR FINISHES RE: ROOM FINISH SCHEDULE AND FINISH PLANS, SHEETS A8.01.
3. UNLESS NOTED OTHERWISE ALL GWB WALLS SHALL HAVE A 6" STUD FRAME RETURN AT ALL DOOR AND WINDOW JAMBS.
4. RE: SHEETS G0.01 FOR BUILDING OCCUPANCY PLANS.
5. SEE ENLARGED PLANS FOR ADDITIONAL WALL TYPES.

FLOOR PLAN LEGEND

- NOT IN SCOPE
- 101 101 DOOR SYMBOL, RE: DOOR SCHEDULE, SHEET A7.01
- XXXXX WALL TYPE, RE: SHEET G0.04
- XX WINDOW TYPE, RE: WINDOW FRAME TYPE SHEETS, SHEET A7.01
- STEEL STUD WALL AND GYPSUM BOARD WALL, RE: WALL TYPES.
- CONCRETE MASONRY UNIT (CMU) WALL, RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS, COORDINATE WITH STRUCTURAL DRAWINGS.
- CONCRETE WALL, RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS, COORDINATE WITH STRUCTURAL DRAWINGS.
- MASONRY VENEER, RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS, COORDINATE WITH STRUCTURAL DRAWINGS.

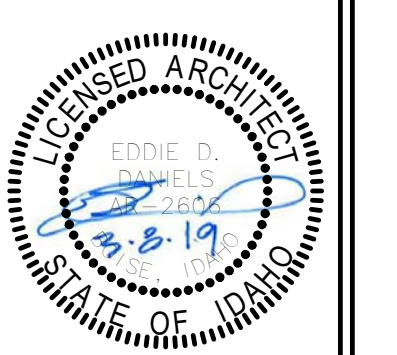
HUMMEL
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Project: POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet: PARTIAL BASEMENT FLOOR AND CEILING PLANS

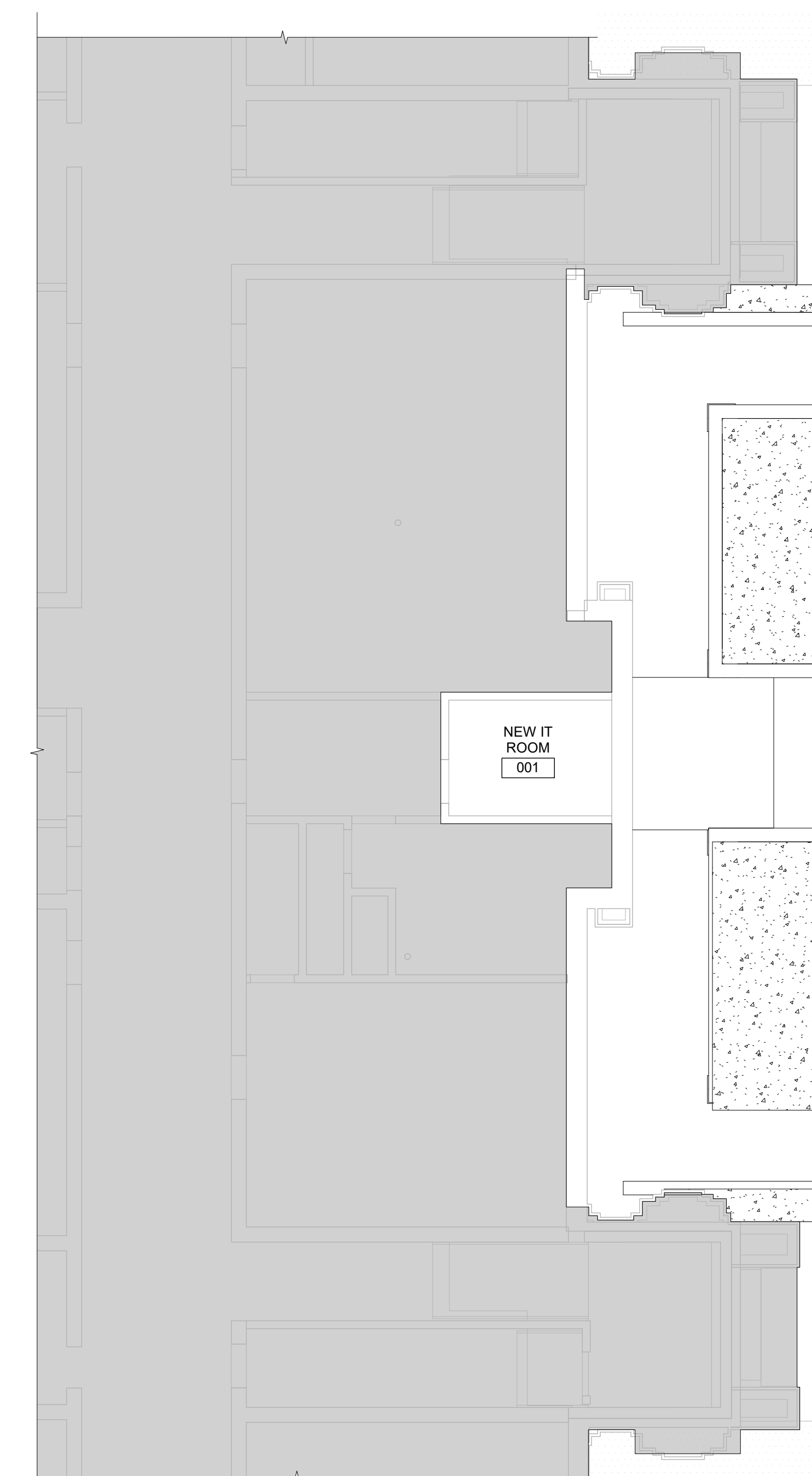
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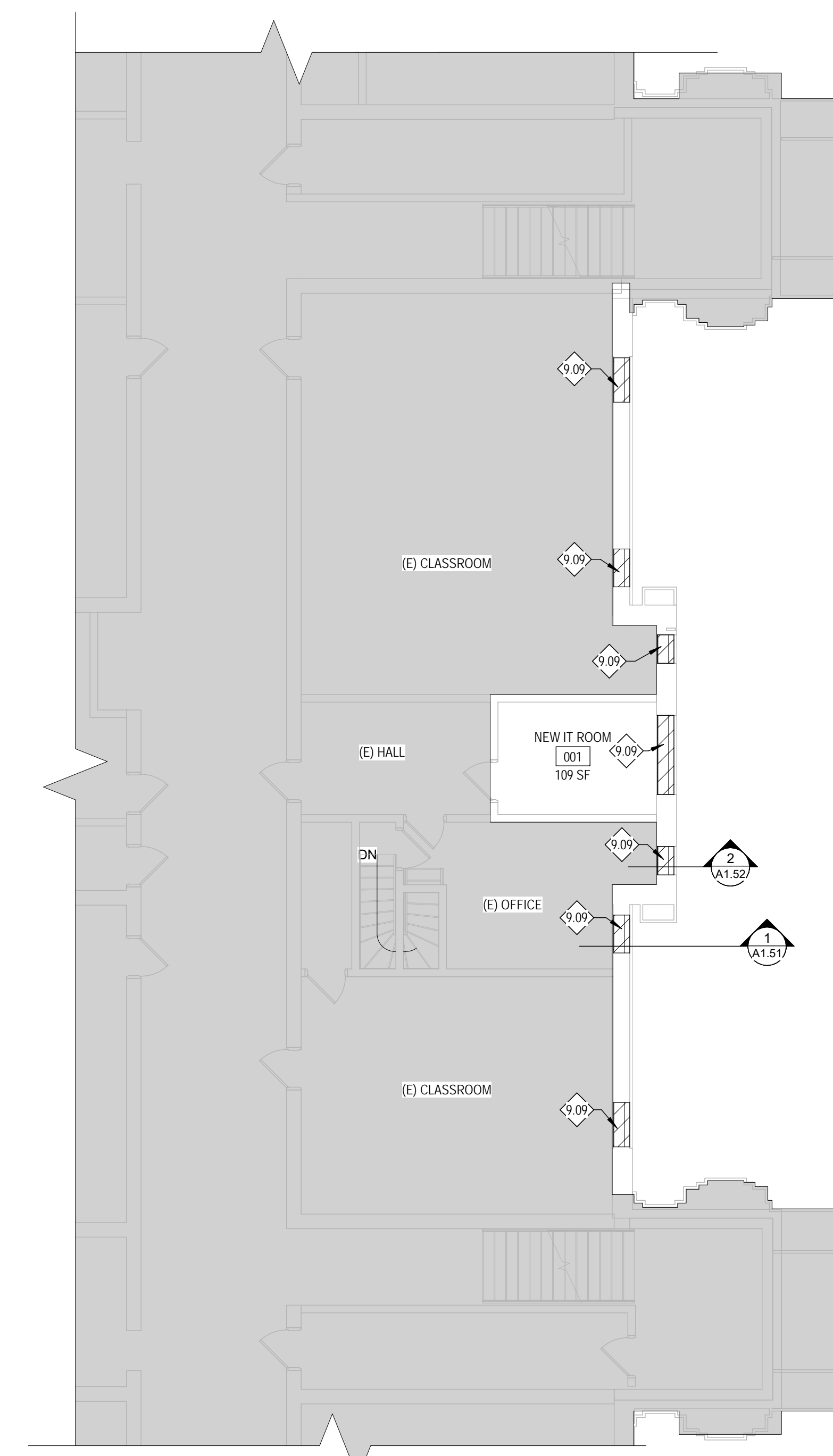
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Project No: 1802
 Drawn By: LEJH
 Checked By: GAJH
 Date: 3-19-19

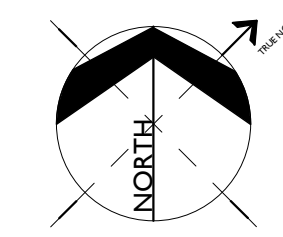
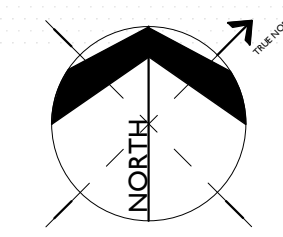
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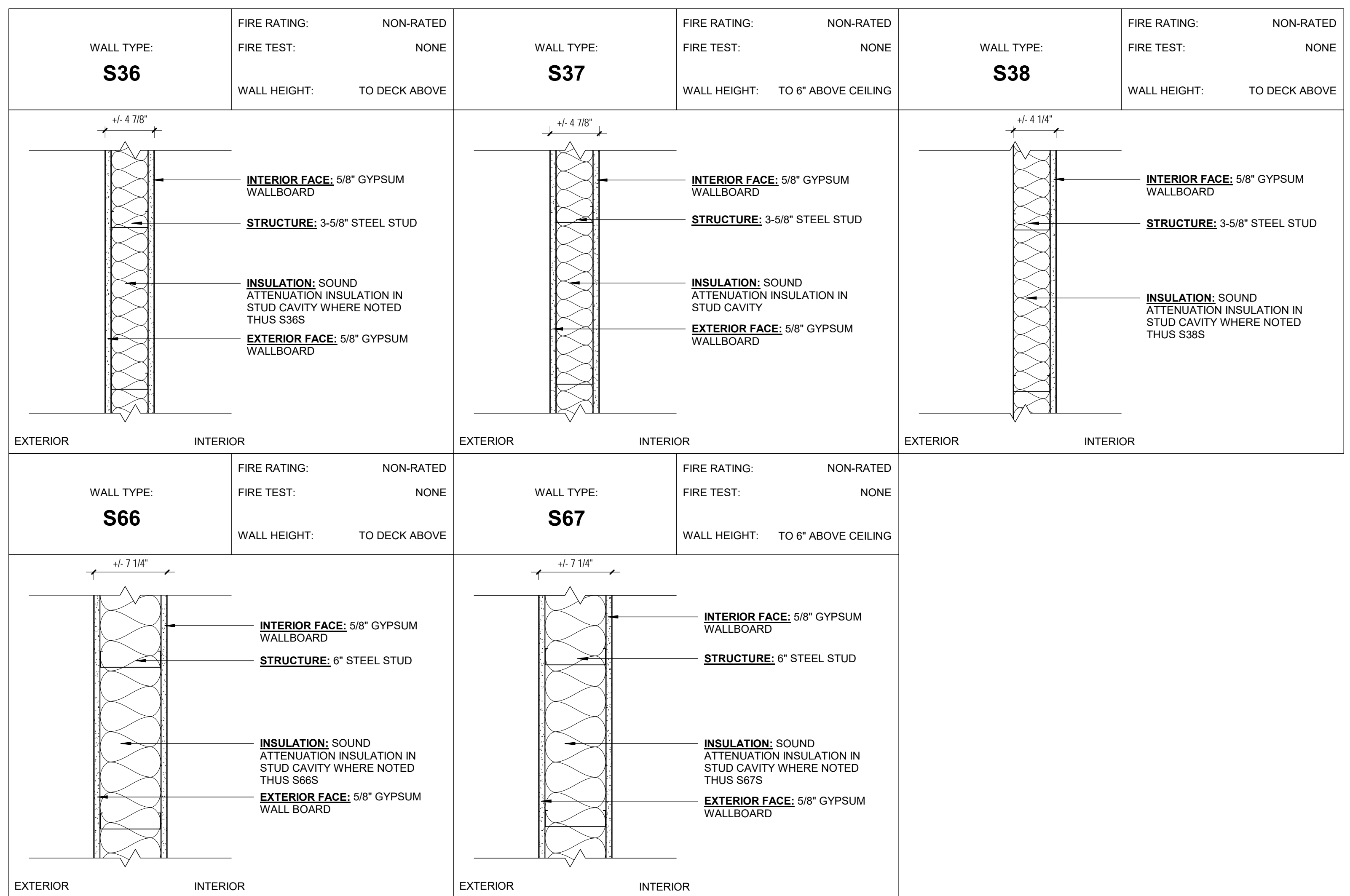


2 BLDG 1 BASEMENT PARTIAL CEILING PLAN
A2.10 1/8" = 1'-0"



1 BLDG 1 BASEMENT FLOOR PLAN
A2.10 1/8" = 1'-0"





GENERAL NOTES

1. WALL TYPES DESCRIBED ON THIS SHEET DO NOT ACCOUNT FOR REQUIRED BACKING AND/OR SUPPORT FOR WALL MOUNTED FIXTURES, EQUIPMENT, CASEWORK AND/OR SYSTEMS FURNITURE. COORDINATE WITH ENLARGED FLOOR PLANS, INTERIOR ELEVATIONS AND EQUIPMENT PLANS PRIOR TO THE COVERING OF STUD FRAMING. REFER TO MANUFACTURER'S RECOMMENDATIONS.
2. WALL THICKNESS DESCRIBED ON THIS SHEET ARE SHOWN NOMINALLY IN PLAN REPRESENTATIONS.
3. HORIZONTAL BRACING 2'-0" A.F.F. AT FIRST OCCURRENCE AND EVERY 4'-0" THEREAFTER AT ALL WALLS W/ GYPSUM BOARD ON ONLY ONE SIDE.
4. AT ALL WALLS WITH SOUND ATTENUATION, SEAL TOP OF WALL AT STRUCTURE AND BOTTOM OF WALL WITH SOUND SEALANT.
5. AT ALL WALLS THAT EXTEND TO STRUCTURE PROVIDE DEFLECTION TRACK.
6. CONTRACTOR SHALL NOTIFY ARCHITECT IMMEDIATELY IF CLEARANCES AND ADA REQUIREMENTS ARE NOT ACHIEVED.
7. PROVIDE (122413.A) MANUALLY OPERATED ROLLER SHADE WINDOWS AT ALL EXTERIOR WINDOWS AT ROOMS 102, 103, 110, AND 111.

PLAN NOTES

1. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE TO THE FACE OF STUDS FOR GWB WALLS / PARTITIONS.
2. FOR FLOOR FINISHES RE: ROOM FINISH SCHEDULE AND FINISH PLANS, SHEETS A8.01.
3. UNLESS NOTED OTHERWISE ALL GWB WALLS SHALL HAVE A 6" STUD FRAME RETURN AT ALL DOOR AND WINDOW JAMBS.
4. RE: SHEETS G0.01 FOR BUILDING OCCUPANCY PLANS.
5. SEE ENLARGED PLANS FOR ADDITIONAL WALL TYPES.

KEYNOTES

- REFERENCE NOTES**
- 2.19 EXISTING COLUMN. PROTECT IN PLACE. FIELD VERIFY EXACT LOCATION.
 - 9.02 ALIGN WALL PLANES.
 - 9.06 VERIFY THICKNESS OF EXISTING WALL AND MATCH WIDTH. FINISH WALL FLUSH AT BOTH SIDES OF WALL. FINISH TO MATCH ADJACENT WALL.

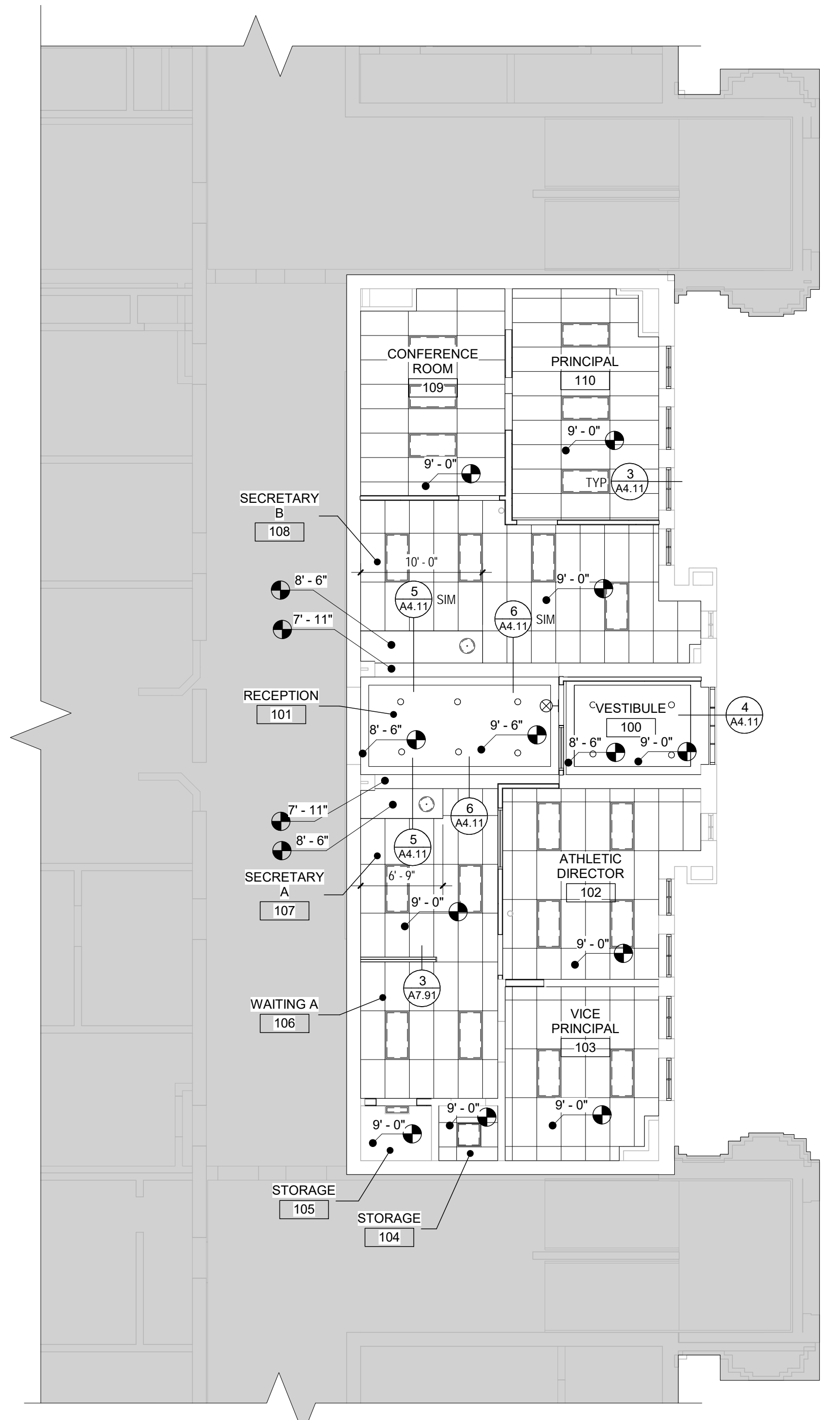
FLOOR PLAN LEGEND

- NOT IN SCOPE
- DOOR SYMBOL, RE: DOOR SCHEDULE, SHEET A7.01
- WALL TYPE, RE: SHEET G0.04
- WINDOW TYPE, RE: WINDOW FRAME TYPE SHEETS, SHEET A7.01
- STEEL STUD WALL AND GYPSUM BOARD WALL, RE: WALL TYPES.
- CONCRETE MASONRY UNIT (CMU) WALL, RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS, COORDINATE WITH STRUCTURAL DRAWINGS.
- CONCRETE WALL, RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS, COORDINATE WITH STRUCTURAL DRAWINGS.
- MASONRY VENEER, RE: WALL SECTIONS, WALL TYPES, EXTERIOR & INTERIOR ELEVATIONS, COORDINATE WITH STRUCTURAL DRAWINGS.

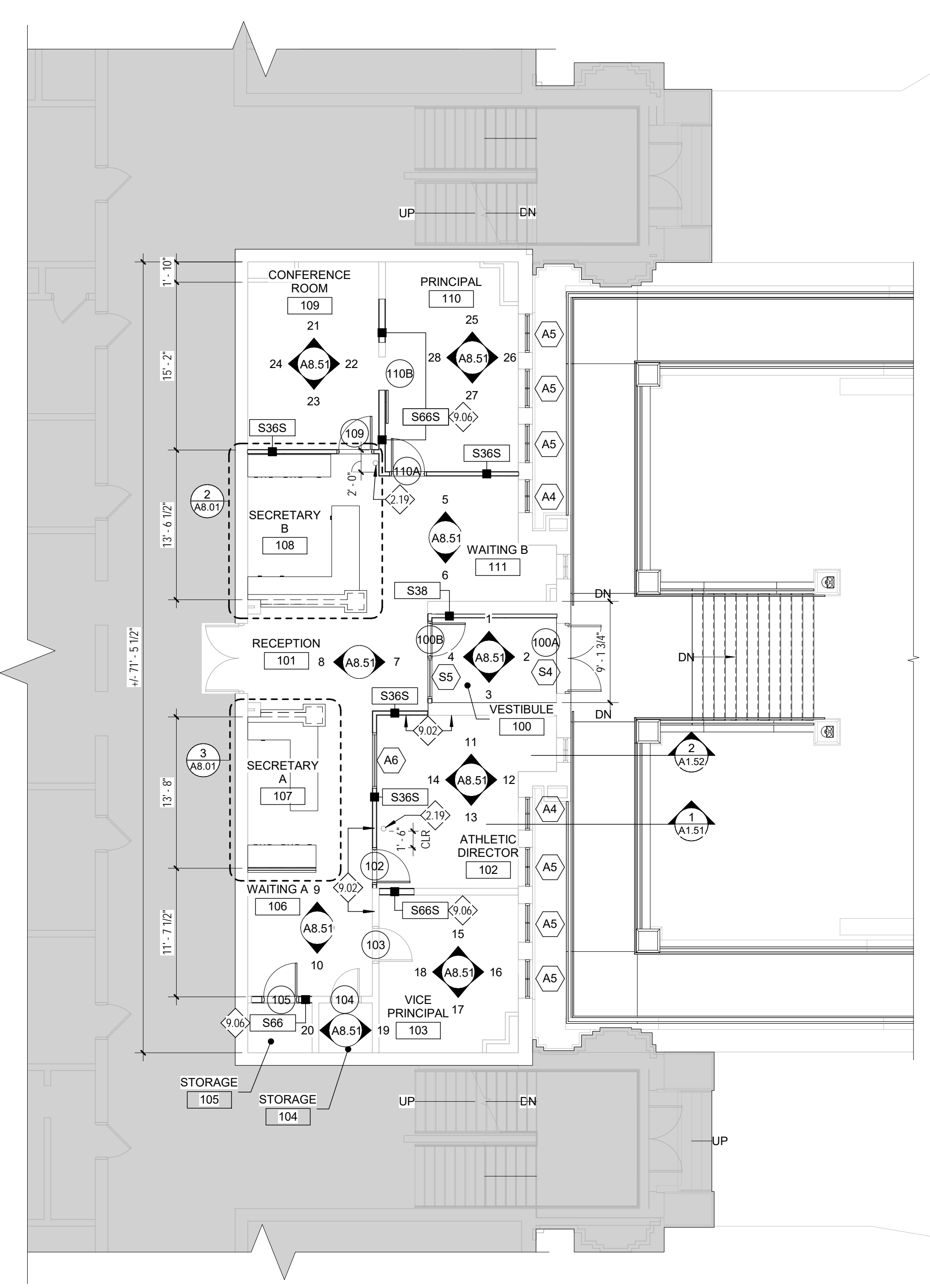
RCP LEGEND

- 2' x 4' ACOUSTICAL CEILING METAL SUSPENSION SYSTEM WITH ACOUSTICAL PANEL CEILING UNITS, APC-1, U.O.N. RE: DIVISION 09 - FINISHES IN THE SPECIFICATIONS
- GYPSUM BOARD CEILING ON STEEL FRAMING AND SUPPORT SYSTEM, PAINT - P, U.O.N. RE: DIVISION 09 - FINISHES IN THE SPECIFICATION.
- OPEN TO STRUCTURE
- VERTICAL SERVICE DROP/CHASE, COORDINATE WITH MECHANICAL DRAWINGS.
- LIGHTING FIXTURES, COORDINATE WITH ELECTRICAL DRAWINGS.
- MECHANICAL FIXTURES, COORDINATE WITH MECHANICAL DRAWINGS.
- PENDANT LIGHT, COORDINATE WITH ELECTRICAL DRAWINGS.
- CEILING HEIGHT ABOVE FINISH FLOOR
- EXIT SIGN

4 WALL TYPES - INTERIOR 01
A2.11 1/12" = 1'-0"



2 LEVEL 1 PARTIAL CEILING PLAN
A2.11 1/8" = 1'-0"



1 LEVEL 1 PARTIAL FLOOR PLAN
A2.11 1/8" = 1'-0"

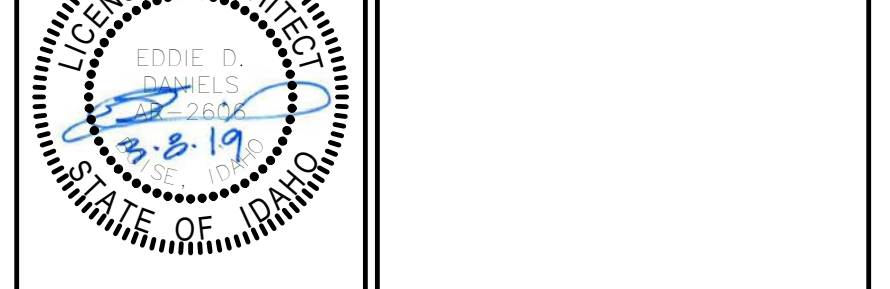
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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
PARTIAL FIRST FLOOR PLAN, CEILING PLAN & WALL TYPES

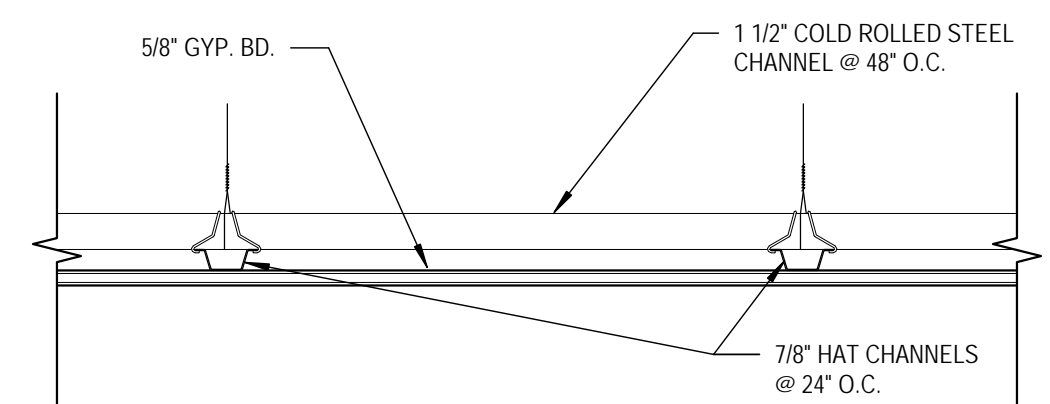
Revisions: Δ



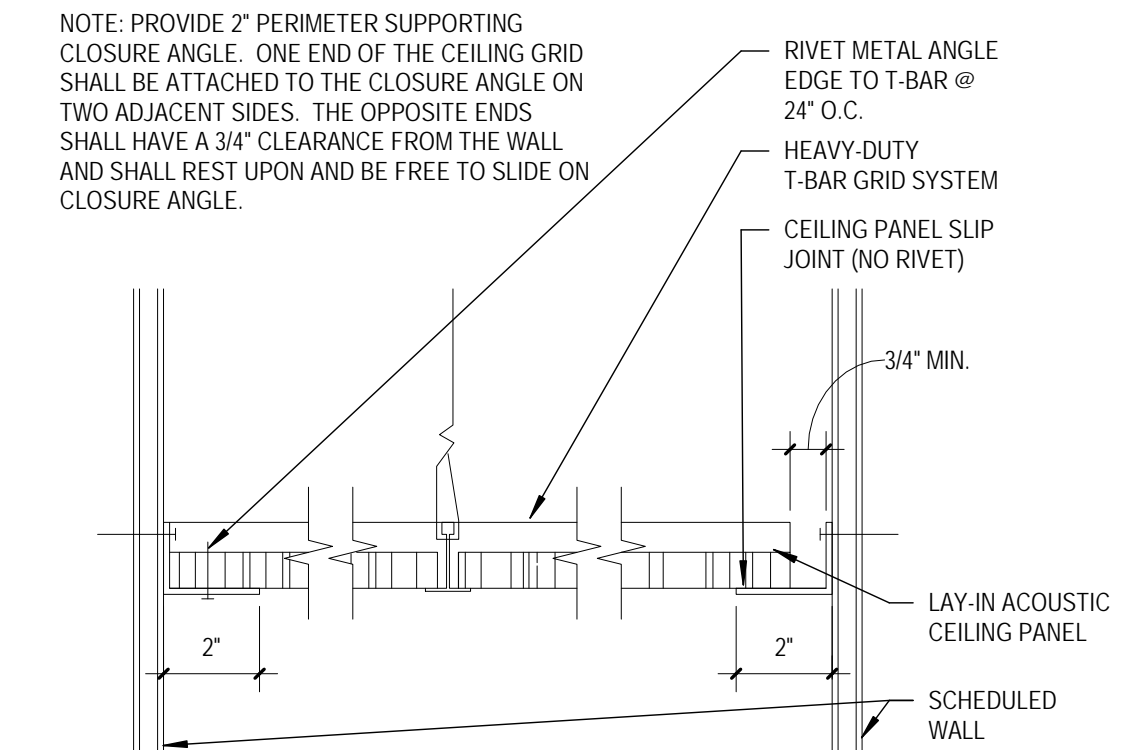
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Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

Sheet No:
A2.11

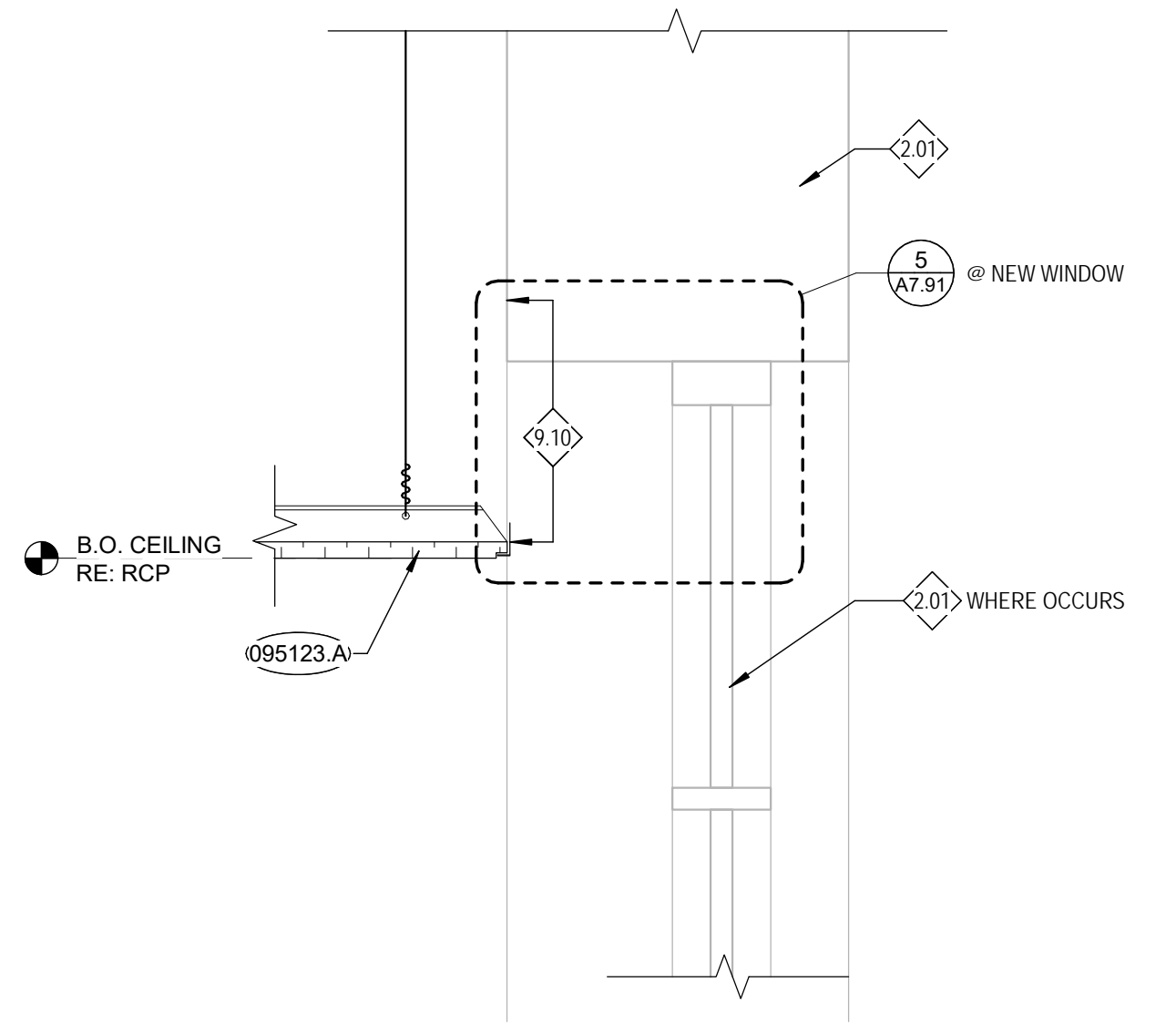
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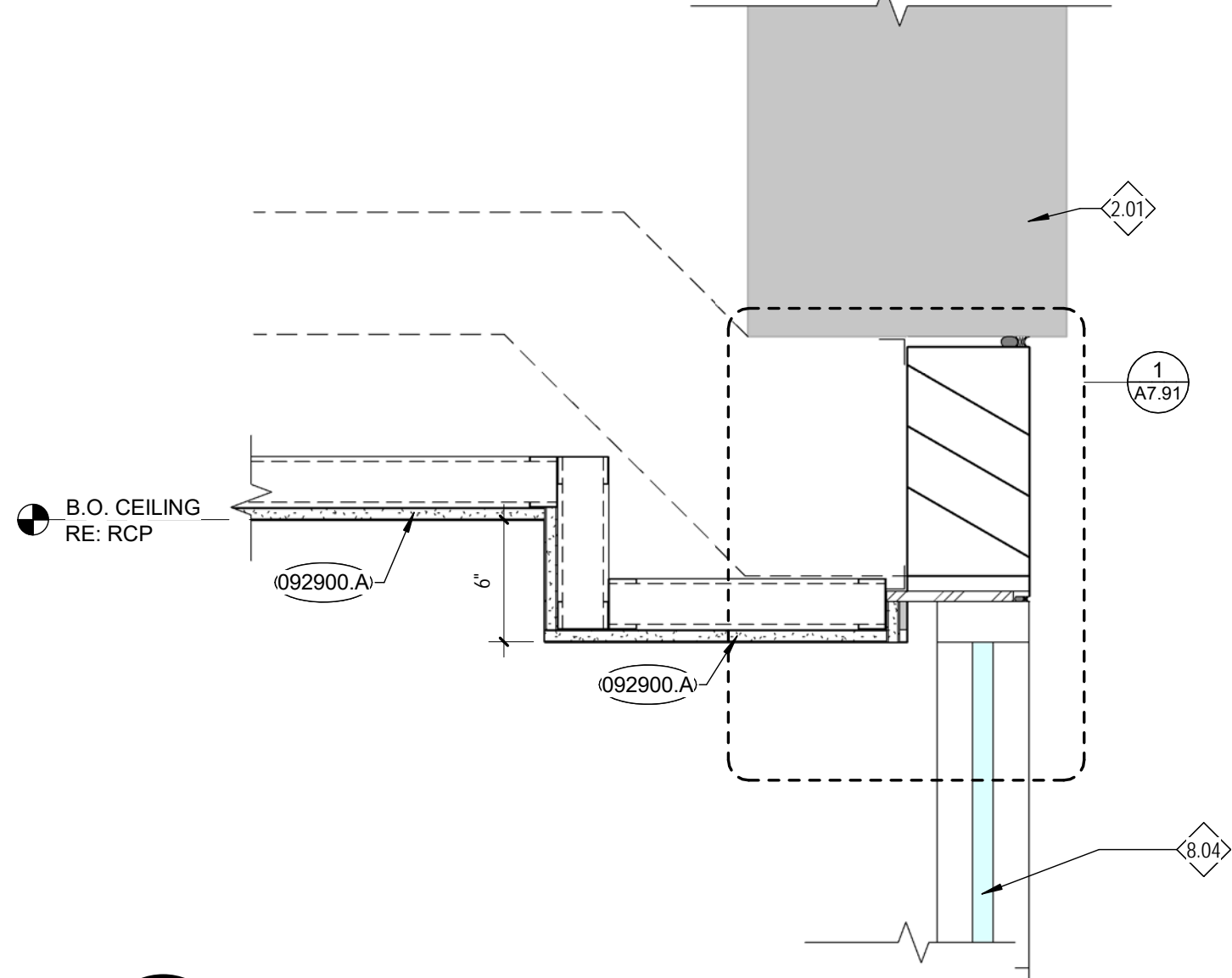
1 TYPICAL SUSPENDED CEILING DETAIL
A4.11 3\"/>



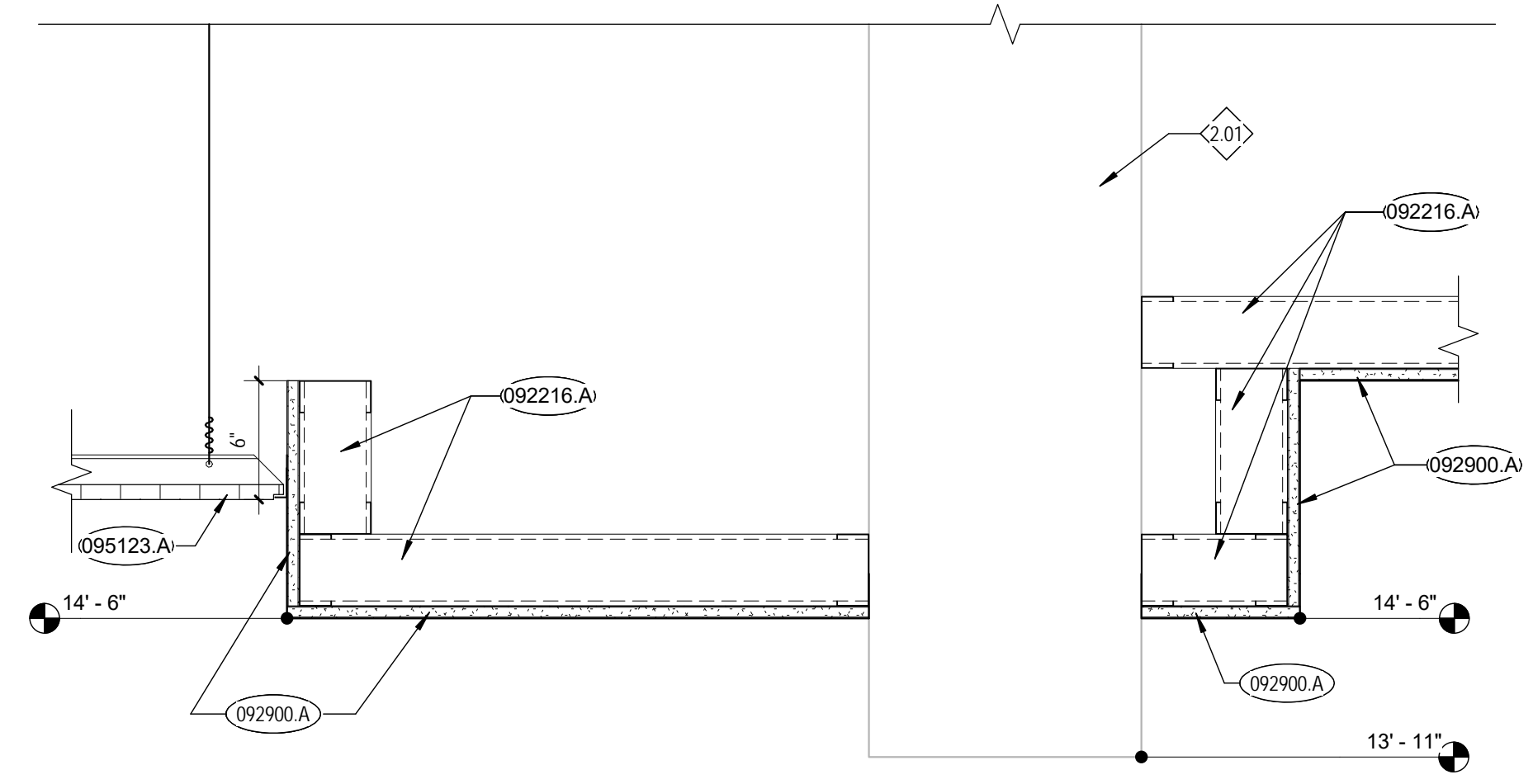
2 TYPICAL LAY-IN CEILING TILE EDGE DETAIL
A4.11 3\"/>



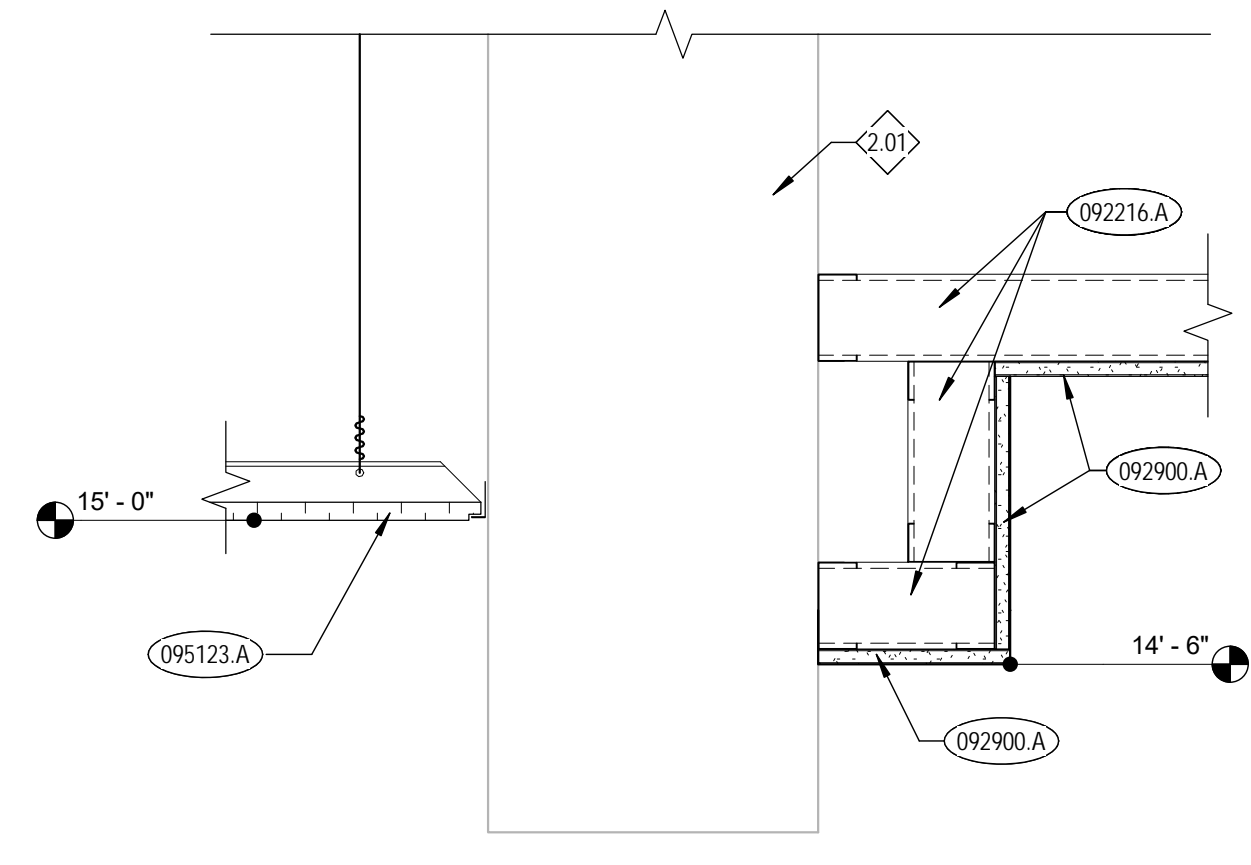
3 SECTION DETAIL 02
A4.11 1 1/2\"/>



4 SECTION DETAIL 01
A4.11 1 1/2\"/>



5 SOFFIT DETAIL 01
A4.11 1 1/2\"/>



6 SOFFIT DETAIL 02
A4.11 1 1/2\"/>

KEYNOTES

- 092216.A STEEL STUD FRAMING (NON-LOAD-BEARING)
- 092900.A GYPSUM BOARD, TYPE X
- 095123.A ACOUSTICAL TILE CEILINGS

REFERENCE NOTES

- 2.01 EXISTING CONSTRUCTION, PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- 8.04 NEW STOREFRONT AS INDICATED PER FLOOR PLANS AND FRAME TYPES.
- 9.10 FLUSH

CEILING NOTES

1. COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL ITEMS TO BE PROVIDED AT THE CEILING PLANE AND IN THE WORK.
2. CENTER ALL LIGHT FIXTURES AND SPRINKLER HEADS IN THEIR RESPECTIVE CEILING PANEL.
3. INSTALL ALL SUSPENSION SYSTEMS FOR ACOUSTICAL PANEL CEILINGS PER PROVISIONS OF ASTM C 635 AND ASTM C 636.
4. ALL SOFFIT DIMENSIONS SHOWN ARE TO FACE OF FINISH.
5. COORDINATE WITH MECHANICAL & ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR PHYSICAL SIZES OF ALL CEILING GRILLES, DIFFUSERS, FIXTURES, GANS, AND ALL RELATED ITEMS.
6. SUSPENSION SYSTEMS FOR GYPSUM BOARD CEILINGS SHALL BE INSTALLED PER THE SPECIFICATIONS AND ASTM C754.

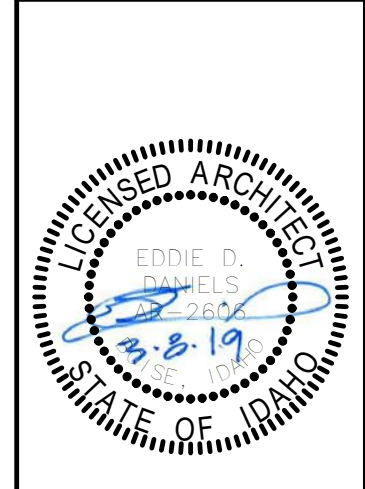
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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
DETAILS

BID SET



Revisions: Δ

No.	Description

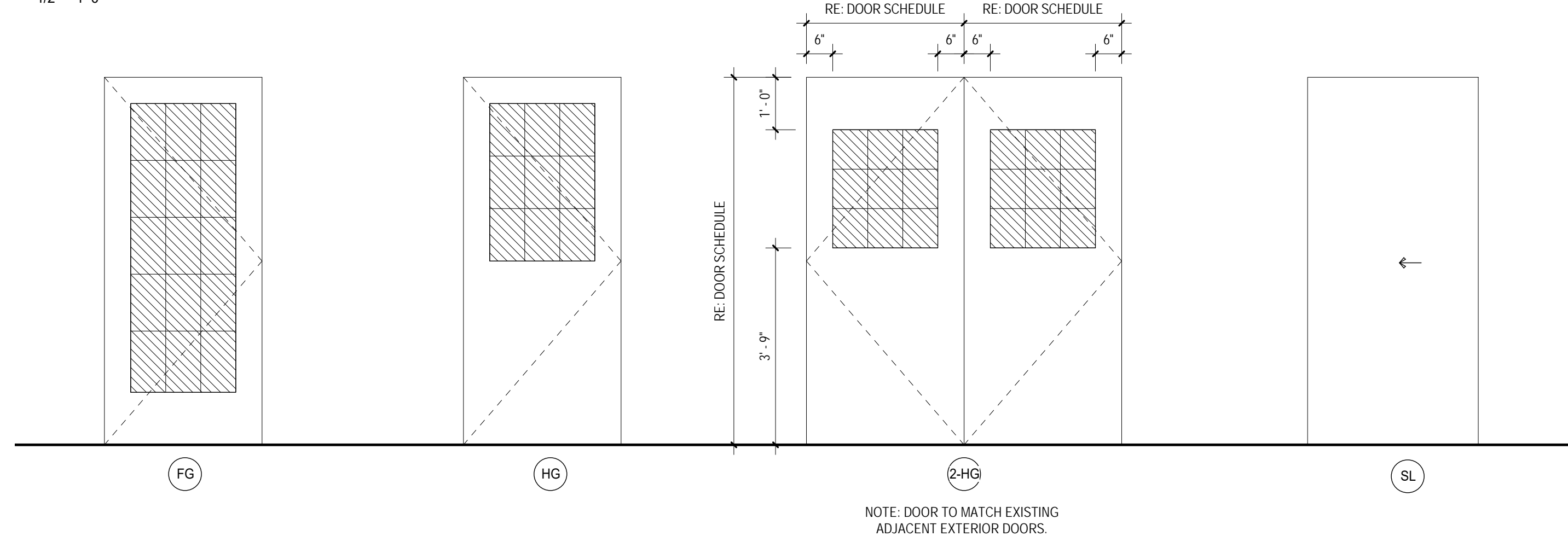
Project No: 1802
Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

Sheet No:
A4.11

SCHEDULE - DOOR											
DOOR #	DOOR						FRAME			DOOR HARDWARE	REMARKS
	TYPE	WIDTH	HEIGHT	MATERIAL	FINISH	TYPE	MATERIAL	FINISH			
100A	2-HG	6'-0"	7'-0"	HM	P	S4	HM	P	1.0	PAINT TO MATCH ADJACENT EXTERIOR DOORS AND FRAMES	
100B	FG	3'-0"	7'-0"	HM	P	S5	HM	P	2.0	PAINT TO MATCH ADJACENT EXTERIOR DOORS AND FRAMES	
102	HG	3'-0"	7'-0"	EXISTING	EXISTING	EXISTING	EXISTING	P	3.0	REINSTALL DOOR #03. PATCH AND REPAIR AS NECESSARY. REPAINT TO EXISTING COLOR	
105	HG	3'-0"	7'-0"	EXISTING	EXISTING	S1	EXISTING	P	3.0	REINSTALL DOOR #01. PATCH AND REPAIR AS NECESSARY. REPAINT TO EXISTING COLOR	
109	HG	3'-0"	7'-0"	EXISTING	EXISTING	EXISTING	EXISTING	P	3.0	REINSTALL DOOR #02. PATCH AND REPAIR AS NECESSARY. REPAINT TO EXISTING COLOR	
110A	HG	3'-0"	7'-0"	EXISTING	EXISTING	EXISTING	EXISTING	P	3.0	REINSTALL DOOR #04. PATCH AND REPAIR AS NECESSARY. REPAINT TO EXISTING COLOR	
110B	SL	3'-0"	7'-0"	WD	FF	S3	HM	P	4.0		

DOOR TYPES

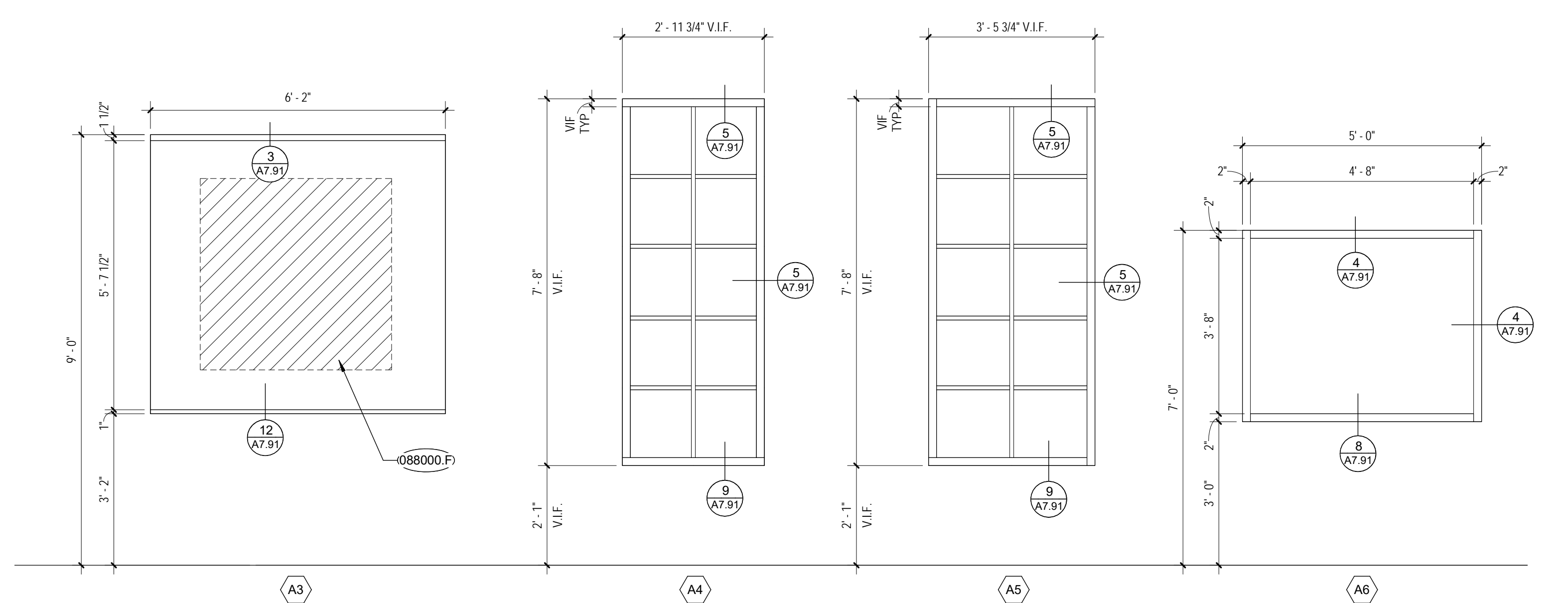
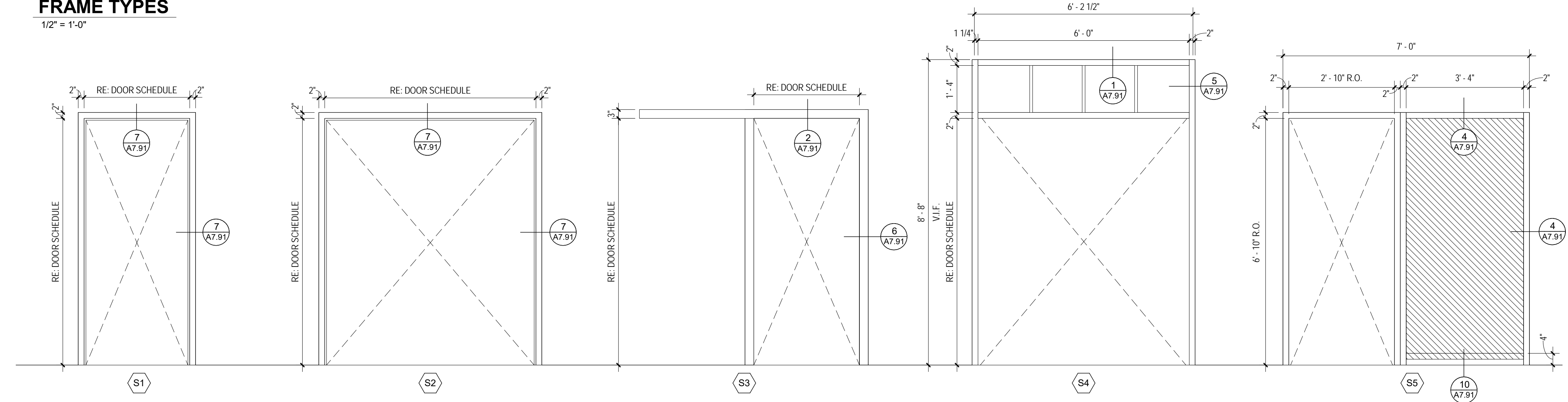
1/2" = 1'-0"



NOTE: DOOR TO MATCH EXISTING ADJACENT EXTERIOR DOORS.

FRAME TYPES

1/2" = 1'-0"



KEYNOTES

088000.F INTERIOR WINDOW FILM

REFERENCE NOTES

GENERAL NOTES

1. PAINT ALL METAL FRAMES & ACCESSORIES TO MATCH EXISTING.
2. ALL HOLLOW METAL FRAME GLAZING STOPS TO BE PLACED ON ROOM SIDE OPPOSITE FROM HALLWAY / CORRIDOR.
3. PROVIDE FULLY TEMPERED GLASS UNITS WHERE REQUIRED BY IBC SECTION 2406 AND SPECIFICATION SECTION 08800 - GLAZING.
4. PROVIDE FLOAT GLASS (08800.A) AT CONDITIONS OTHER THAN DESCRIBED IN GENERAL NOTE 3 OF THIS SHEET.

ABBREVIATIONS

- ALUM - ALUMINUM
- FF - FACTORY FINISH AS SPECIFIED
- HM - HOLLOW METAL
- HPC - HIGH PERFORMANCE COATING
- M - MINUTES
- PH - PAINT COLOR "NUMBER" (RE: DIVISION 9 SECTION "INTERIOR PAINTING")
- WD - WOOD
- S - SMOKE
- AN - ANODIZED

LEGEND

- HATCH IN FRAME UNITS INDICATES AREAS OF FULLY-TEMPERED FLOAT GLASS. RE: DIVISION 08800 IN THE SPECIFICATIONS.
- NO HATCH AREA IN FRAME UNITS INDICATES AREAS OF FLOAT GLASS. RE: DIVISION 08800 IN THE SPECIFICATIONS.

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Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
DOOR SCHEDULE & TYPES

BID SET

Revisions:

Project No: 1802
Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

Sheet No:
A7.01

KEYNOTES

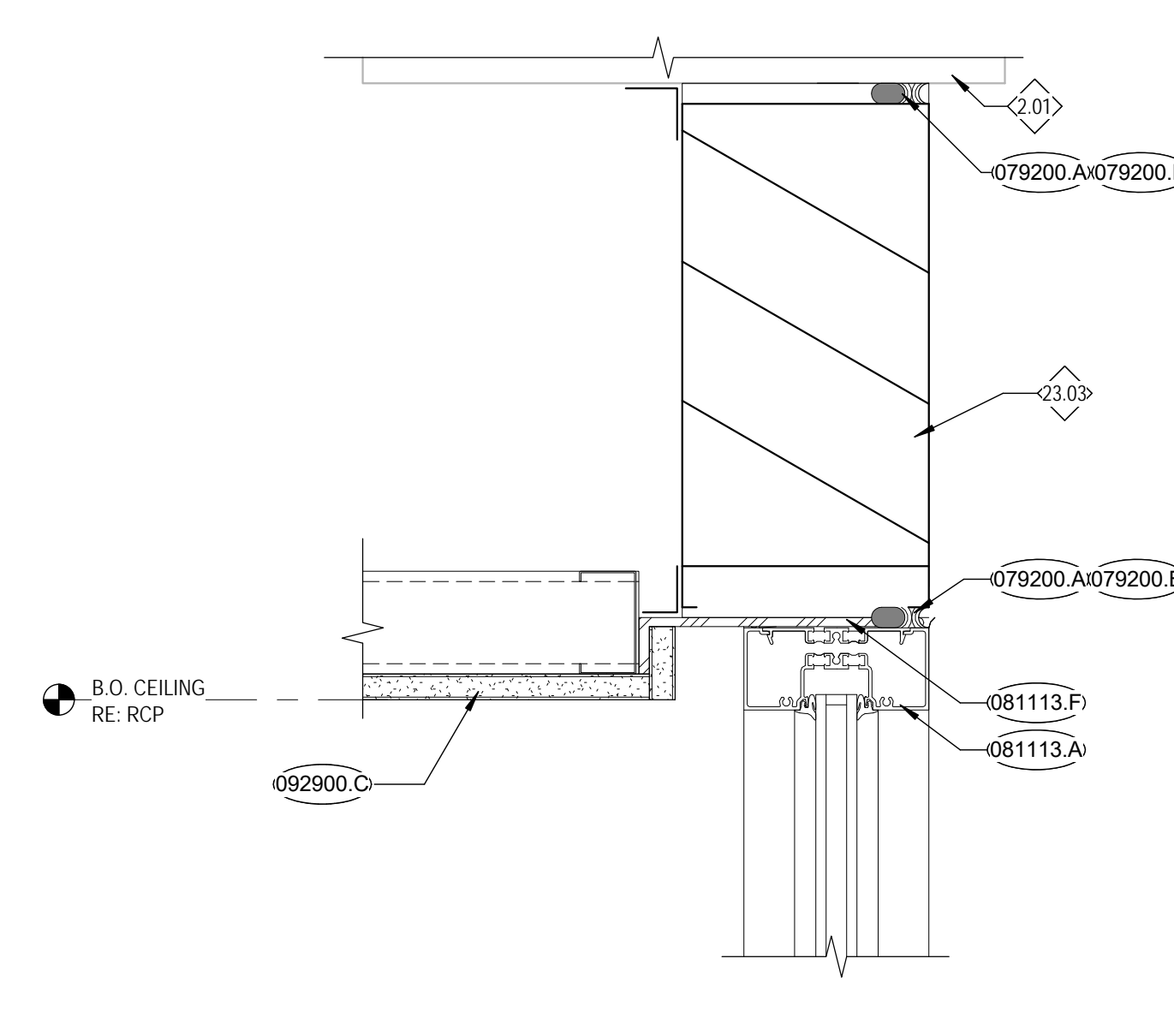
- 064023.B WOOD TRIM
- 079200.A JOINT SEALANT
- 079200.B JOINT SEALANT BACKING
- 081113.A HOLLOW METAL FRAME
- 081113.F STEEL PLATE
- 081416.A FLUSH WOOD VENEER-FACED WOOD DOOR*
- 084113.B ALUMINUM STOREFRONT FRAMING SYSTEM
- 084113.G HIGH-PERFORMANCE SILL
- 084113.N ALUMINUM U-CHANNEL FITTING
- 087100.F BARN DOOR TRACK HANGER HARDWARE
- 092900.A GYPSUM BOARD, TYPE X
- 092900.C GYPSUM CEILING BOARD
- 095123.A ACOUSTICAL TILE CEILINGS

REFERENCE NOTES

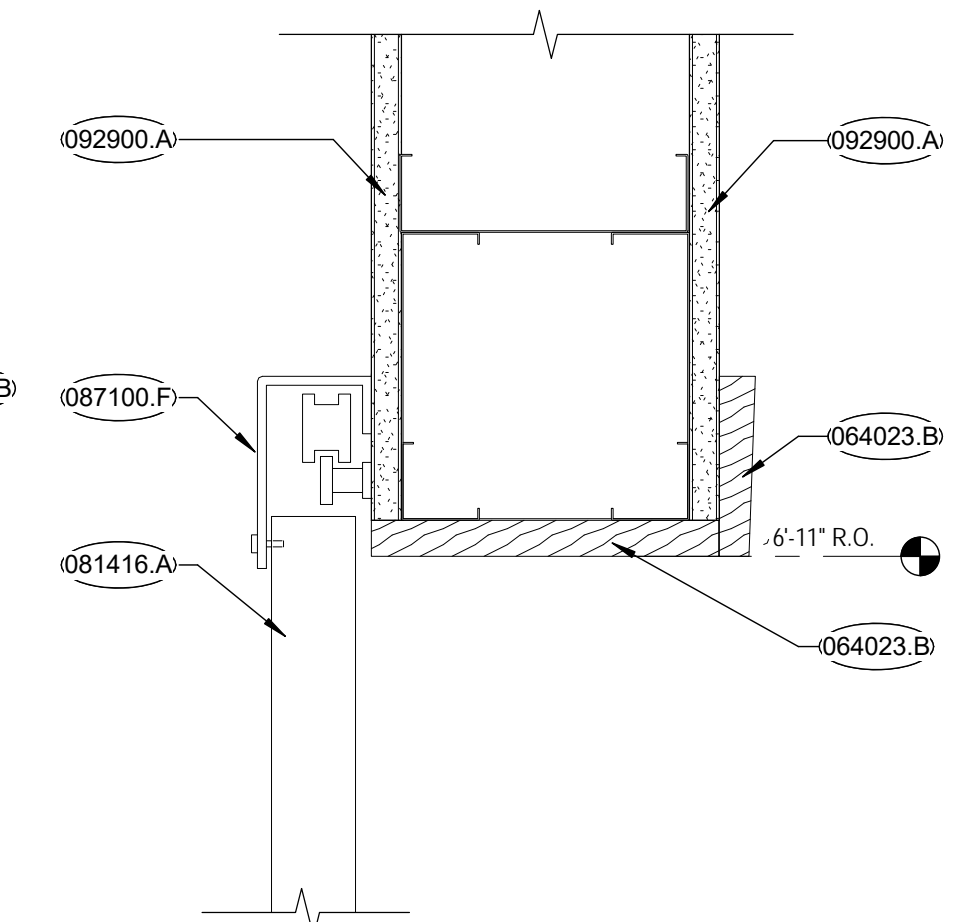
- 2.01 EXISTING CONSTRUCTION. PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- 8.01 DOOR AS SCHEDULED.
- 8.02 REFER TO WINDOW TYPES FOR GLAZING.
- 8.05 MATCH WIDTH TO EXISTING ADJACENT WINDOWS.
- 8.06 ROLL-IN GLAZING GASKET
- 9.03 FLOOR FINISH. RE: FINISH SCHEDULE A8.01.
- 9.07 RE: FLOOR PLAN FOR WALL TYPE.
- 9.11 REINSTALL SILL AND PAINT TO MATCH EXISTING.
- 9.12 PATCH AND REPAIR GYP TO MATCH ADJACENT WALLS.
- 23.03 MECHANICAL GRILLE. COORDINATE WITH MECHANICAL DRAWINGS.

GENERAL NOTES

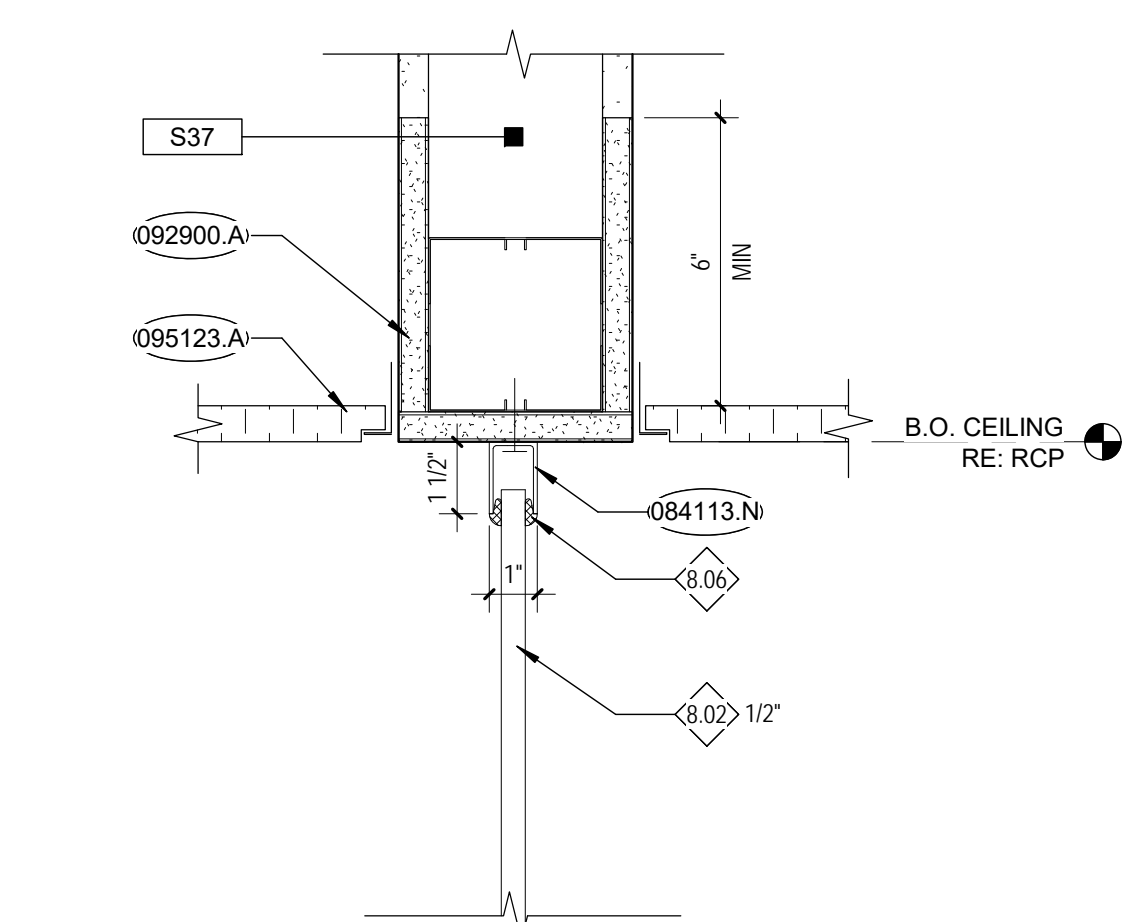
- 1. PAINT ALL METAL FRAMES & ACCESSORIES TO MATCH EXISTING.
- 2. ALL HOLLOW METAL FRAME GLAZING STOPS TO BE PLACED ON ROOM SIDE OPPOSITE FROM HALLWAY / CORRIDOR.
- 3. PROVIDE FULLY TEMPERED GLASS UNITS WHERE REQUIRED BY I.B.C. SECTION 2406 AND SPECIFICATION SECTION 08850 - GLAZING.
- 4. PROVIDE FLOAT GLASS (88800.A) AT CONDITIONS OTHER THAN DESCRIBED IN GENERAL NOTE 3 OF THIS SHEET.



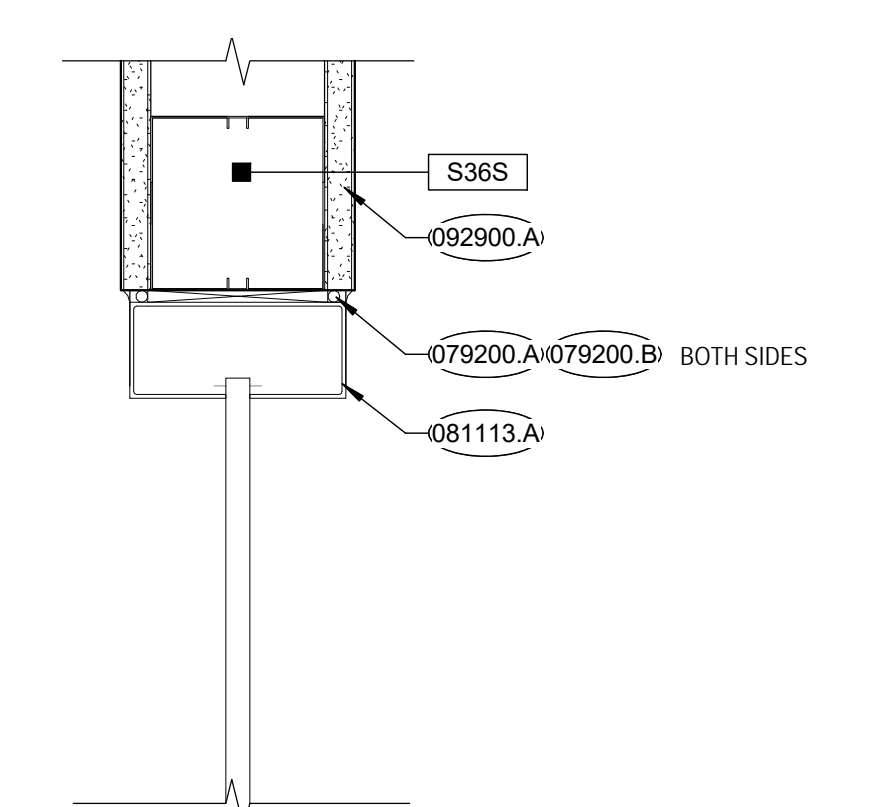
1 HEAD DETAIL @ GRILLE
A7.91 3" = 1'-0"



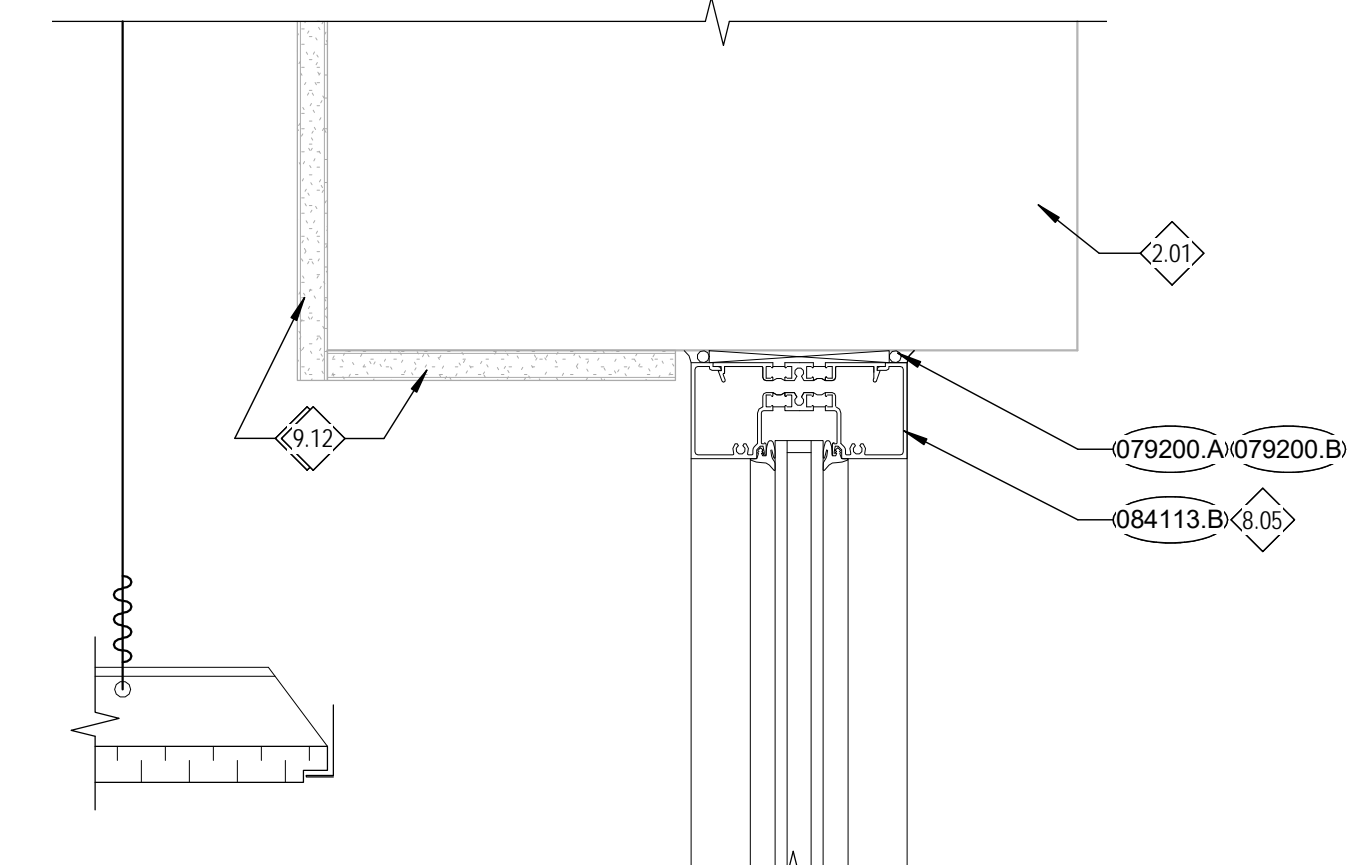
2 SLIDER HEAD DETAIL
A7.91 3" = 1'-0"



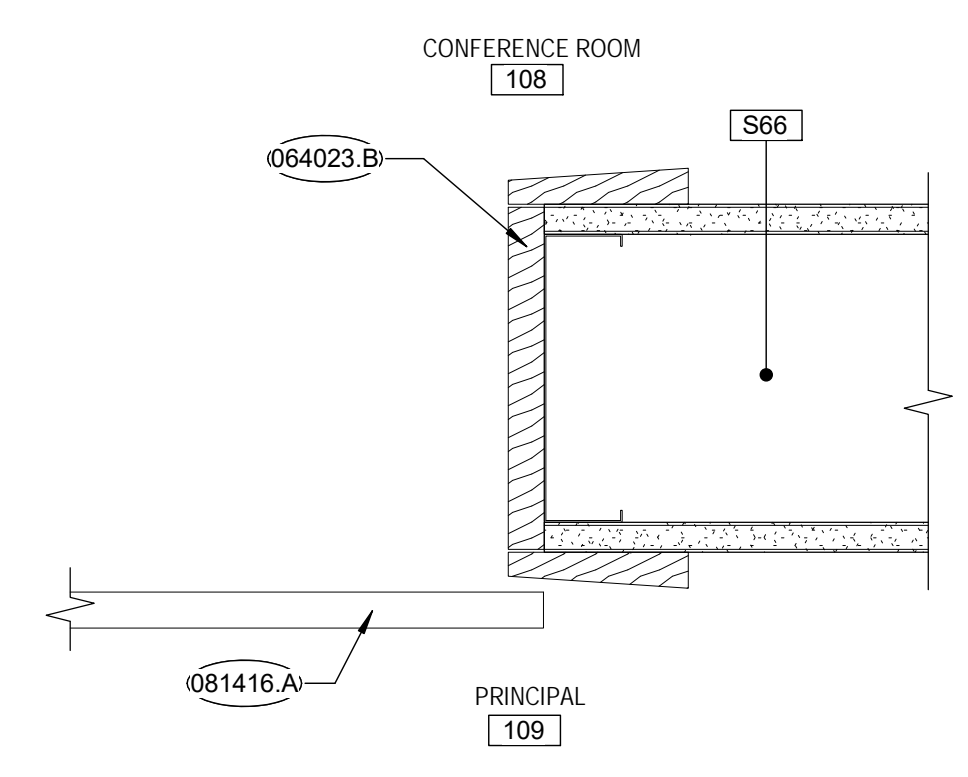
3 HEAD DETAIL
A7.91 3" = 1'-0"



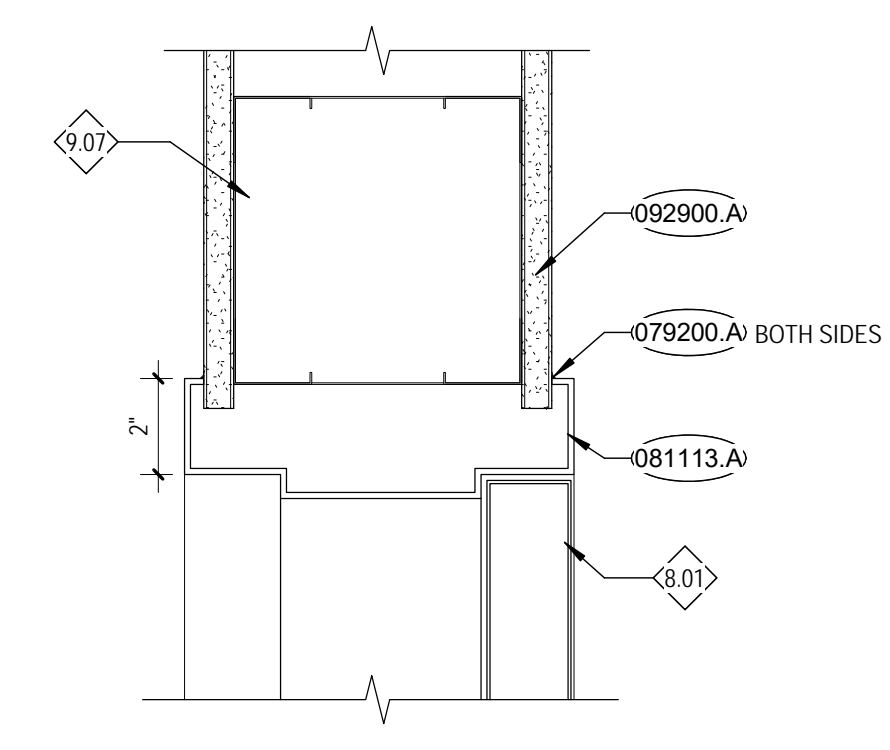
4 HEAD / JAMB @ INTERIOR STOREFRONT
A7.91 3" = 1'-0"



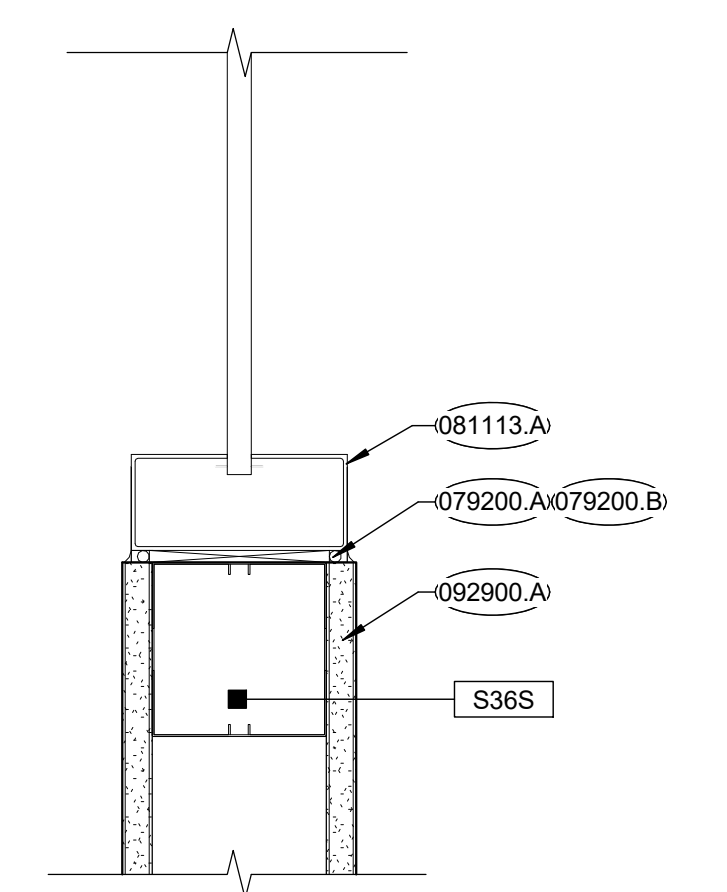
5 HEAD / JAMB @ EXTERIOR WALL
A7.91 3" = 1'-0"



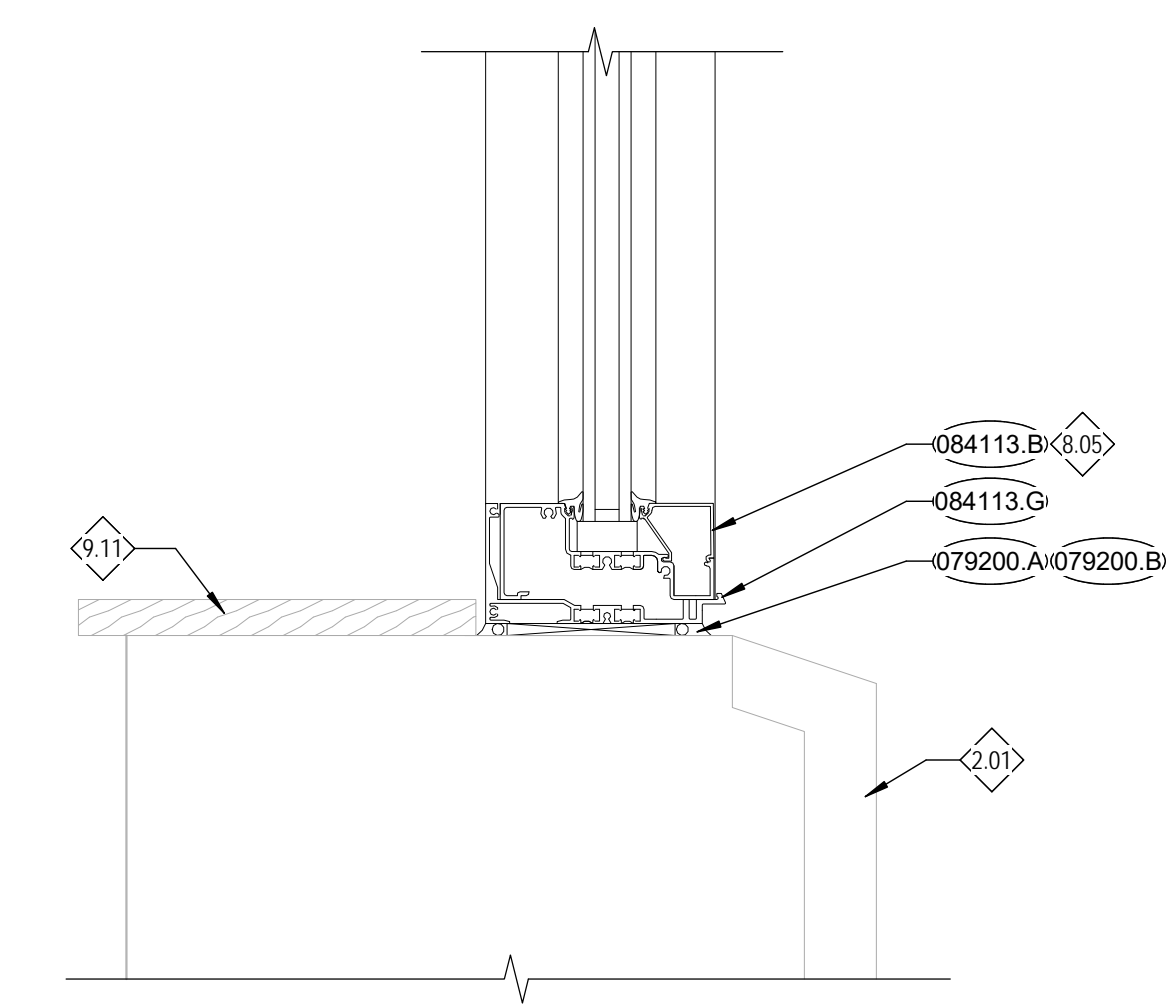
6 SLIDER JAMB DETAIL
A7.91 3" = 1'-0"



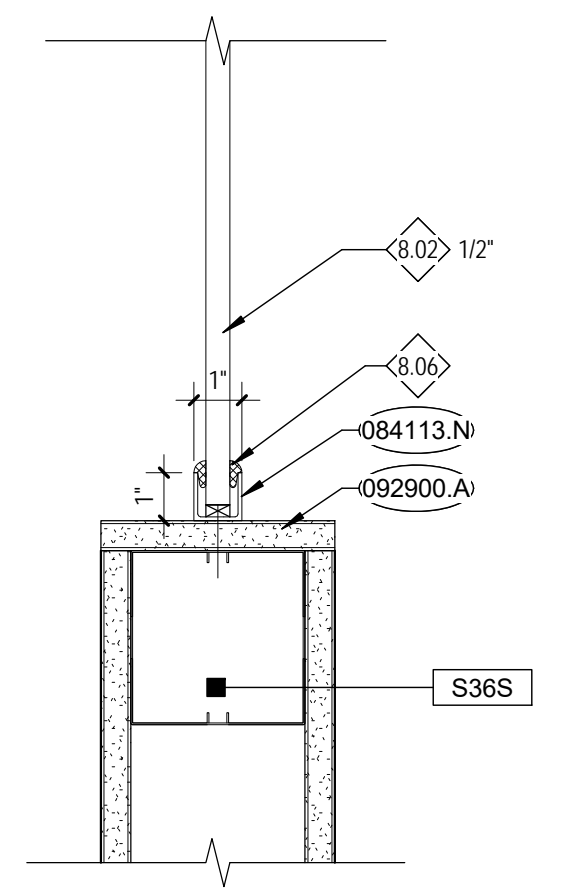
7 HM HEAD / JAMB
A7.91 3" = 1'-0"



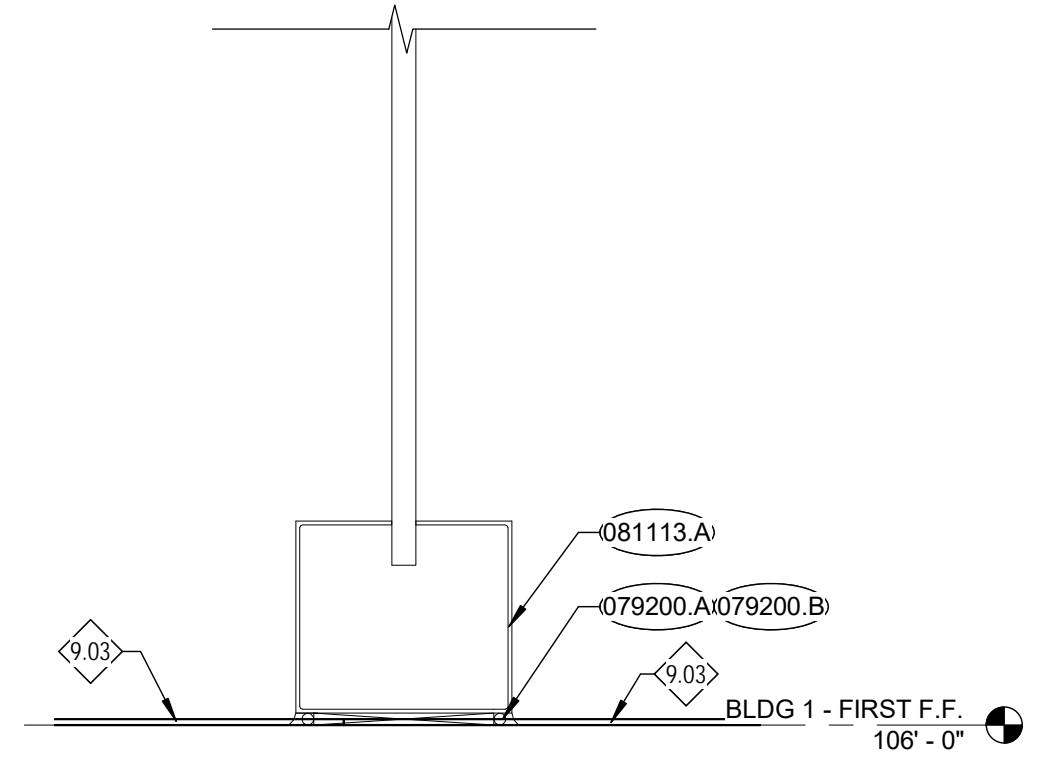
8 SILL @ INTERIOR STOREFRONT
A7.91 3" = 1'-0"



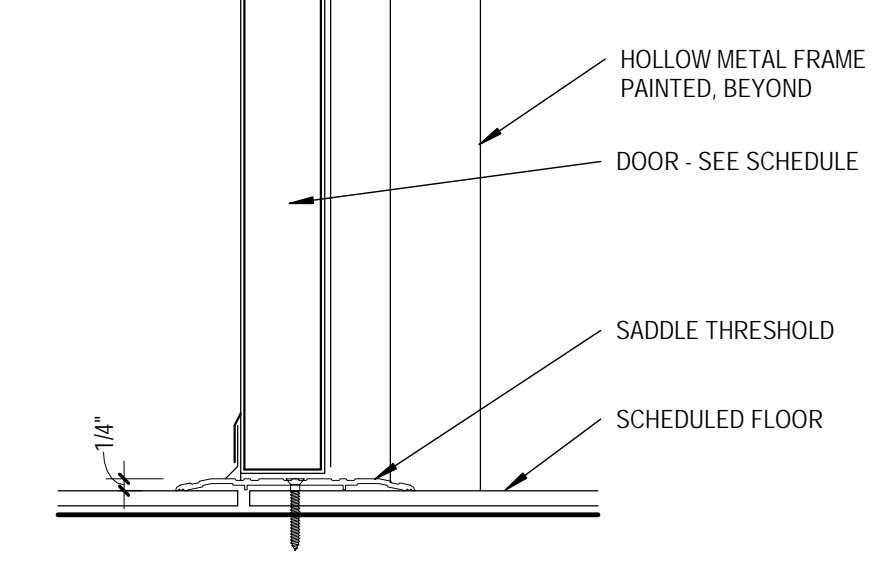
9 SILL @ EXTERIOR WALL
A7.91 3" = 1'-0"



12 SILL @ INTERIOR STOREFRONT
A7.91 3" = 1'-0"



10 SILL DETAIL
A7.91 3" = 1'-0"



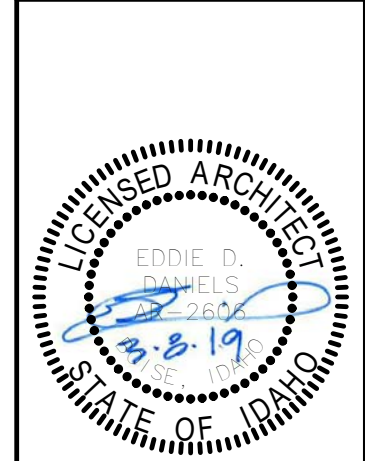
11 SADDLE THRESHOLD DETAIL
A7.91 3" = 1'-0"

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Project:
**POCATELLO HIGH SCHOOL -
ENTRANCE RENOVATION**

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
FRAME DETAILS



Revisions: Δ

Project No: 18027
Drawn By: LEJH
Checked By: GAJH
Date: 3-19-19

Sheet No:
A7.91

BID SET

SCHEDULE - ROOM FINISH											
ROOM NO.	ROOM TITLE	FLOOR		WALLS				CASEWORK			REMARKS
		MAT.	BASE	NORTH	EAST	SOUTH	WEST	CABINETRY	COUNTER TOP	TRANS TOP	
100	VESTIBULE	LVP-1	RB	P-1	P-1	P-1	P-1	NA	NA	NA	
101	RECEPTION	LVP-1	RB, MB	NA	P-1	P-1	P-1	PL-1	PL-2	SS	2
102	ATHLETIC DIRECTOR	CPT-1, CPT-2	RB	P-1	P-1	P-2	P-1	NA	NA	NA	1
103	VICE PRINCIPAL	CPT-1, CPT-2	RB	P-1	P-1	P-2	P-1	NA	NA	NA	1
104	STORAGE	CPT-1	RB	P-1	P-1	P-1	P-1	NA	NA	NA	
105	STORAGE	CPT-1	RB	P-1	P-1	P-1	P-1	NA	NA	NA	
106	WAITING A	CPT-1	RB	P-1	P-1	P-2	P-1	NA	NA	NA	1
107	SECRETARY A	CPT-1	RB	NA	P-1	P-1	P-1	PL-1	PL-2	SS	2
108	SECRETARY B	CPT-1	RB	P-2	P-1	NA	P-1	PL-1	PL-2	SS	1, 2
109	CONFERENCE ROOM	CPT-1, CPT-2	RB	P-1	P-1	P-1	P-2	NA	NA	NA	1
110	PRINCIPAL	CPT-1, CPT-2	RB	P-2	P-1	P-1	P-1	NA	NA	NA	1
111	WAITING B	CPT-1	RB	P-1	P-1	P-1	P-1	NA	NA	NA	

REMARKS

- SEE INTERIOR ELEVATIONS FOR LOCATION OF EXTENTS OF PAINT COLORS.
- SEE INTERIOR ELEVATIONS FOR LOCATION OF BASES.

KEYNOTES

- 064116.KK PLASTIC-LAMINATE SURFACE
- 064116.N CABLE GROMMET
- 064116.UU PLASTIC-LAMINATE-FACED COUNTERTOP
- 064116.W MILLWORK REVEAL L ANGLE W/ RETURN KEY
- 064116.XX MILLWORK CORNER KEY
- 064116.YY SOLID SURFACE
- 092216.A STEEL STUD FRAMING (NON-LOAD-BEARING)
- 092900.A GYPSUM BOARD, TYPE X

REFERENCE NOTES

- EXISTING CONSTRUCTION, PRESERVE AND PROTECT. REPAIR DAMAGED AREAS TO ORIGINAL STATE.
- INCLUDE BACKSPLASH
- 1/4" CLEAR
- WINDOW FRAME - TYPE AS INDICATED PER FLOOR PLANS AND FRAME TYPES.
- REMOVE AND REINSTALL EXISTING THRESHOLD OVER NEW FLOORING.
- LINE OF FRAMING BELOW.

GENERAL NOTES

- PAINT ALL WALL AND GYPSUM BOARD CEILINGS P-1, UNO.
- RE. DIVISION 8, SECTION "RESILIENT WALL BASE AND ACCESSORIES" FOR TRANSITIONS AND OTHER FLOORING ACCESSORIES.

ABBREVIATIONS - FINISHES

- FLOOR FINISHES**
- CPT CARPET TILE
 - CT CERAMIC TILE
 - QT QUARRY TILE
 - RF RUBBER FLOOR TILE
 - RMA RESILIENT MOLDING ACCESSORY
 - SC SEALED CONCRETE
 - SD STATIC DISSIPATIVE FLOOR TILE
 - SV VINYL SHEET FLOOR COVERING
 - TZ TERRAZZO
 - WM WALK OFF MAT

- WALL BASE**
- RB RESILIENT BASE
 - MB METAL TRIM BASE

- WALL FINISHES**
- CT CERAMIC TILE
 - GT GLASS TILE
 - FRP PLASTIC SHEET PANELING
 - P PAINT
 - RP RESIN PANEL
 - RMA RESILIENT MOLDING ACCESSORY
 - WC VINYL WALL COVERING
 - WDP WOOD PANELING
 - WP WRAPPED FABRIC PANEL

- CEILING**
- APC ACOUSTICAL PANEL CEILING
 - WD WOOD CEILING
 - GBD GYPSUM BOARD

- CASEWORK**
- PL PLASTIC LAMINATE
 - SS SOLID SURFACE
 - TF TRANSPARENT FINISH
 - WDP WOOD PANELING

LEGEND

- LVT-1
- CPT-1
- CPT-2

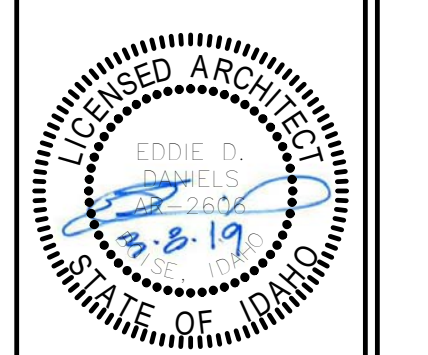
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POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

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POCATELLO, ID 83204

Sheet:
FINISH SCHEDULE, PLAN AND CASEWORK DETAILS

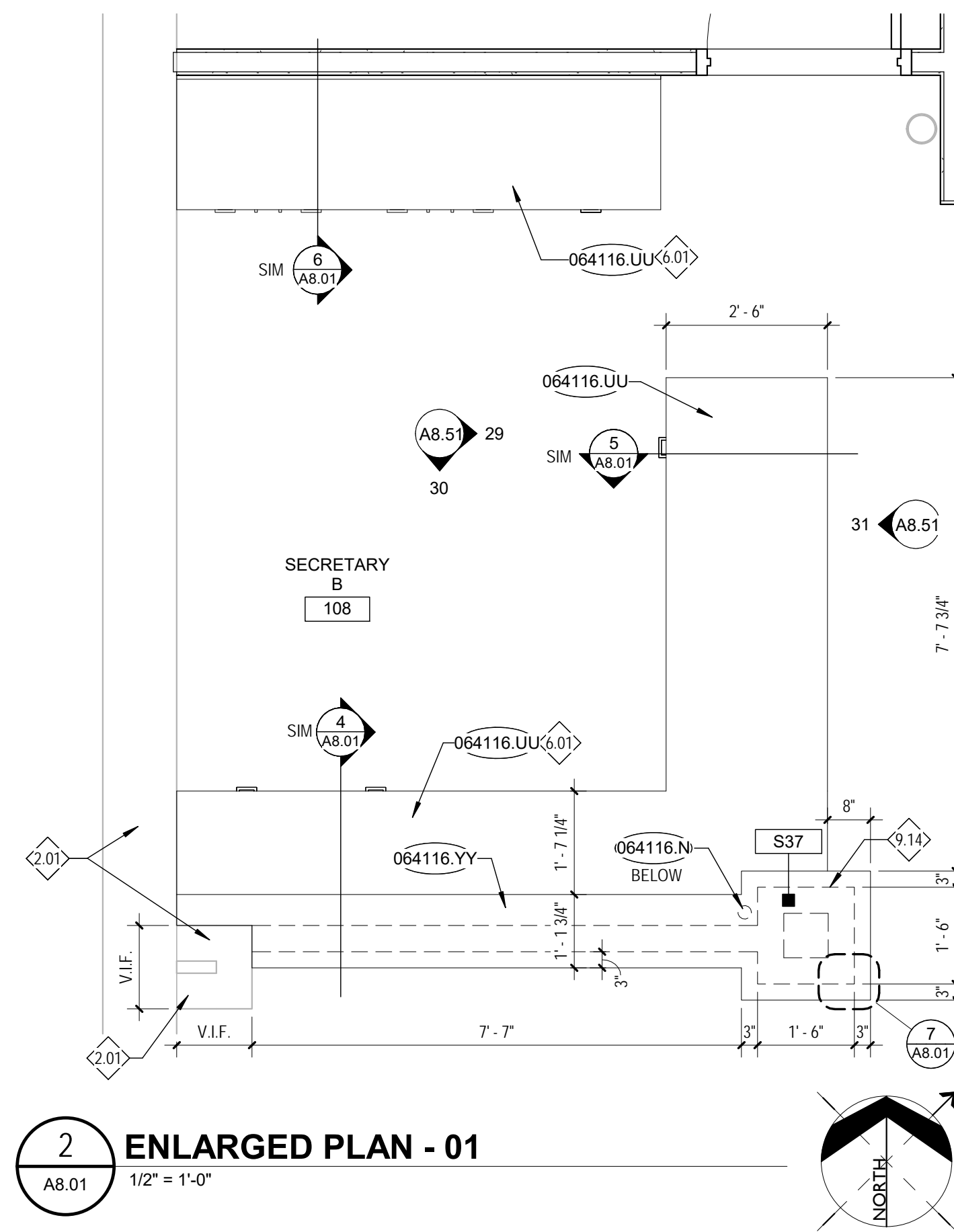
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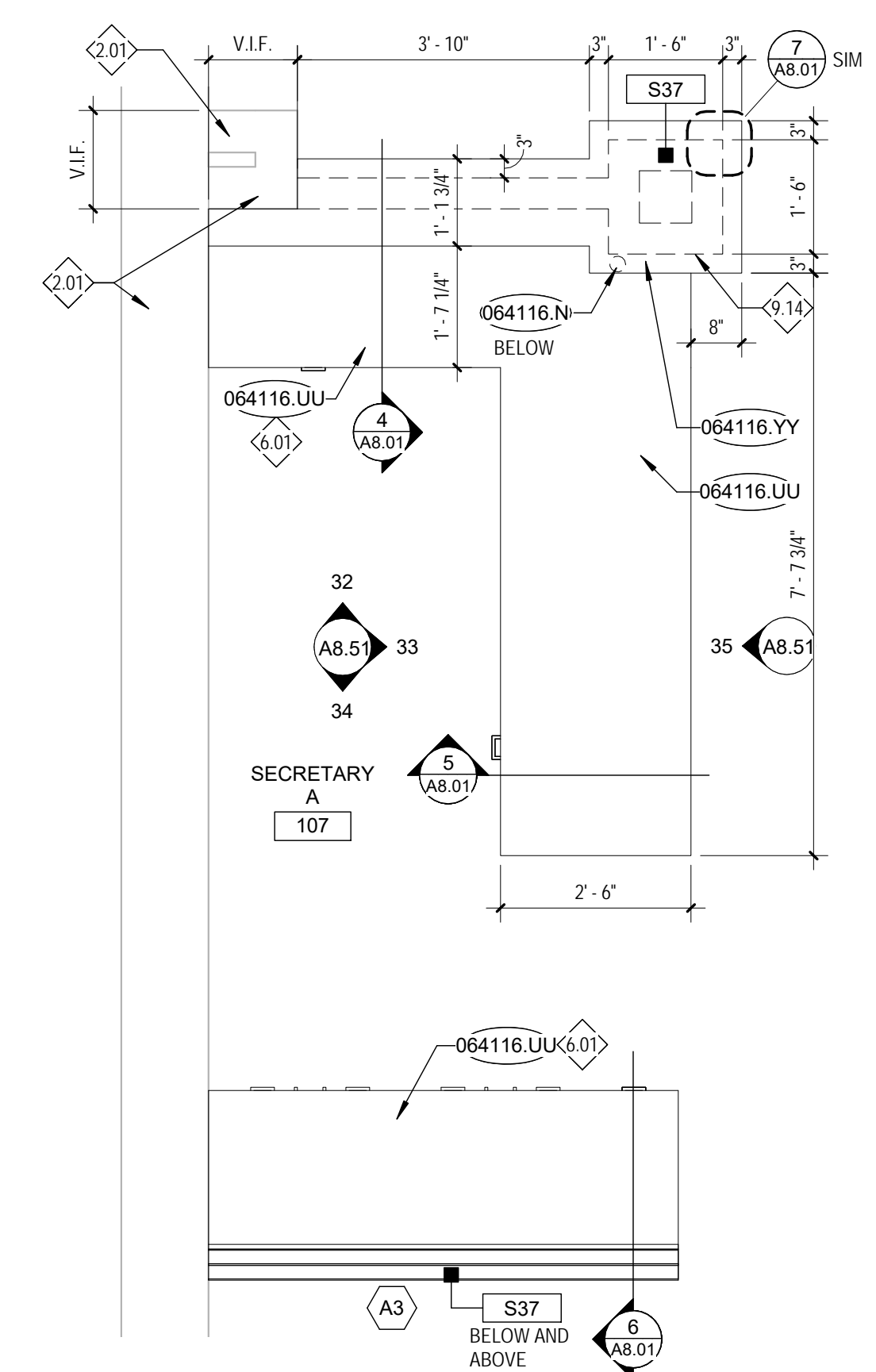
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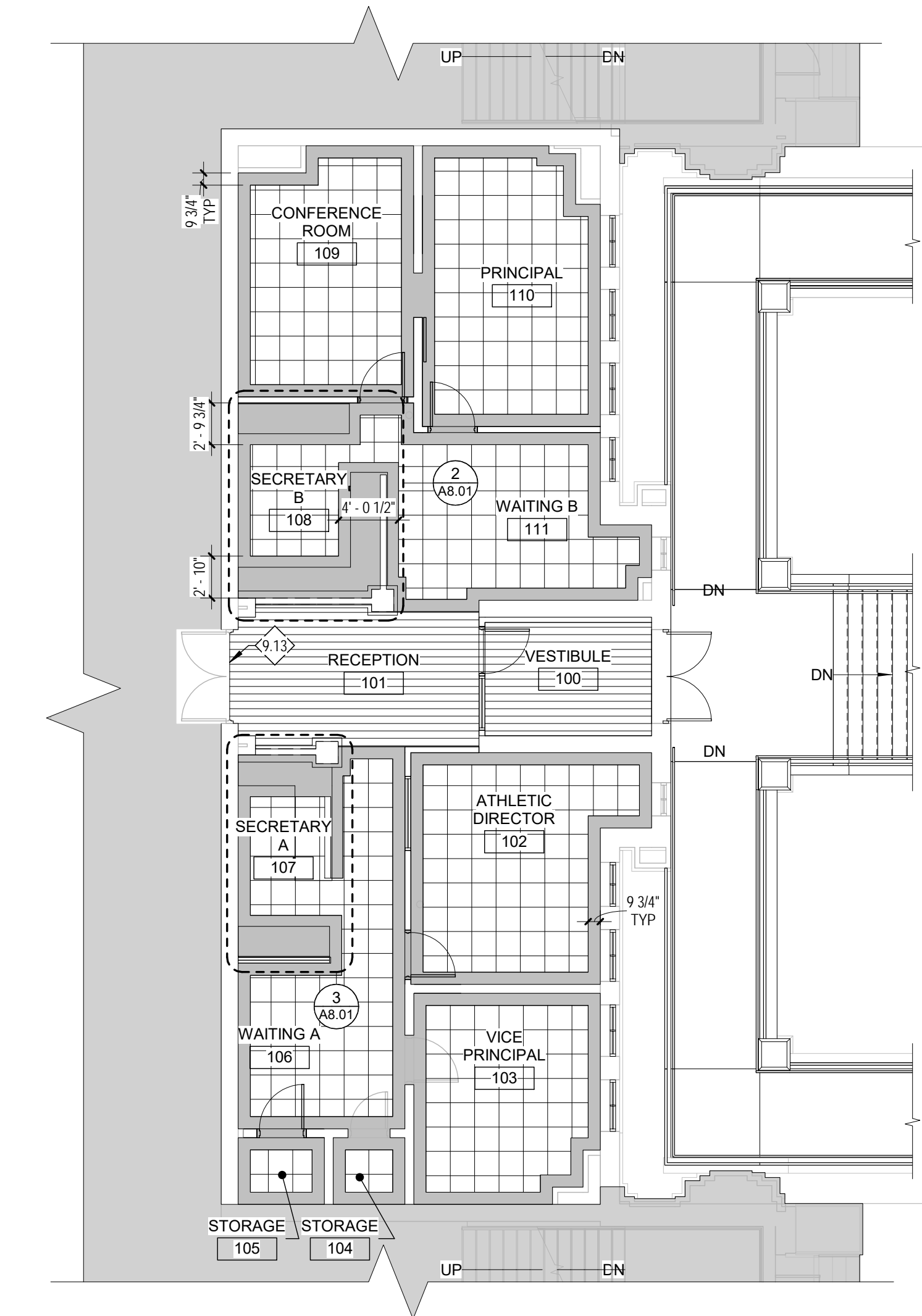
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A8.01



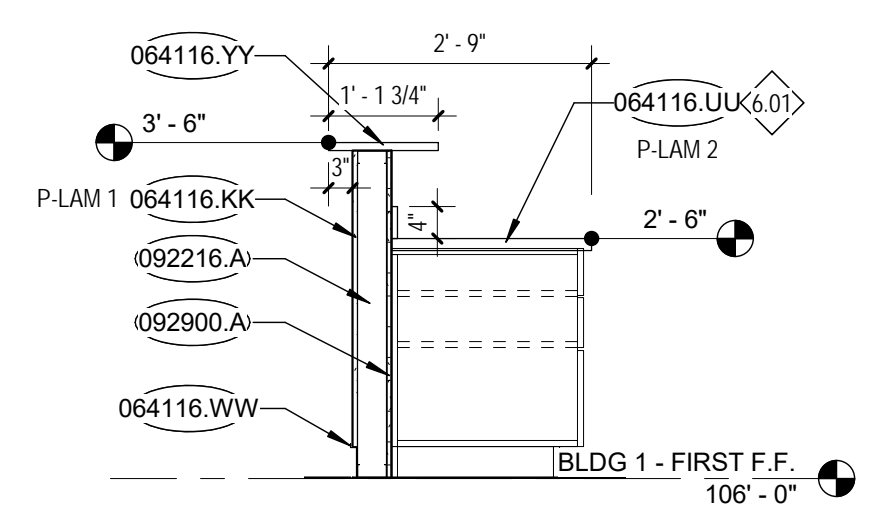
2 ENLARGED PLAN - 01
A8.01 1/2" = 1'-0"



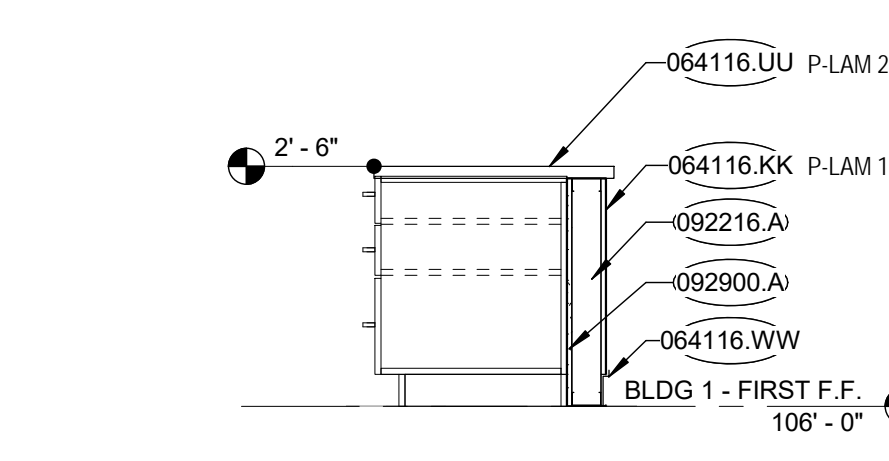
3 ENLARGED PLAN - 02
A8.01 1/2" = 1'-0"



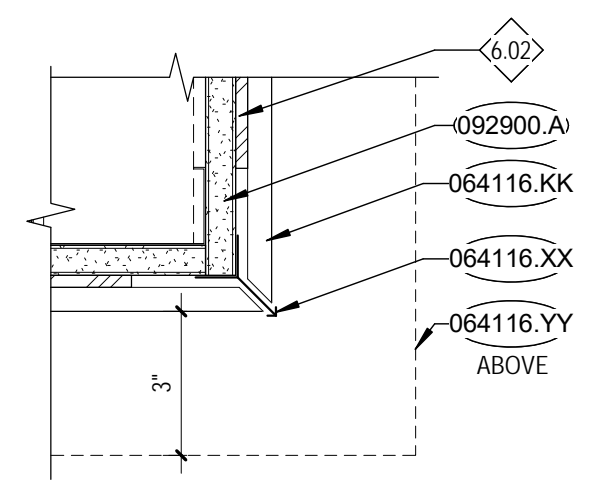
1 BLDG 1 LEVEL 1 ADMIN FINISH FLOOR PLAN
A8.01 1/8" = 1'-0"



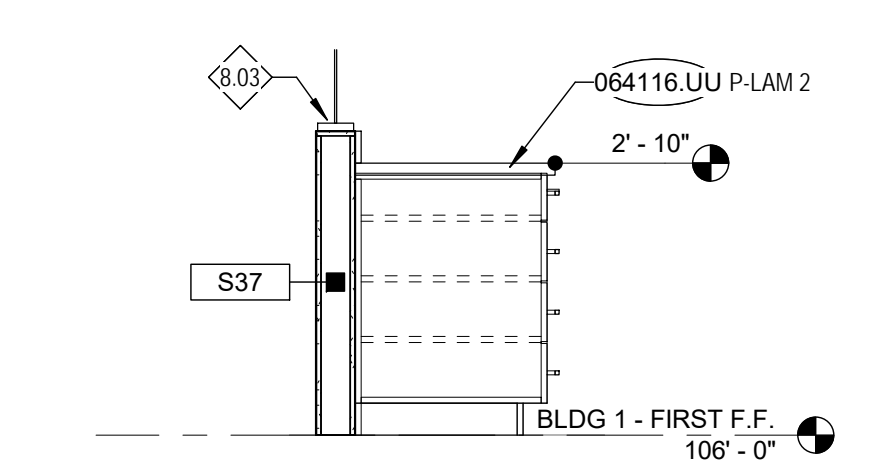
4 TRANSACTION WALL SECTION
A8.01 1/2" = 1'-0"



5 DESK SECTION
A8.01 1/2" = 1'-0"



7 CORNER KEY DETAIL
A8.01 3" = 1'-0"



6 CASEWORK DETAIL
A8.01 1/2" = 1'-0"

KEYNOTES

- 064116.KK PLASTIC-LAMINATE SURFACE
- 064116.UU PLASTIC-LAMINATE-FACED COUNTERTOP
- 064116.XX MILLWORK CORNER KEY
- 064116.YY SOLID SURFACE
- 064116.ZZ METAL TRIM BASE
- 088000.F INTERIOR WINDOW FILM
- 096513.A RESILIENT BASE
- 101423.A PANEL SIGNAGE

REFERENCE NOTES

- 2.19 EXISTING COLUMN. PROTECT IN PLACE. FIELD VERIFY EXACT LOCATION.
- 2.20 EXISTING DOOR TO REMAIN. PROTECT IN PLACE.
- 2.34 EXISTING WINDOW. PROTECT IN PLACE.
- 2.35 EXISTING SHELING TO REMAIN. PAINT P-1.
- 6.01 INCLUDE BACKSPASH
- 8.01 DOOR AS SCHEDULED.
- 8.03 WINDOW FRAME - TYPE AS INDICATED PER FLOOR PLANS AND FRAME TYPES.
- 8.04 NEW STOREFRONT AS INDICATED PER FLOOR PLANS AND FRAME TYPES.
- 9.15 PAINT P-1.
- 26.04 LIGHT FIXTURE. SEE ELECTRICAL.

GENERAL NOTES

- 1. RE: ROOM FINISH SCHEDULE AND FINISH FLOOR PLANS FOR MATERIAL AND FINISH INFORMATION.
- 2. FOR CODE AND FIRE INFORMATION, RE: BUILDING INFORMATION SHEET 60.01.
- 3. PROVIDE RIVS AT ALL JOE SPACE OF ALL CABINETS, SIDES OF CABINETS AND ALL KNEE SPACES BELOW CABINETS U.N.O. RE: SPECIFICATION SECTION 9.
- 4. RE: FLOOR PLANS AND DOOR SCHEDULE FOR DOOR AND FRAME TYPES.
- 5. PAINT ALL WALL AND GYPSUM BOARD CEILINGS P-1, U.N.O.

CASEWORK TAG LEGEND

MODIFICATION		INDICATES MODIFIED CABINET
MODEL NUMBER		INDICATES MODEL NUMBER OF AWS CABINET
WIDTH		INDICATES WIDTH OF CABINET, DIMENSIONED FROM OUTSIDE FACE TO OUTSIDE FACE.
DEPTH		INDICATES DEPTH OF CABINET, DIMENSIONED FROM FACE OF WALL TO FACE OF CABINET EXCLUDING CABINET DOOR WHEN DOOR APPLIES
HEIGHT		INDICATES HEIGHT OF CABINET, DIMENSIONED FROM FACE OF FINISHED FLOOR TO TOP OF COUNTERTOP FOR BASE CABINETS AND FROM BOTTOM OF CABINET TO TOP OF CABINET FOR UPPER CABINETS.

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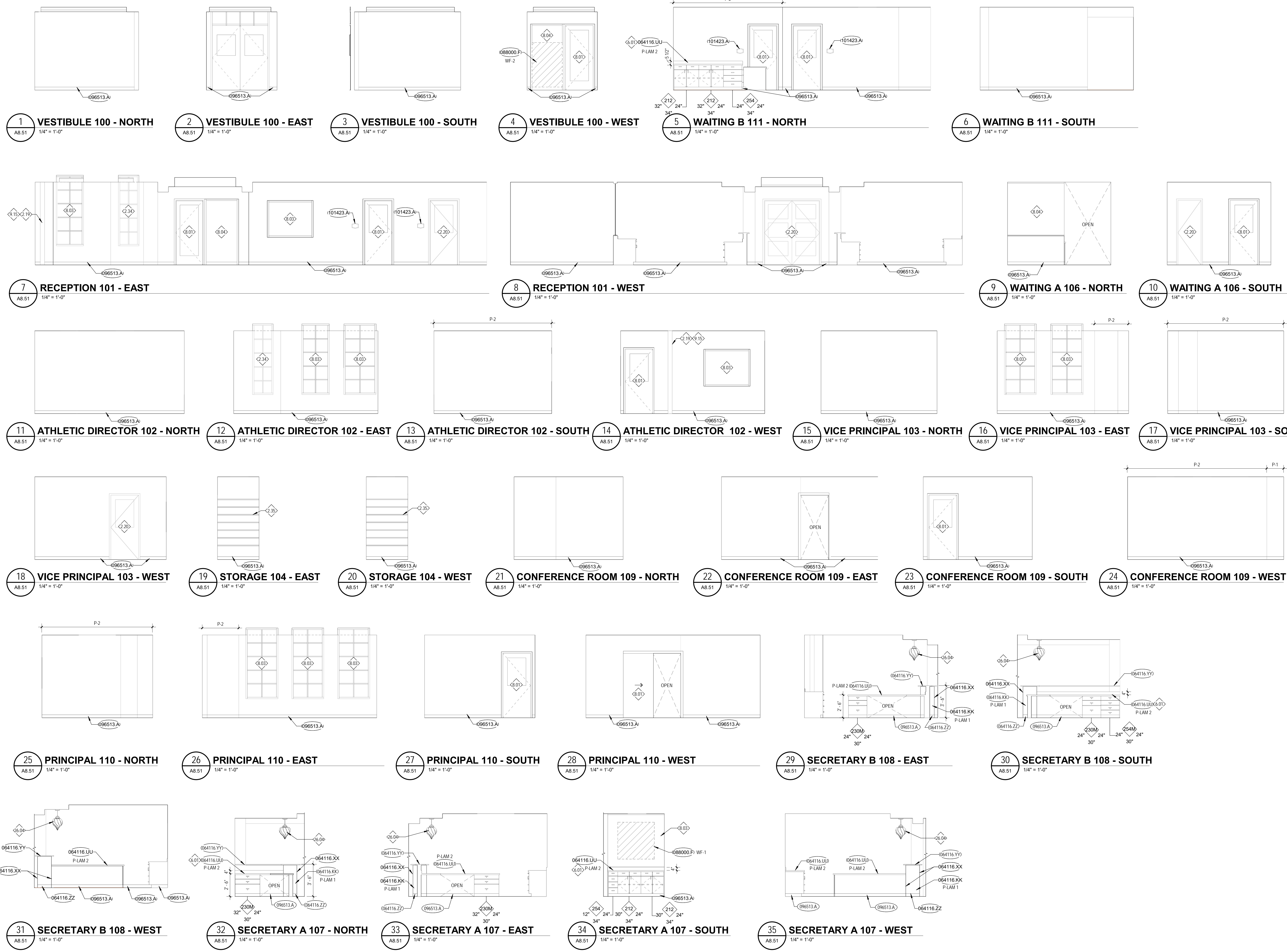
Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
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Sheet:
INTERIOR ELEVATIONS

Revisions:

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Drawn By:	LEJH
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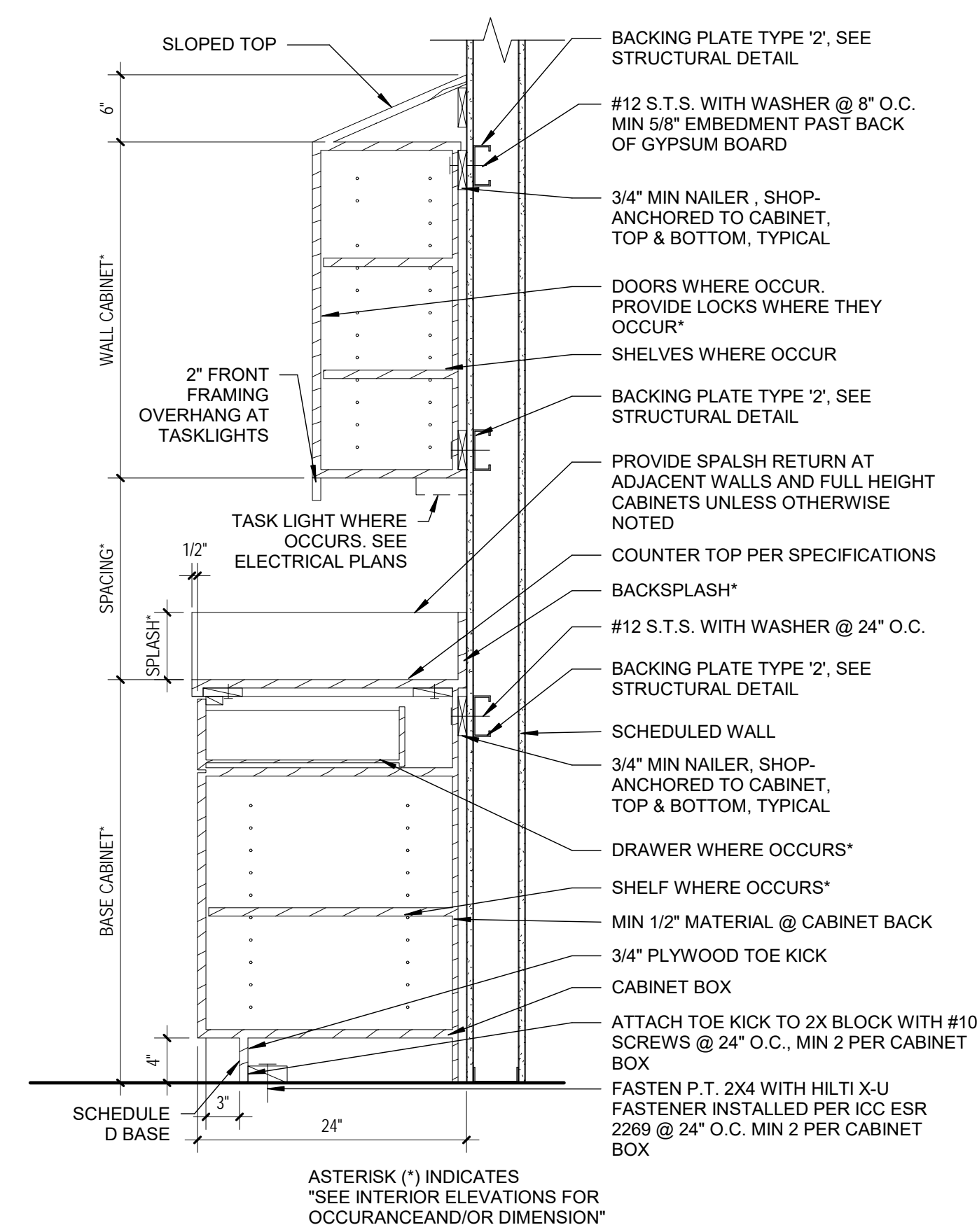
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KEYNOTES

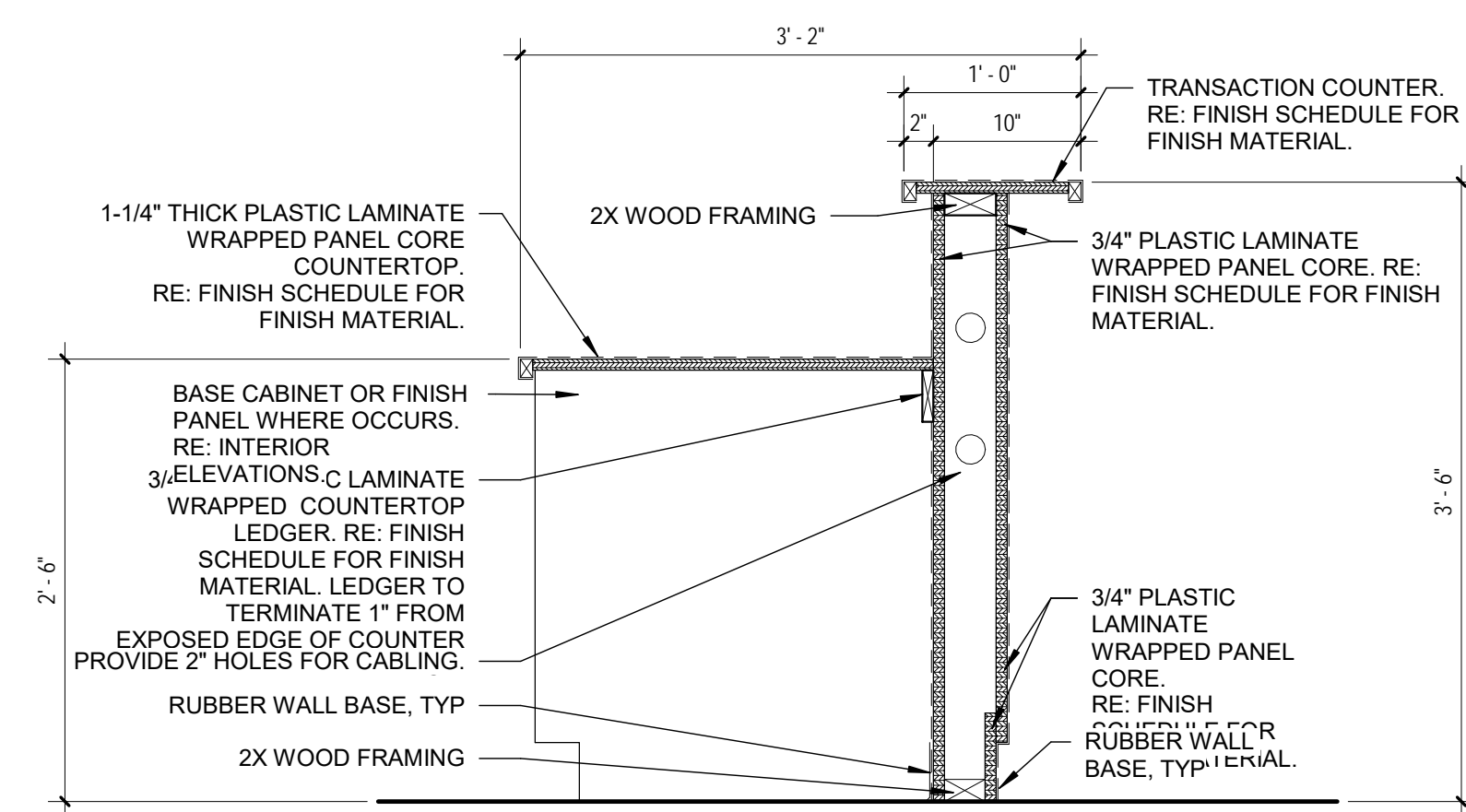
REFERENCE NOTES

GENERAL NOTES

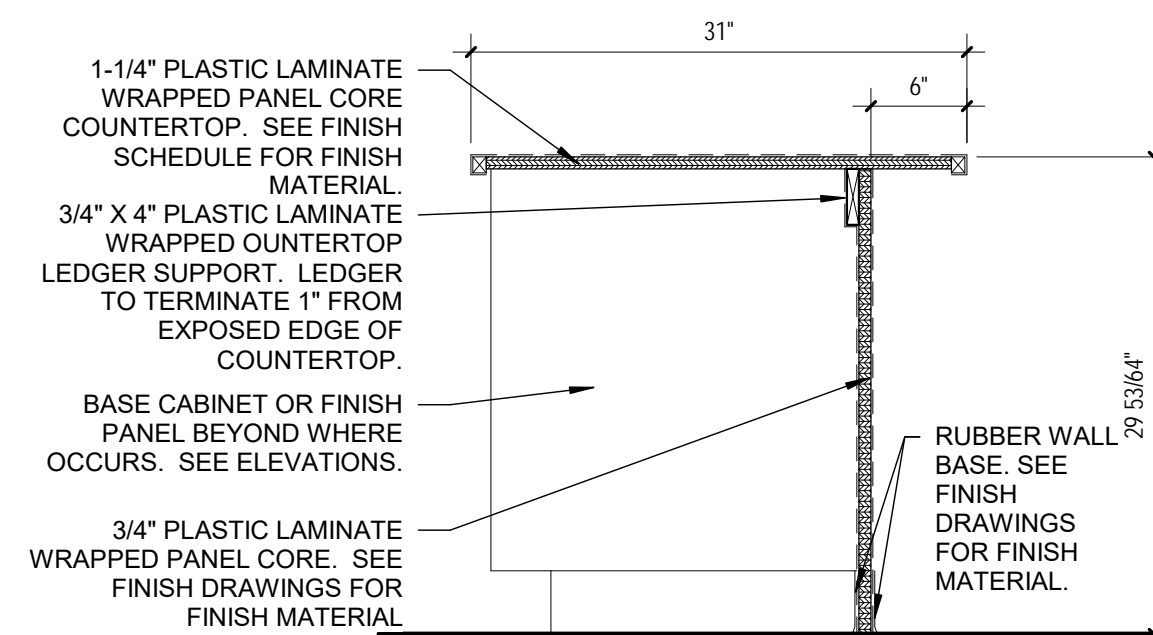
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2. FOR CODE AND FIRE INFORMATION, RE: BUILDING INFORMATION SHEET 00.01.
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4. RE: FLOOR PLANS AND DOOR SCHEDULE FOR DOOR AND FRAME TYPES.
5. PAINT ALL WALL AND GYPSUM BOARD CEILINGS P-1, U.N.O.



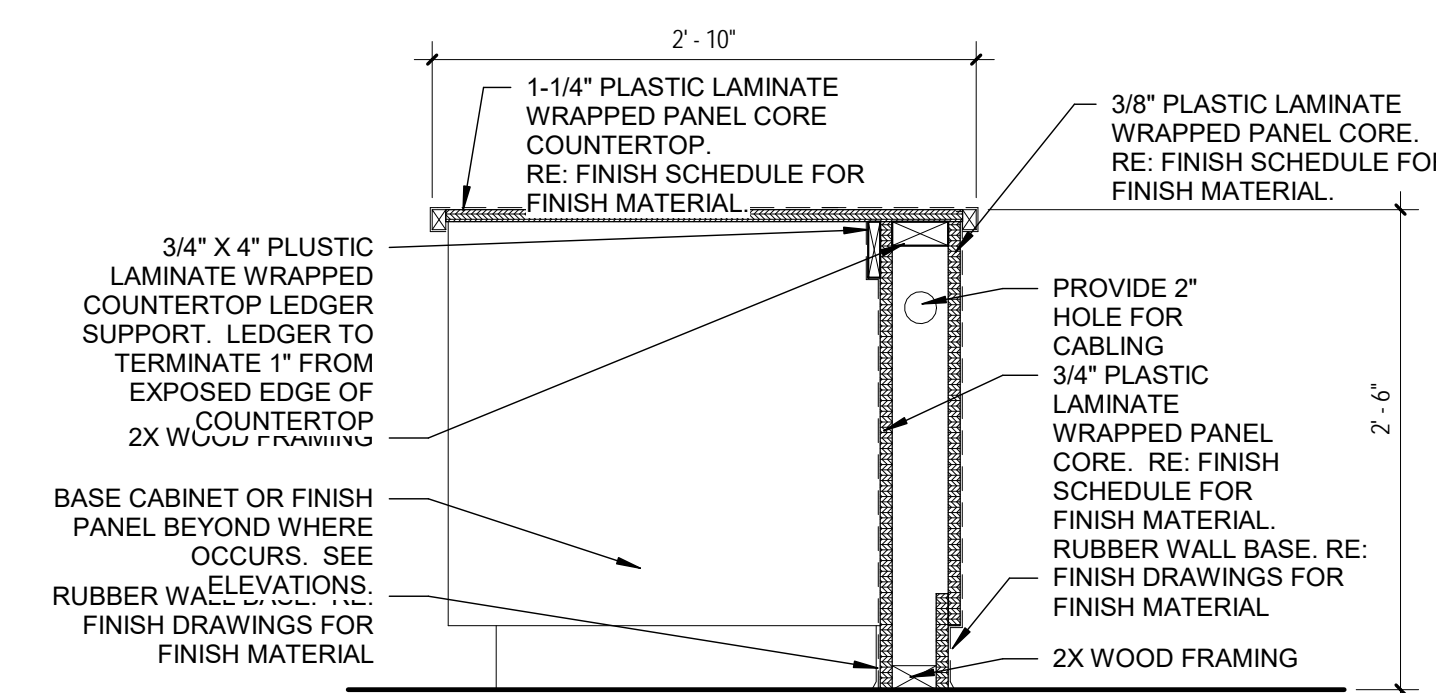
2 BASE AND UPPER CASEWORK - METAL STUD
A8.91 1" = 1'-0"



3 MILLWORK DETAIL - 01
A8.91 1" = 1'-0"



5 MILLWORK DETAIL - 03
A8.91 1" = 1'-0"



4 MILLWORK DETAIL - 02
A8.91 1" = 1'-0"

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**POCATELLO HIGH SCHOOL -
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INTERIOR DETAILS

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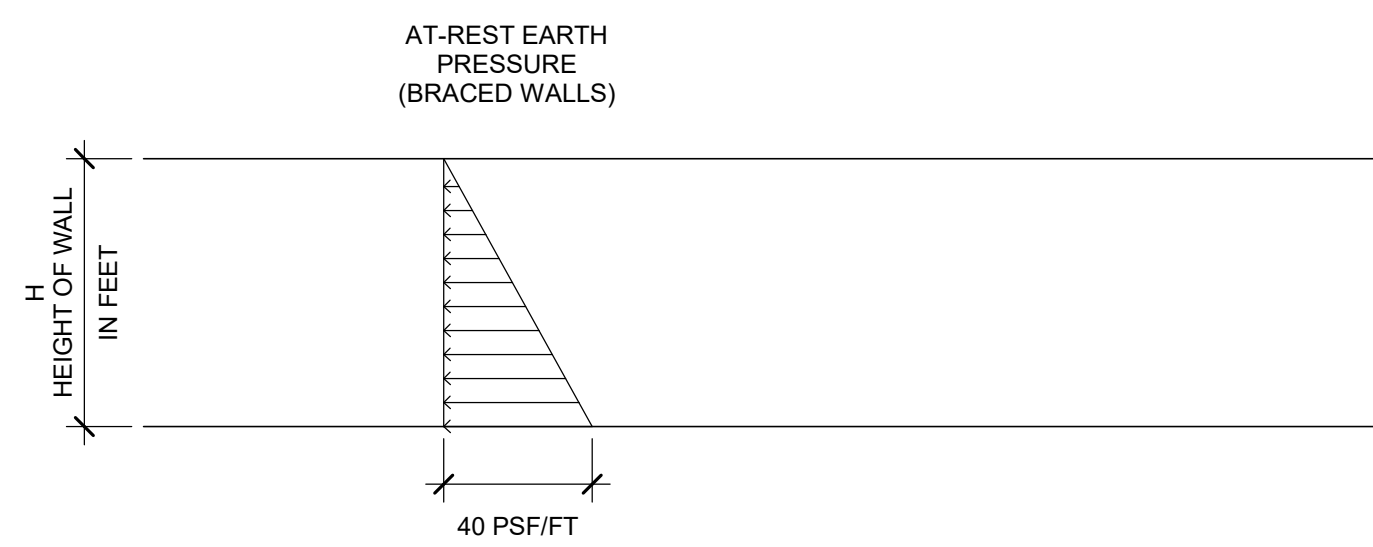
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Checked By: GAJH
Date: 3-19-19

Sheet No:
A8.91

FOUNDATION:

1. GEOTECHNICAL INFORMATION AND FOUNDATION DESIGN IS BASED ON THE MINIMUM PRESCRIPTIVE VALUES FROM 2015 IBC CHAPTER 18.
2. LATERAL EARTH PRESSURES:



FOUNDATION REQUIREMENTS:

1. STRUCTURAL FILL: COMPACT ALL SOIL BELOW FOUNDATIONS AND SLABS-ON-GRADE TO MINIMUM 95% OF OPTIMUM DRY DENSITY PER ASTM D1557.
2. FROST PROTECTION: AT EXTERIOR FOOTINGS, PROVIDE 36 INCHES MINIMUM FROM LOWEST ADJACENT GRADE TO BOTTOM OF FOOTING. VERIFY THAT FOOTING ELEVATIONS AND FINAL GRADES INDICATED WILL PROVIDED THIS MINIMUM DEPTH. NOTIFY ARCHITECT OF ANY LOCATIONS THAT MAY NOT ACHIEVE THIS MINIMUM FROST DEPTH.
3. PROVIDE DE-WATERING OF EXCAVATIONS FROM SURFACE WATER, GROUND WATER AND/OR SEEPAGE.
4. EXCAVATION FOR FOOTINGS SHALL BE APPROVED BY THE SPECIAL INSPECTOR PRIOR TO PLACING CONCRETE AND REINFORCING.
5. DO NOT PLACE BACKFILL BEHIND RETAINING WALLS BEFORE CONCRETE OR GROUT HAS ATTAINED FULL DESIGN STRENGTH. BRACE OR PROTECT ALL BUILDING AND PIT WALLS BELOW GRADE FROM LATERAL LOADS UNTIL ATTACHING SLABS ARE COMPLETELY IN PLACE AND HAVE ATTAINED FULL DESIGN STRENGTH.
6. REMOVE ALL ABANDONED FOOTINGS, UTILITIES, ETC. NEW FOOTINGS MUST EXTEND INTO UNDISTURBED SOILS.

DESIGN:

FLOOR LIVE LOADS:

PUBLIC WALKWAY 100 PSF (NO REDUCTION)

ROOF SNOW LOADS: (2016CBC SECTION 1603.1.3)

GROUND SNOW LOAD: $P_g = 45$ PSF
 MINIMUM SNOW LOAD: $P_{min} = 35$ PSF

EARTHQUAKE DESIGN DATA:

SITE AND OCCUPANCY PARAMETERS	
SEISMIC IMPORTANCE FACTOR	$I_e = 1.25$
RISK CATEGORY	III
MAPPED SPECTRAL RESPONSE ACCELERATION PARAMETERS	$S_a = 0.501$ $S_1 = 0.158$
SITE CLASS	D
DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS	$S_{ns} = 0.467$ $S_{d1} = 0.229$
SEISMIC DESIGN CATEGORY	D

GENERAL:

STRUCTURAL DRAWINGS:

1. STRUCTURAL DRAWINGS ARE A PORTION OF THE CONTRACT DOCUMENTS AND ARE INTENDED TO BE USED WITH OTHER DRAWINGS, SPECIFICATIONS, AND DOCUMENTS ENUMERATED IN THE OWNER/CONTRACTOR AGREEMENT.
2. REVIEW AND COORDINATE THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCY IDENTIFIED SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT SO THAT A CLARIFICATION CAN BE ISSUED. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
3. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE GIVEN, CONSTRUCTION SHALL BE AS SHOWN FOR SIMILAR WORK.

CODE REQUIREMENTS AND REFERENCED STANDARDS:

1. ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE FOLLOWING CODES:
 2015 INTERNATIONAL BUILDING CODE (IBC) AND LATEST REVISIONS REFERRED TO HERE AS "THE CODE"; AND ANY OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK AND THOSE CODES & STANDARDS LISTED IN THESE NOTES AND SPECIFICATIONS.
2. ASTM SPECIFICATIONS ON THE DRAWINGS SHALL BE THE VERSION REFERENCED IN CHAPTER 35 OF THE CODE OR AS REFERENCED IN THE APPLICABLE DESIGN STANDARD.

EXISTING CONDITIONS:

1. VERIFY EXISTING CONDITIONS, DIMENSIONS, AND ELEVATIONS PRIOR TO STARTING CONSTRUCTION. NOTIFY THE ARCHITECT ANY DISCREPANCIES OR INCONSISTENCIES.
2. INVESTIGATE SITE DURING CLEARING AND EARTHWORK OPERATIONS FOR FILLED EXCAVATIONS OR BURIED STRUCTURES, SUCH AS CESSPOOLS, CISTERNS, FOUNDATIONS, ETC. IF ANY SUCH STRUCTURES ARE FOUND, NOTIFY THE ARCHITECT IMMEDIATELY.

TEMPORARY CONDITIONS:

1. THE CONTRACT DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION, INCLUDING BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT ETC. OBSERVATION VISITS TO THE SITE BY THE STRUCTURAL ENGINEER DO NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
2. THE CONTRACT STRUCTURAL DRAWINGS SHOW THE BUILDING IN ITS FINAL INTENDED POSITION. MAKE PROVISIONS IN THE CONSTRUCTION SEQUENCING OF THE BUILDING TO TAKE INTO ACCOUNTS SHRINKAGE, CREEP, SHORTENING, THERMAL EXPANSION, ETC.
3. SPREAD OUT CONSTRUCTION MATERIALS IF PLACED ON FRAMED ROOF OR FLOOR. LOAD SHALL NOT EXCEED THE DESIGN LIVE LOAD PER SQUARE FOOT.

OTHER DRAWINGS:

1. SEE ARCHITECTURAL DRAWINGS FOR THE FOLLOWING:
 - A. SIZE AND LOCATION OF ALL DOOR AND WINDOW OPENINGS, EXCEPT AS NOTED
 - B. SIZE AND LOCATION OF ALL INTERIOR AND EXTERIOR NON-BEARING PARTITIONS UNLESS NOTED AND/OR DETAILED ON THE STRUCTURAL DRAWINGS
 - C. SIZE AND LOCATION OF ALL CONCRETE CURBS, EQUIPMENT PADS, PITS, FLOOR DRAINS, SLOPES, DEPRESSED AREAS, CHANGES IN LEVEL, CHAMFERS, GROOVES, INSERTS, ETC
 - D. SIZE AND LOCATION OF ALL FLOOR AND ROOF OPENINGS EXCEPT AS SHOWN
 - E. FLOOR AND ROOF FINISHES
 - F. MISCELLANEOUS DRAINAGE AND WATERPROOFING
 - G. ALL FIREPROOFING REQUIREMENTS INCLUDING FIREPROOFING OF STRUCTURAL STEEL
 - H. DIMENSIONS NOT SHOWN ON STRUCTURAL DRAWINGS
2. SEE MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR THE FOLLOWING:
 - A. PIPE RUNS, SLEEVES, HANGERS, TRENCHES, WALL AND SLAB OPENINGS, ETC., EXCEPT AS SHOWN OR NOTED.
 - B. ELECTRICAL CONDUIT RUNS, BOXES, OUTLETS IN WALLS AND SLABS.
 - C. CONCRETE INSERTS FOR ELECTRICAL, MECHANICAL OR PLUMBING FIXTURES.
 - D. SIZE AND LOCATION OF MACHINE OR EQUIPMENT BASES, ANCHOR BOLTS FOR MOTOR MOUNTS.

CONCRETE:

GENERAL:

1. COMPLY WITH THE PROVISIONS OF ACI 301 AND ACI 117, EXCEPT AS MODIFIED BY THESE CONTRACT DOCUMENTS.
2. MANUFACTURER QUALIFICATIONS: CERTIFIED ACCORDING TO NRMCA'S "CERTIFICATION OF READY MIXED CONCRETE PRODUCTION FACILITIES".
3. QUALIFICATIONS:
 - A. INSTALLER QUALIFICATIONS: ACI-CERTIFIED CONCRETE FLATWORK TECHNICIAN
 - B. MANUFACTURER QUALIFICATIONS: CERTIFIED ACCORDING TO NRMCA'S "CERTIFICATION OF READY MIXED CONCRETE PRODUCTION FACILITIES"
4. SUBMITTALS:
 - A. DESIGN MIXTURES FOR EACH CONCRETE MIXTURE. INCLUDE THE FOLLOWING WITH EACH MIX DESIGN:
 - INTENDED LOCATION OR USE OF THE MIX DESIGN
 - SUPPORTING STRENGTH TEST DATA
 - STATISTICAL ANALYSIS DEMONSTRATING COMPLIANCE WITH ACI 301
 - WATER/CEMENT RATIO
 - SLUMP: WHEN HIGH RANGE WATER REDUCING ADMIXTURES ARE USED, INDICATE SLUMP BEFORE AND AFTER ADDITION OF ADMIXTURE.
 - GRADATION OF FINE AND COURSE AGGREGATE
 - AIR CONTENT OF FRESHLY MIXED CONCRETE
 - MATERIAL CERTIFICATES FOR CEMENTITIOUS MATERIALS AND ADMIXTURES
 - AMOUNTS OF MIXING WATER TO BE WITHHELD FOR LATER ADDITION AT PROJECT SITE
 - B. CONSTRUCTION JOINT LAYOUT

PRODUCTS:

1. OBTAIN EACH TYPE OR CLASS OF CEMENTITIOUS MATERIAL OF THE SAME BRAND FROM THE SAME MANUFACTURER'S PLANT. OBTAIN AGGREGATE FROM A SINGLE SOURCE, AND OBTAIN ADMIXTURES FROM A SINGLE MANUFACTURER.
2. PORTLAND CEMENT: ASTM C-150, TYPE II
3. NORMAL WEIGHT AGGREGATE: ASTM C33
4. LIGHT WEIGHT AGGREGATE: ASTM C350.
5. FLY ASH: ASTM C618, CLASS F
6. ADMIXTURES:
 - A. AIR ENTRAINMENT: ASTM C260
 - B. CHEMICAL ADMIXTURES: ASTM C494
 - C. PLASTICIZING ADMIXTURES: ASTM C1017
7. CONCRETE MIXTURES: PREPARE DESIGN MIXTURES FOR EACH TYPE AND STRENGTH OF CONCRETE, PROPORTIONED ON THE BASIS OF LABORATORY TRIAL MIXTURES OR FIELD TEST DATA OR BOTH, ACCORDING TO ACI 301.
 - A. PROVIDE CONCRETE MIXTURES THAT MEET THE DURABILITY REQUIREMENTS OF ACI 318, CHAPTER 19, BASED ON EXPOSURE CATEGORIES INDICATED IN TABLE BELOW.
 - B. CEMENTITIOUS MATERIAL CONTENT, IN ADDITION TO W/C RATIO INDICATED IN TABLE, PROVIDE CONCRETE WITH MINIMUM CEMENTITIOUS MATERIAL CONTENT AS INDICATED IN ACI 301, TABLE 4.2.2.1 FOR SLABS/FLOORS
 - C. LIMIT WEIGHT OF CEMENTITIOUS MATERIALS OTHER THAN PORTLAND CEMENT TO THOSE INDICATED IN ACI 301.
 - D. USE WATER-REDUCING ADMIXTURES AS REQUIRED FOR PLACEMENT AND WORKABILITY.
 - E. SLUMP: $4" \pm 1"$
 - a. WATER REDUCING OR PLASTIZING ADMIXTURES ARE PERMITTED TO INCREASE THE SLUMP TO A MAXIMUM OF 8 INCHES FOR CONCRETE WITH VERIFIED SLUMP OF 2 TO 4 INCHES PRIOR TO ADDING ADMIXTURES.
 - F. LIMIT WATER-SOLUBLE, CHLORIDE-ION CONTENT IN HARDENED CONCRETE TO 0.06 PERCENT BY WEIGHT OF CEMENT.

CONCRETE MIXTURES				
LOCATIONS IN STRUCTURE	DESIGN STRENGTH	MAX UNIT WEIGHT	MAX W/C RATIO	EXPOSURE CATEGORIES
FOOTINGS AND FOUNDATION WALLS	4,000 PSI	145 PCF	0.45	F2, S0, W1, C2
SLAB ON GRADE	4,000 PSI	145 PCF	0.45	F2, S0, W1, C2
CANTILEVERED CONCRETE SLAB	4,000 PSI	145 PCF	0.45	F2, S0, W1, C2
CURBS, PADS, TOPPING SLABS, ETC.	3,000 PSI	145 PCF	0.50	F2, S0, W1, C2

EXECUTION:

1. CONFORM TO ASTM C94 FOR CONCRETE MIXING OPERATIONS.
2. CONFORM TO ACI 306.1 FOR COLD-WEATHER PLACEMENT AND ACI 301 FOR HOT-WEATHER PLACEMENT.
3. PROTECT FRESHLY PLACED CONCRETE FROM PREMATURE DRYING AND EXCESSIVE COLD OR HOT TEMPERATURES. CURE CONCRETE ACCORDING TO ACI 308.1.
4. PLACE AND SECURE ANCHORAGE DEVICES AND OTHER EMBEDDED ITEMS REQUIRED FOR ADJOINING WORK THAT IS ATTACHED TO OR SUPPORTED BY CAST-IN-PLACE CONCRETE. USE SETTING DRAWINGS, TEMPLATES, ETC. REQUIRED TO POSITION AND SECURE EMBEDDED ITEMS PRIOR TO CONCRETE PLACEMENT.
 - A. INSTALL ANCHOR RODS TO ELEVATIONS REQUIRED AND COMPLYING WITH TOLERANCES IN SECTION 7.5 OF AISC 303.
5. INSTALL CONSTRUCTION JOINTS SO STRENGTH AND APPEARANCE OF CONCRETE ARE NOT IMPAIRED, AT LOCATIONS INDICATED OR AS APPROVED BY THE ARCHITECT.
6. OPENINGS, POCKETS, ETC., LARGER THAN 6" SHALL NOT BE PLACED IN CONCRETE SLABS, DECKS, OR WALLS UNLESS SPECIALLY DETAILED ON THE STRUCTURAL DRAWINGS. NOTIFY THE ARCHITECT WHEN DRAWINGS BY OTHERS SHOW OPENINGS, POCKETS, ETC., LARGER THAN 6" NOT SHOWN ON THE STRUCTURAL DRAWINGS.
 - A. PIPES AND CONDUITS EMBEDDED IN CONCRETE:
 - A. PIPES LARGER THAN 1-1/2" DIAMETER SHALL NOT BE EMBEDDED IN STRUCTURAL CONCRETE EXCEPT WHERE SPECIFICALLY APPROVED BY ARCHITECT.
 - B. PIPES SHALL NOT DISPLACE OR INTERRUPT REINFORCING BARS.
 - C. DO NOT STACK CONDUITS. SPACE EMBEDDED PIPES AND CONDUITS AT A MINIMUM OF AT A MINIMUM OF 3 DIAMETERS CLEAR FROM OTHER EMBEDDED PIPES/CONDUITS AND 1 1/2" CLEAR FROM REINFORCING BARS.
 - D. NO CONDUITS SHALL BE PLACED IN CONCRETE FILL OVER METAL DECK.
 - B. PROVIDE SLEEVES FOR PLUMBING AND ELECTRICAL OPENINGS IN CONCRETE BEFORE PLACING. DO NOT CUT REINFORCING WHICH MAY CONFLICT. CORING IN CONCRETE IS NOT PERMITTED WITHOUT ARCHITECT REVIEW AND APPROVAL.
7. PROVIDE 3/4" CHAMFER AT EXTERIOR CONCRETE CORNERS AND EDGES OF PERMANENTLY EXPOSED CONCRETE UNLESS NOTED OTHERWISE.
8. ALL CONCRETE SURFACES AGAINST WHICH NEW CONCRETE IS TO BE PLACED SHALL BE CLEANED AND ROUGHENED TO 1/4" AMPLITUDE.
9. FIELD QUALITY CONTROL:
 - A. THE OWNER WILL RETAIN A SPECIAL INSPECTOR AND QUALIFIED TESTING AGENCY TO PERFORM SPECIAL INSPECTIONS AND TESTS AS IDENTIFIED IN THE STATEMENT OF SPECIAL INSPECTION.

REINFORCING STEEL:

GENERAL:

1. DETAIL, FABRICATE, AND INSTALL REINFORCING IN ACCORDANCE WITH THE REQUIREMENTS OF ACI 301, ACI 117, AND THE "CRSI MANUAL OF STANDARD PRACTICE."

PRODUCTS:

1. REINFORCING STEEL: ASTM A615, GRADE 60, DEFORMED

EXECUTION:

1. PROVIDE THE MINIMUM CONCRETE COVER FOR REINFORCEMENT IN CAST-IN-PLACE CONCRETE (NON-PRESTRESSED) AS INDICATED IN THE TABLE BELOW.

MINIMUM CONCRETE CLEAR COVER		
LOCATION	BAR SIZE	CLEAR COVER
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	ALL	3"
CONCRETE EXPOSED TO EARTH OR WEATHER	#6 & LARGER	2"
	#5 & SMALLER	1 1/2"
SLABS, WALLS, OR JOISTS NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND	#14 & LARGER	1 1/2"
	#11 & SMALLER	3/4"
BEAM AND COLUMN TIES & STIRRUPS NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	ALL	1 1/2"



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Project:
**POCATELLO HIGH SCHOOL -
 ENTRANCE RENEVATION**

325 N. ARTHUR AVE POCATELLO, ID 83204

Sheet:
**GENERAL STRUCTURAL
 NOTES**

Revisions: △

BID SET

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 Checked By: C.C.H.
 Date: 03/19/2019

Sheet No:
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SPECIAL INSPECTIONS AND TESTING

TABLE 1 - REQUIRED SPECIAL INSPECTIONS				
SYSTEM OR MATERIAL	INSPECTION			REMARKS
	INSPECTION TYPE	CODE REFERENCE	REFERENCED STANDARDS	
SOILS				
1. VERIFY MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	PERIODIC			BY THE GEOTECHNICAL ENGINEER
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	PERIODIC			
3. PERFORM CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS	PERIODIC	1705.6	GEOTECHNICAL REPORT	
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF CONTROLLED FILL	CONTINUOUS			
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	PERIODIC			
CONCRETE TESTING				
CONCRETE STRENGTH			ASTM C39	FABRICATE SPECIMENS AT TIME FRESH CONCRETE IS PLACED. TEST EACH 150 CY NOR LESS THAN EACH 5000 SF OF SLAB OR WALL PLACED EACH DAY
CONCRETE SLUMP			ASTM C143	
CONCRETE AIR CONTENT	1903 1705.3		ASTM C231	
CONCRETE TEMPERATURE			ASTM C1064	
UNIT WEIGHT OF FRESH STRUCTURAL LIGHTWEIGHT CONCRETE			ASTM C567	
FLOOR FLATNESS AND LEVELNESS			ASTM E1155	
CONCRETE				
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS AND VERIFY PLACEMENT	PERIODIC	1705.3 1908.4	ACI 318 CHAPTER 20 ACI 318 25.2 - 25.3 ACI 318 26.6.1 - 26.6.3	TOLERANCE AND REINFORCING PLACEMENT PER ACI 318, SECTION 26.6.2
2. INSPECT ANCHORS CAST IN CONCRETE	PERIODIC		ACI 318 17.8.2	
3. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS.				INSPECTION REQUIREMENTS PER ICC EVALUATION REPORT.
A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATION TO RESIST SUSTAINED TENSION LOADS.	CONTINUOUS		ACI 318 17.8.2.4	VERIFY THAT ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATION ARE INSTALLED BY CERTIFIED INSTALLERS.
B. MECHANICAL ANCHORS AND ADHESIVE NOT DEFINED IN 4A.	PERIODIC		ACI 318 17.8.2	
4. VERIFY USE OF REQUIRED DESIGN MIX	PERIODIC	1904.1, 1904.2, 1908.2, 1908.3	ACI 318 CH 19, 24.4.3, 26.4.4	VERIFY THAT ALL MIXES USED COMPLY WITH APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED CODES AND STANDARDS
5. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TEST, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE TEMPERATURE OF CONCRETE.	CONTINUOUS	1908.10	ASTM C172 ASTM C31 ACI 318 26.4, 26.12	
6. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	CONTINUOUS	1904.6, 1908.7, 1908.8	ACI 318 26.5	
7. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	PERIODIC	1908.9	ACI 318 26.5.3 - 26.5.5	
8. INSPECT FORMWORK FOR SHAPE, LOCATION, AND DIMENSIONS OF CONCRETE MEMBER BEING FORMED.	PERIODIC		ACI 318 26.11.1.2(b)	

SPECIAL INSPECTION NOTES:

1. OWNER WILL RETAIN A QUALIFIED, INDEPENDENT SPECIAL INSPECTION AGENCY TO PERFORM SPECIAL INSPECTIONS AND TESTS PER CHAPTER 17 OF THE CODE. REFER TO THE TABLES 1 AND 2 FOR TESTS AND INSPECTIONS THAT WILL BE PERFORMED.
2. THE SPECIAL INSPECTOR WILL OBSERVE THE INDICATED WORK FOR COMPLIANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS. ALL NON-CONFORMING WORK WILL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR FOR CORRECTION AND NOTED IN THE INSPECTION REPORTS.
3. TESTING FREQUENCIES IDENTIFIED IN THE STATEMENT OF SPECIAL INSPECTION ARE DEFINED AS FOLLOWS:
 - A. CONTINUOUS: THE FULL-TIME OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY THE SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED.
 - B. PERIODIC: THE PART-TIME OR INTERMITTENT OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY THE SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK HAS BEEN OR IS BEING PERFORMED AND AT THE COMPLETION OF THE WORK.
 - C. OBSERVE: THE SPECIAL INSPECTOR WILL OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS.
 - D. PERFORM: THE SPECIAL INSPECTOR WILL PERFORM THESE TASKS FOR EACH ELEMENT.
 - E. DOCUMENT: THE SPECIAL INSPECTOR WILL DOCUMENT IN A REPORT THAT THE WORK HAS BEEN PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

SPECIAL INSPECTION FOR FABRICATED ITEMS:

1. SPECIAL INSPECTION IS REQUIRED FOR STRUCTURAL LOAD-BEARING MEMBERS AND ASSEMBLIES FABRICATED ON THE PREMISES OF A FABRICATOR'S SHOP AS REQUIRED IN THE SPECIAL INSPECTION PROGRAM. THE SPECIAL INSPECTOR SHALL VERIFY THAT THE FABRICATOR MAINTAINS DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES AND SHALL REVIEW FOR COMPLETENESS AND ADEQUACY RELATIVE TO THE CODE REQUIREMENT EXCEPT AS NOTED BELOW.
2. SPECIAL INSPECTIONS OF FABRICATED ITEMS ARE NOT REQUIRED WHERE THE FABRICATOR IS REGISTERED AND APPROVED IN ACCORDANCE WITH SECTION 1704.2.5.1 OF THE CODE.

DEFERRED SUBMITTALS:

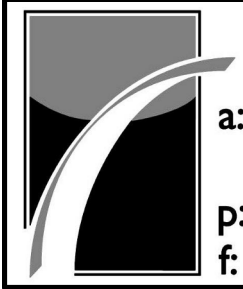
1. SPECIAL INSPECTION REQUIREMENTS FOR DEFERRED SUBMITTAL ITEMS SHALL BE SPECIFIED BY THE SYSTEMS ENGINEER AND INCLUDED WITH DEFERRED SUBMITTAL DOCUMENTS.

CONTRACTOR RESPONSIBILITY:

1. THE CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF THE MAIN WIND/SEISMIC FORCE RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM, OR A WIND/SEISMIC FORCE RESISTING COMPONENT LISTED IN TABLE 1 SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL CONTAIN THE FOLLOWING:
 - A. ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS.
 - B. ACKNOWLEDGEMENT THAT CONTROL WILL BE EXERCISED TO OBTAIN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS APPROVED BY THE BUILDING OFFICIAL.
 - C. PROCEDURES FOR EXERCISING CONTROL WITHIN THE CONTRACTOR'S ORGANIZATION INCLUDING THE METHOD AND FREQUENCY OF REPORTING AND DISTRIBUTION OF THE REPORTS.
 - D. IDENTIFICATION AND QUALIFICATIONS OF THE PERSON(S) EXERCISING SUCH CONTROL AND THEIR POSITION(S) IN THE ORGANIZATION.



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Project:
POCATELLO HIGH SCHOOL -
ENTRANCE RENEVATION

325 N. ARTHUR AVE POCATELLO, ID 83204

Sheet:
SPECIAL INSPECTION

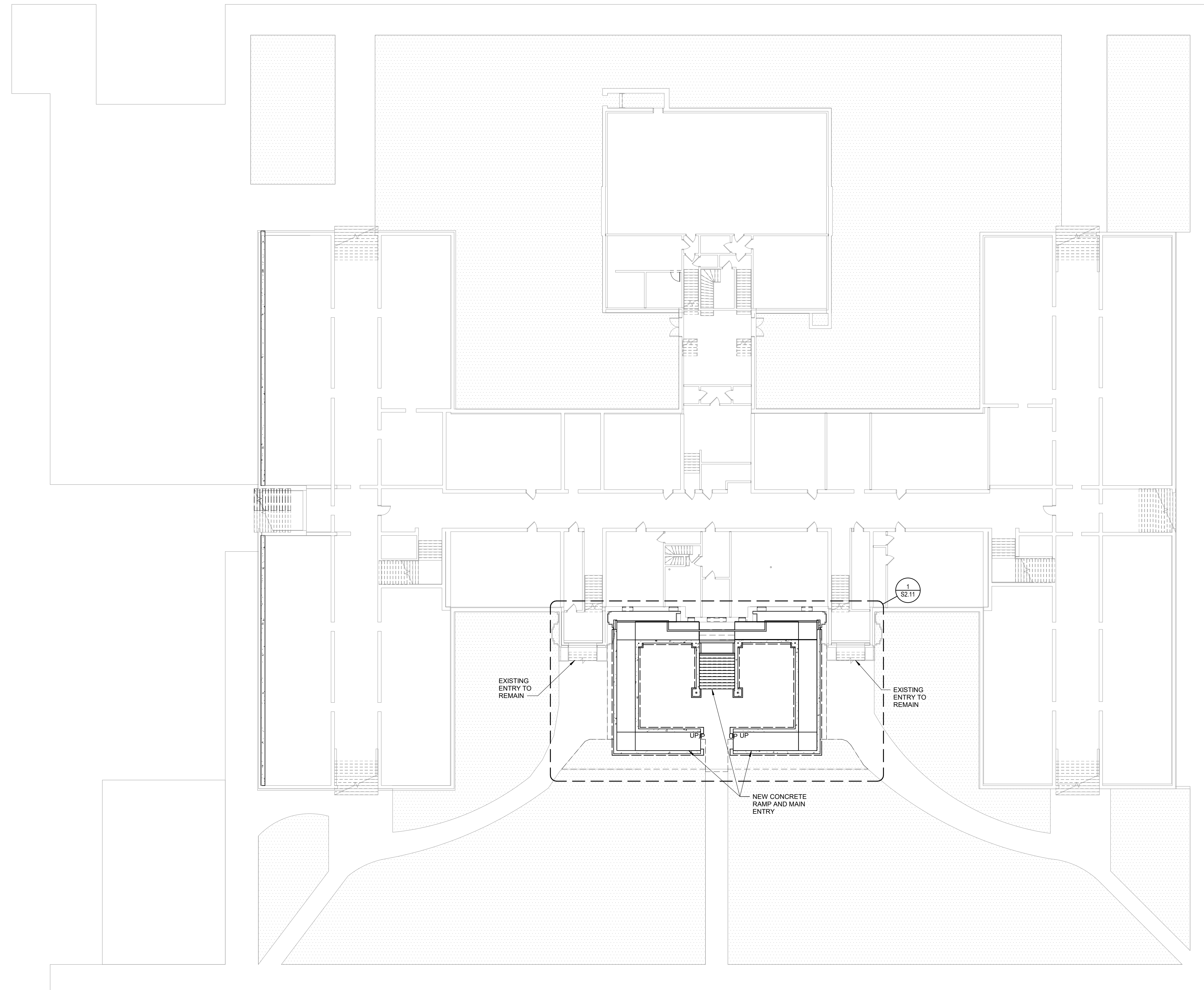
Revisions: △

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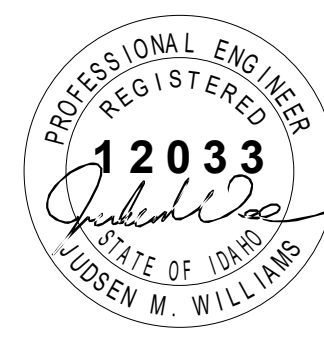
Project No: 1021900043
Drawn By: E.B.
Checked By: C.C.H.
Date: 03/19/2019

Sheet No:
S1.11

- PLANE NOTES:**
1. FOR GENERAL STRUCTURAL NOTES AND SPECIAL INSPECTION SEE SHEETS S1.01 & S1.11.
 2. ALL EXISTING CONDITIONS SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
 3. FOR FINISHES AND HANDRAILS SEE ARCHITECTURAL.

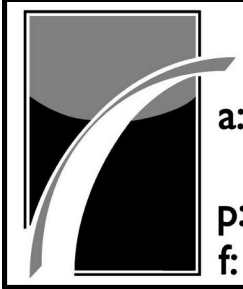


1 OVERALL BUILDING PLAN
SCALE: 1/16" = 1'-0"



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Sheet:
OVERALL BUILDING PLAN








Revisions: Δ

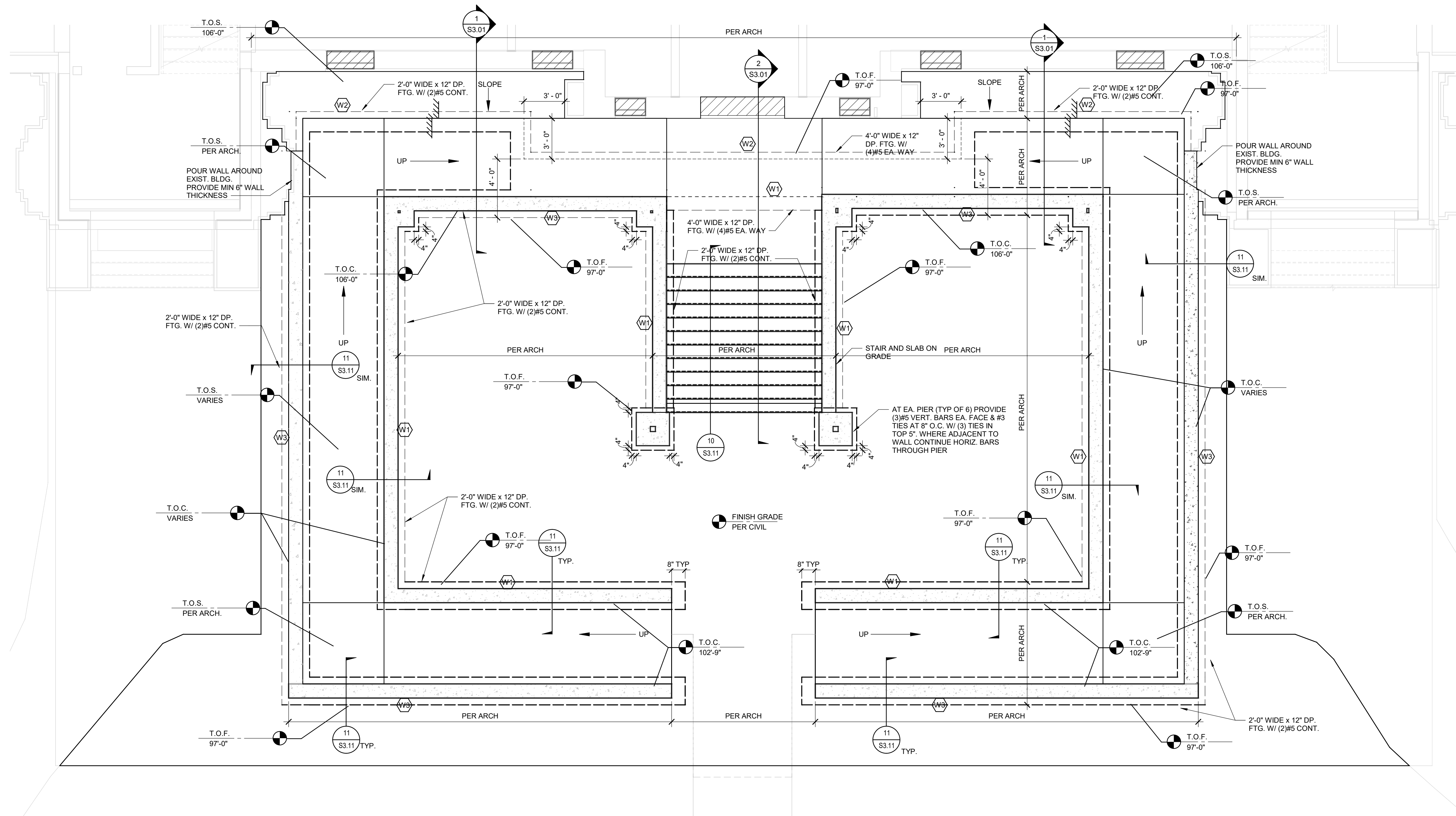
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Project No: 1021900043
Drawn By: E.B.
Checked By: C.C.H.
Date: 03/19/2019

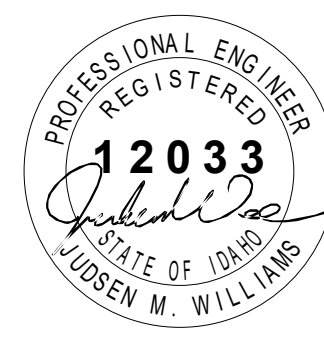
Sheet No: **S2.01**

PLANE NOTES:

1. FOR GENERAL STRUCTURAL NOTES AND SPECIAL INSPECTION SEE SHEETS S1.01 & S1.11.
2. ALL EXISTING CONDITIONS SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
3. FOR FINISHES AND HANDRAILS SEE ARCHITECTURAL.
4. ALL DIMENSIONS SHOWN SHALL BE VERIFIED WITH ARCHITECTURAL DRAWINGS.
5.  DENOTES CMU INFILL INSIDE EXISTING OPENING.
6. FOR TYPICAL CONCRETE REINFORCING DETAILS SEE SHEET S3.11
7.  T.O.C. DENOTES TOP OF CONCRETE WALL ELEVATION
8.  T.O.S. DENOTES TOP OF SLAB ELEVATION
9.  T.O.F. DENOTES TOP OF FOOTING ELEVATION
10. EXISTING WALLS ARE ASSUMED TO BE CONCRETE. IF CONDITIONS DIFFER CONTACT STRUCTURAL E.O.R.
11.  W1 DENOTES 12" THICK CONCRETE WALL W/ #5 VERT. AT 16" O.C. AND #5 HORIZ. AT 18" O.C. EA. SIDE
12.  W2 DENOTES 6" THICK CONCRETE WALL W/ #5 VERT. AT 12" O.C. AND #5 HORIZ. AT 18" O.C.
13.  W3 DENOTES 12" THICK CONCRETE WALL W/ STEPPED TO 6" THICK FOR VENER. REINFORCE 12" THICKNESS TO MATCH "W1" AT 6" WALL SECTION PROVIDE #5 VERT. & HORIZ. AT 16" O.C. EA. WAY CENTERED IN WALL
14. ALL SLABS SHALL BE 4" THICK CONCRETE W/ #3 REINF. AT 12" O.C. EA. WAY CENTERED. WHERE SLAB SPANS OVER NON-STRUCTURAL STYROFOAM DECREASE SPACING TO 8"
15. FOR GUARDRAIL PIPE SLEEVE SEE DETAIL 3/S3.11



1 ENLARGED RAMP AND ENTRANCE PLAN
SCALE: 1/4" = 1'-0"



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Project:
**POCATELLO HIGH SCHOOL -
ENTRANCE RENEVATION**

325 N. ARTHUR AVE POCATELLO, ID 83204

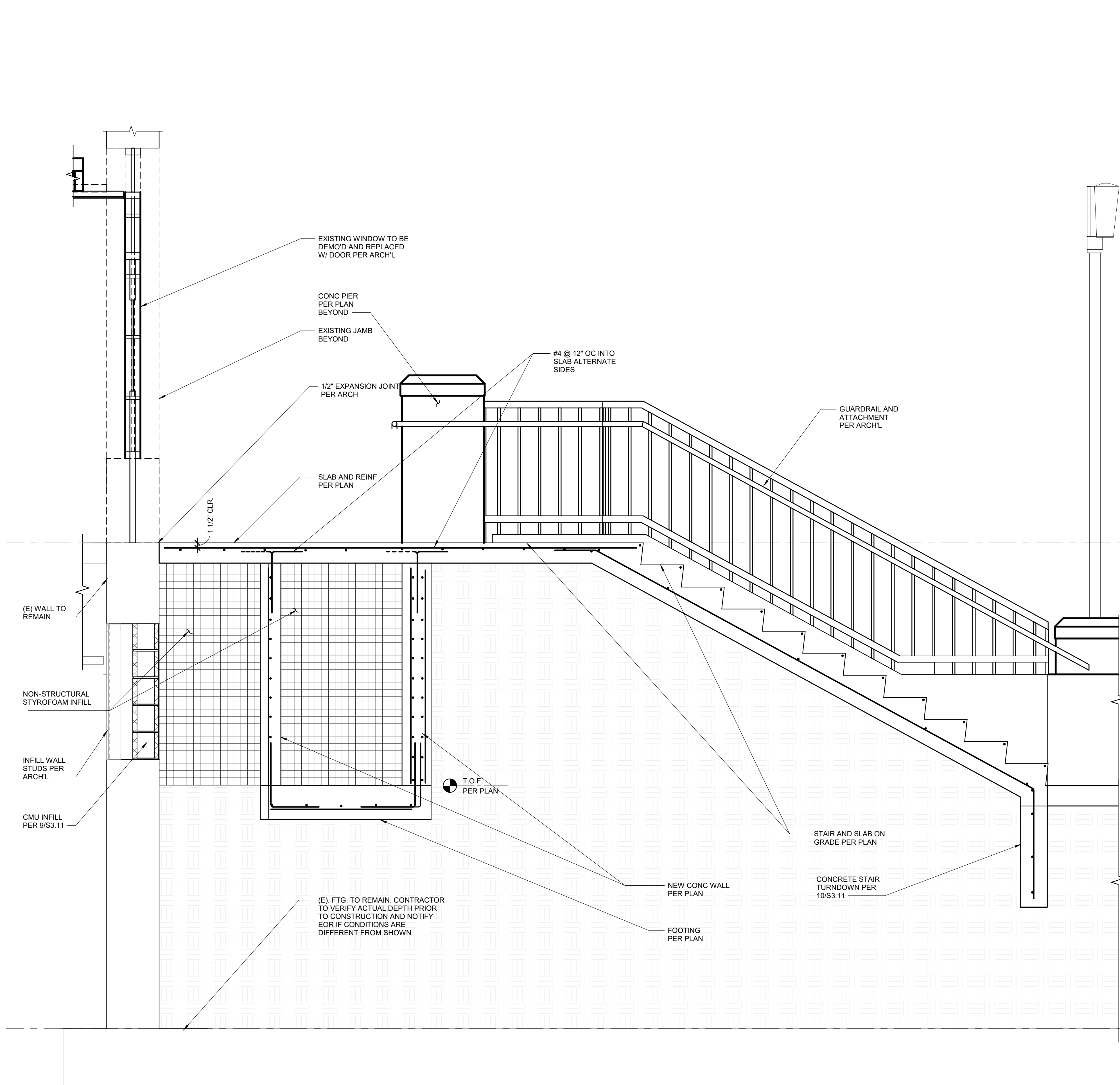
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**ENLARGED RAMP AND
ENTRANCE PLAN**

Revisions: 

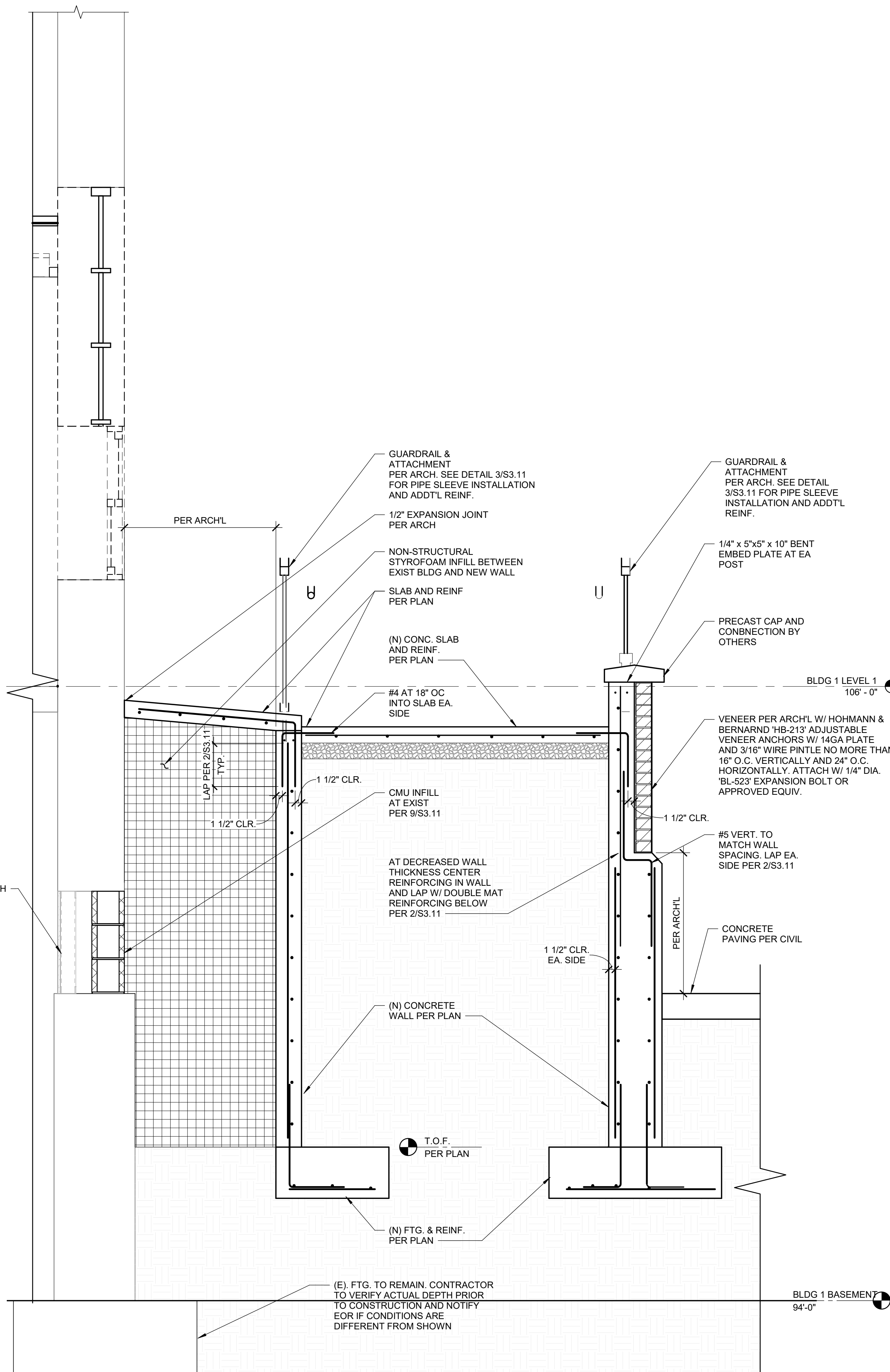
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Date: 03/19/2019

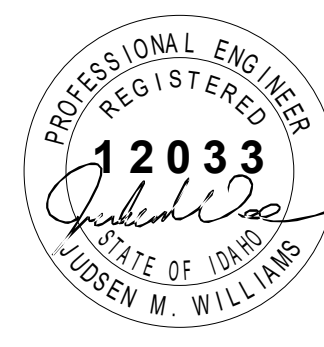
Sheet No:
S2.11



2 SECTION
SCALE: 3/4" = 1'-0"



1 SECTION
SCALE: 3/4" = 1'-0"



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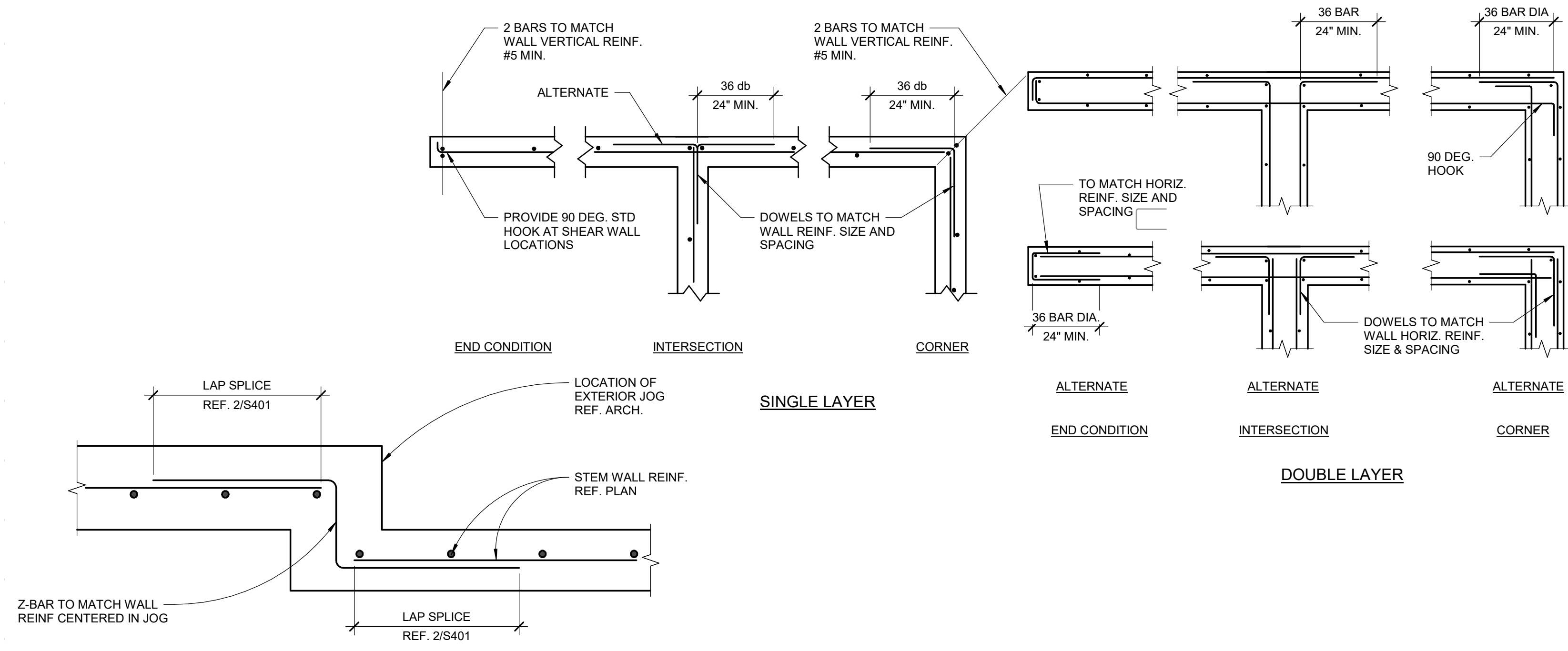
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WALL SECTIONS

Revisions: Δ

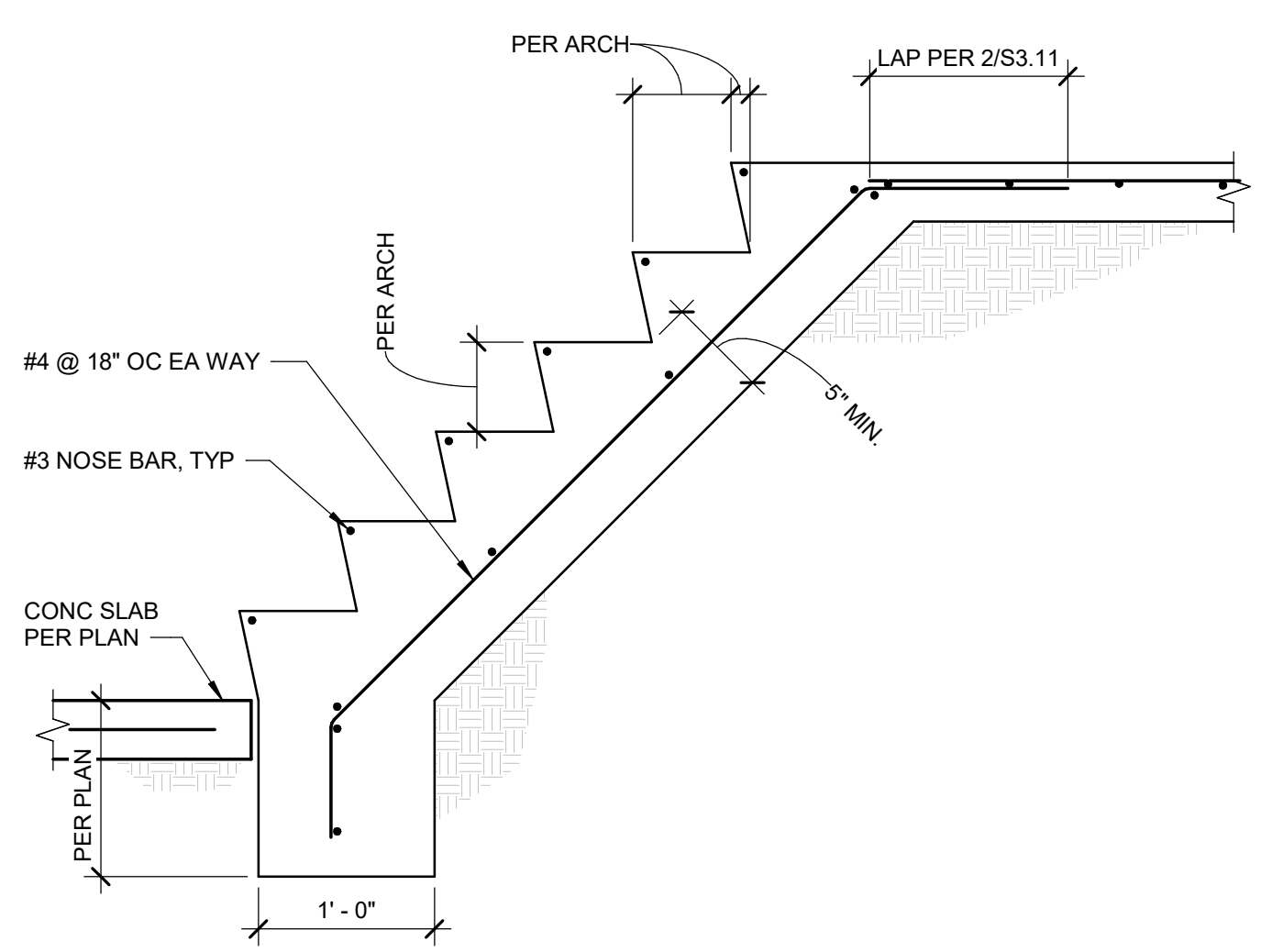
Project No: 1021980043
Drawn By: E.B.
Checked By: C.C.H.
Date: 03/19/2019

Sheet No:
S3.01

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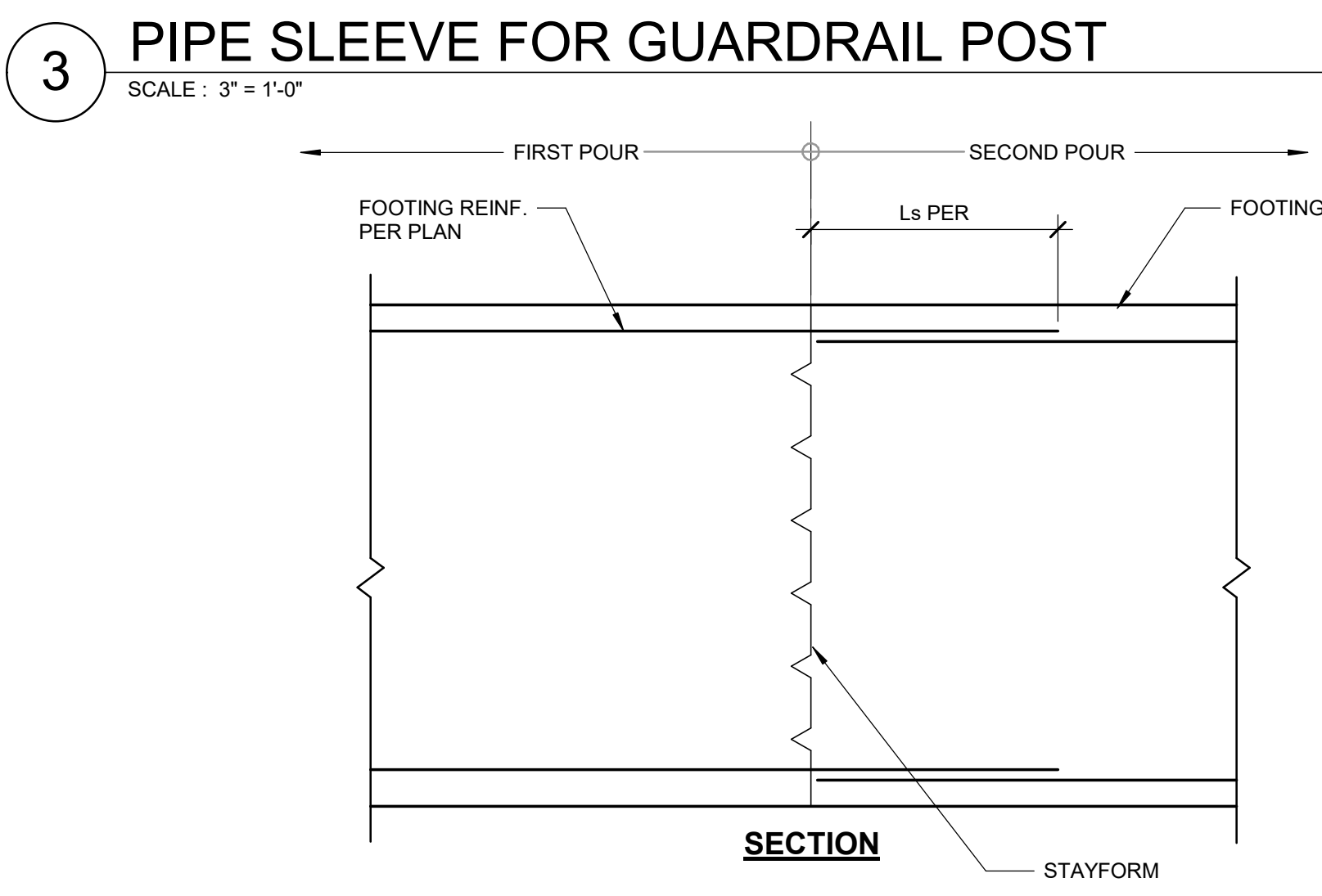


6 CONCRETE WALL CORNER AND INTERSECTION
SCALE: 1" = 1'-0"



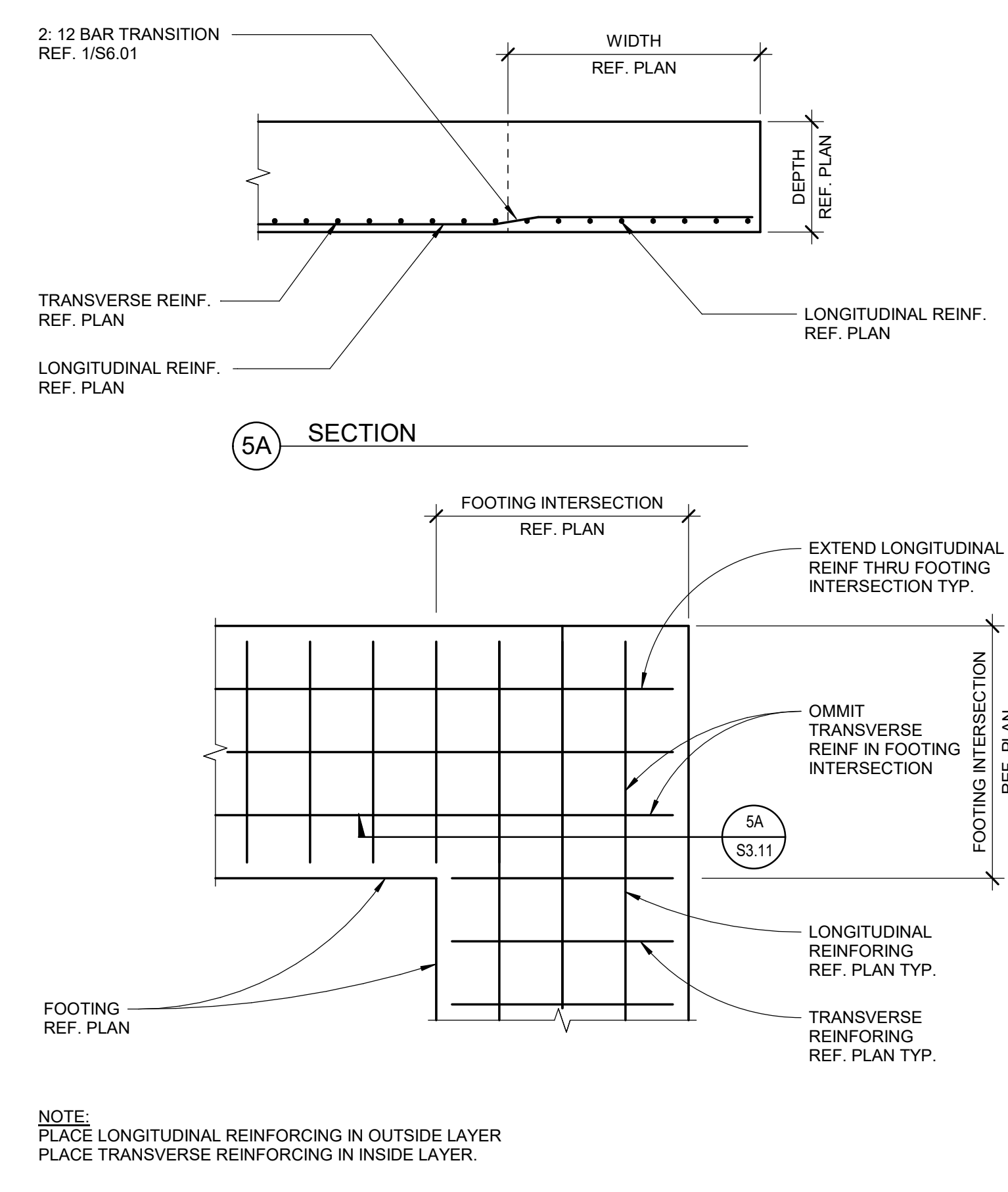
7 SLAB-ON-GRADE JOINTS
SCALE: 1" = 1'-0"

- NOTES:
- CONTROL JOINTS TO BE LOCATED AT COLUMN CENTER LINES AND AT 20'-0" MAX. AND EVERY 400 SQUARE FEET.
 - IF SAW-CUT CONTROL JOINT TO BE USED, SAW-CUT WITHIN 24 HOURS OF POUR.
 - CONSTRUCTION JOINT TO BE LOCATED AS PER NOTES #1 AND #2 UNLESS SPECIFICALLY INDICATED ON PLANS.

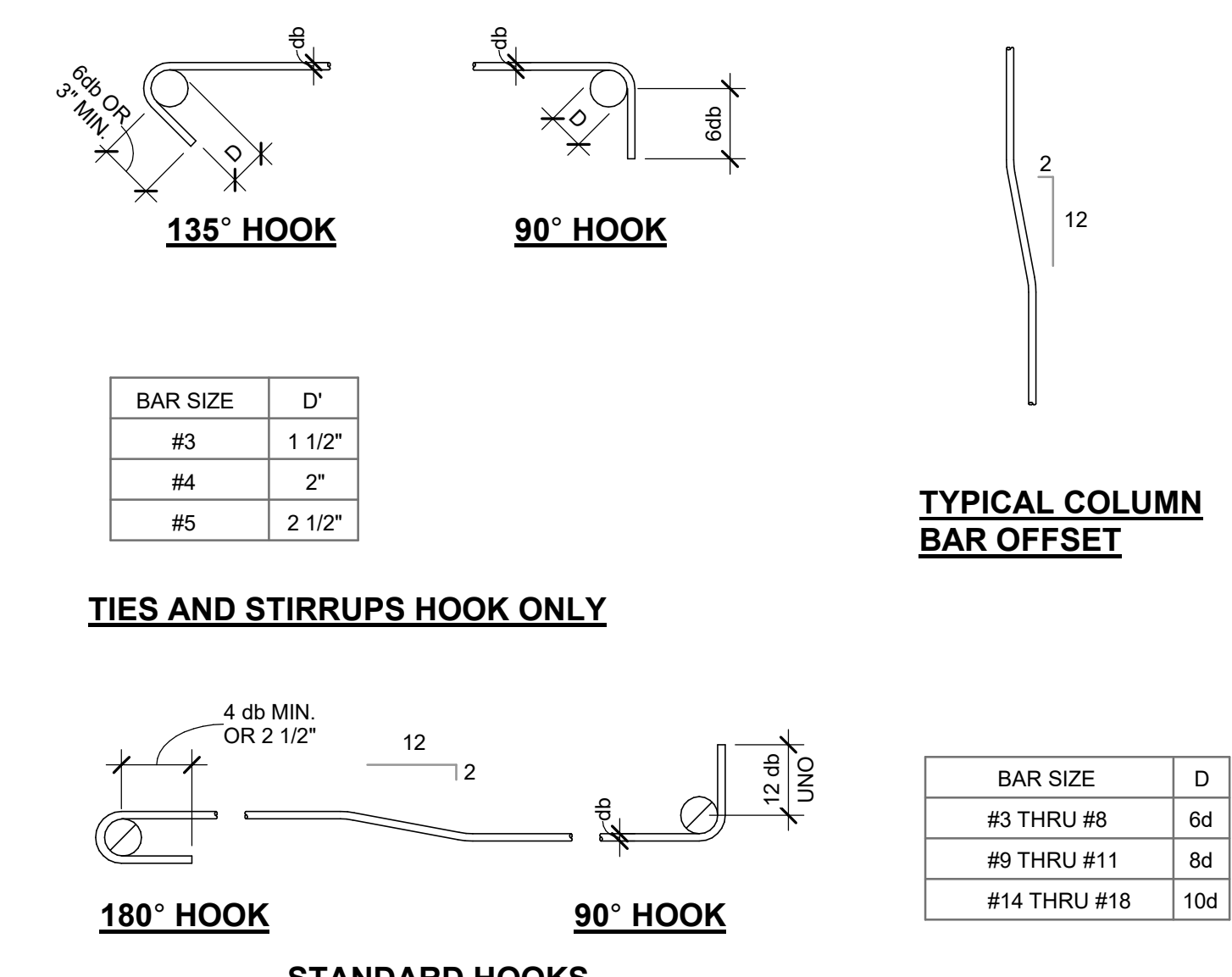


3 PIPE SLEEVE FOR GUARDRAIL POST
SCALE: 3" = 1'-0"

4 CONT FOOTING CONSTRUCTION JOINT
SCALE: 1" = 1'-0"



1 REINFORCING BAR BENDING DETAIL
SCALE: 1" = 1'-0"



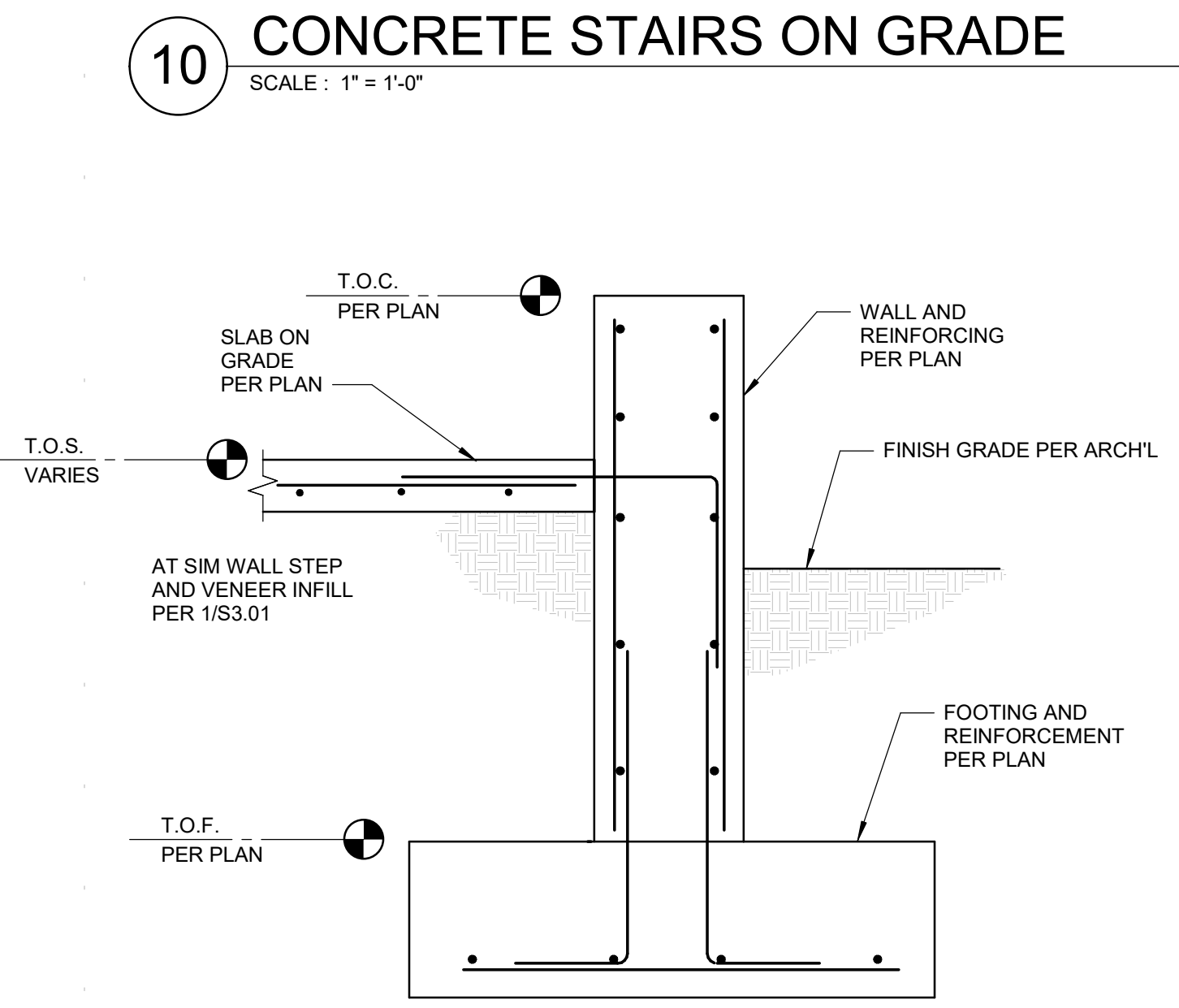
2 DEVELOPMENT AND SPLICE LENGTH SCHEDULE
SCALE: 1" = 1'-0"

CONCRETE STRENGTH = 4,000 PSI

BAR SIZE	TOP BARS		OTHER BARS		L _{th}	L _{ht}
	L _d	L _s	L _d	L _s		
#4	25	32	19	25	9	8
#5	31	40	24	31	12	10
#6	37	48	28	37	14	12
#7	54	70	42	54	17	14
#8	62	80	47	62	19	16
#9	70	90	54	70	21	18
#10	78	102	60	78	24	20
#11	87	113	67	87	27	22

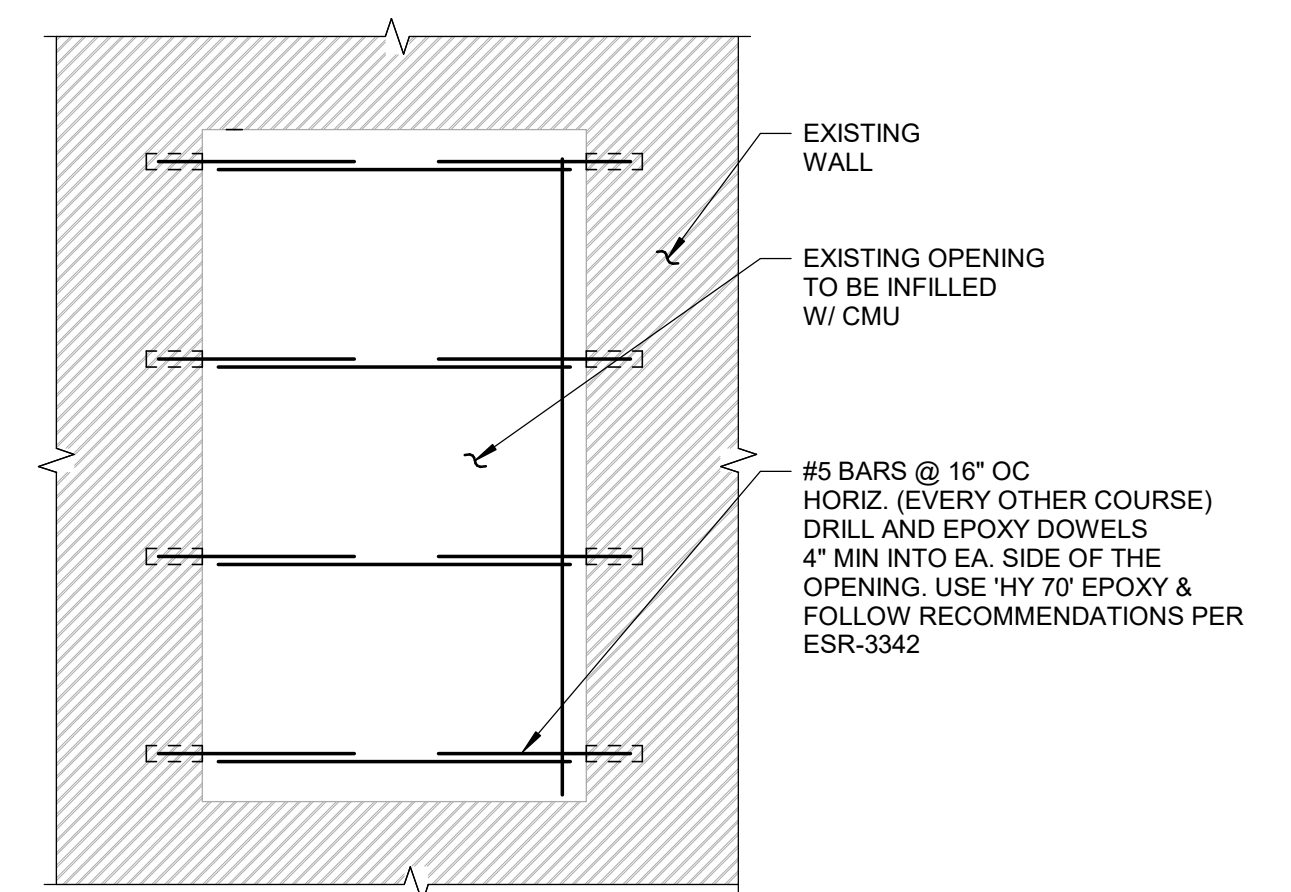
- NOTES:
- TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BAR.
 - REF. 1/S3.11, FOR STANDARD HOOK DETAIL REQUIREMENTS.
 - LAP LENGTHS NOTED ON PLAN GOVERN OVER LENGTHS NOTED IN THIS SCHEDULE.
- ABBREVIATIONS
- L_d = TENSION DEVELOPMENT LENGTH
L_s = CLASS B LAP SPLICE LENGTH
L_{th} = TENSION DEVELOPMENT LENGTH FOR A STANDARD HOOK
L_{ht} = TENSION DEVELOPMENT LENGTH FOR A HEADED BAR

2 DEVELOPMENT AND SPLICE LENGTH SCHEDULE
SCALE: 1" = 1'-0"



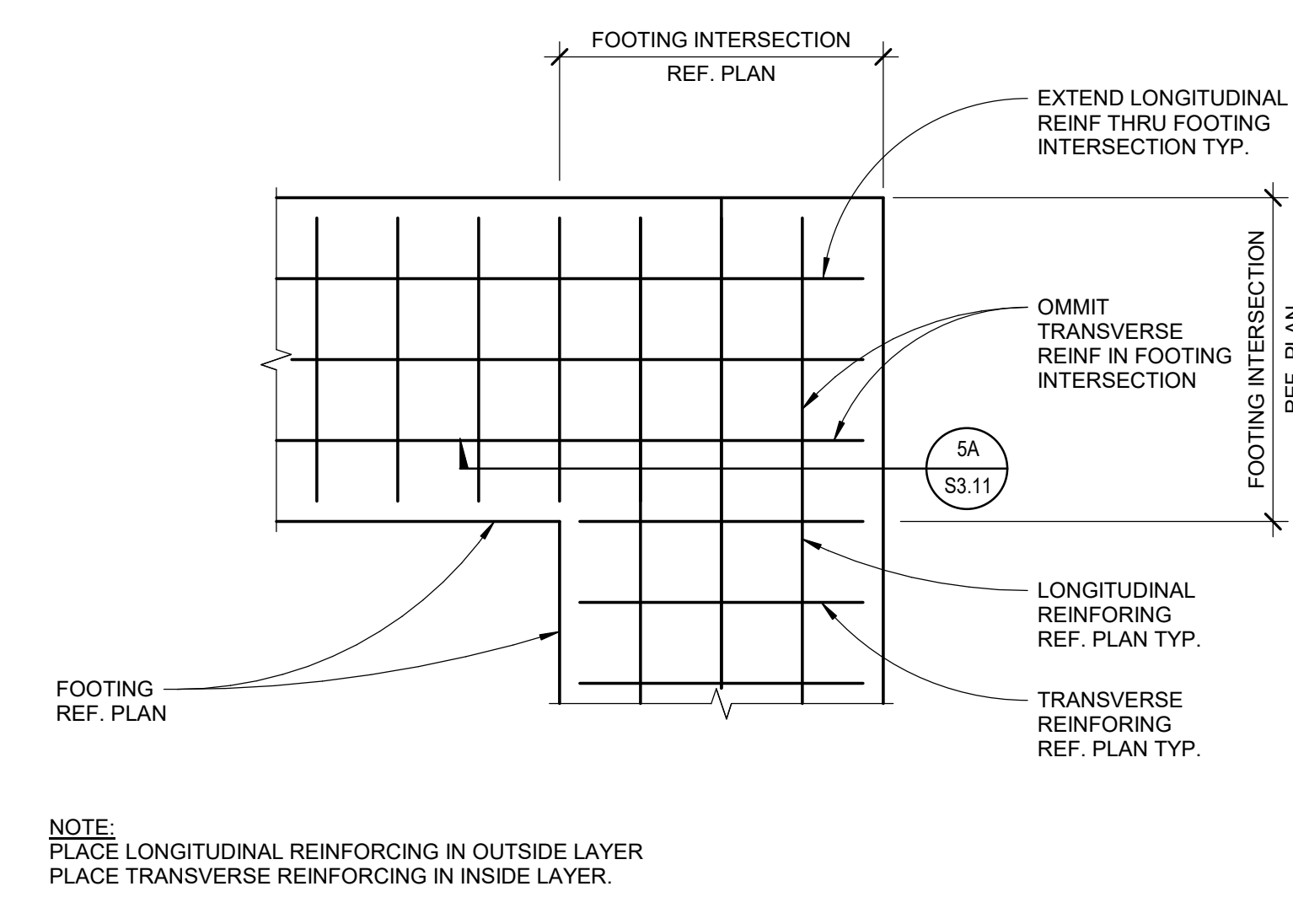
10 CONCRETE STAIRS ON GRADE
SCALE: 1" = 1'-0"

8 NOT USED
SCALE: 1" = 1'-0"



9 CMU INFILL AT EXISTING
SCALE: 1" = 1'-0"

5 REINF INTERSECTION OF CONT FOOTINGS
SCALE: 1/2" = 1'-0"



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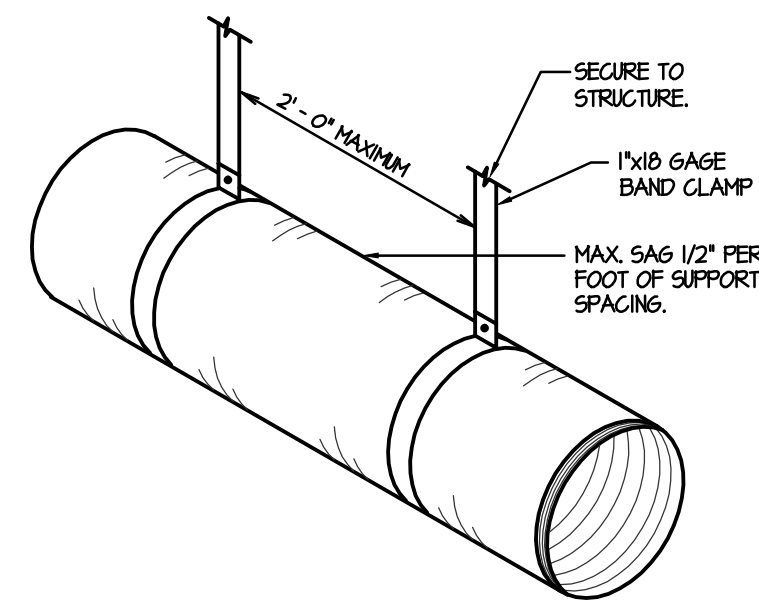
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Sheet:
STRUCTURAL DETAILS

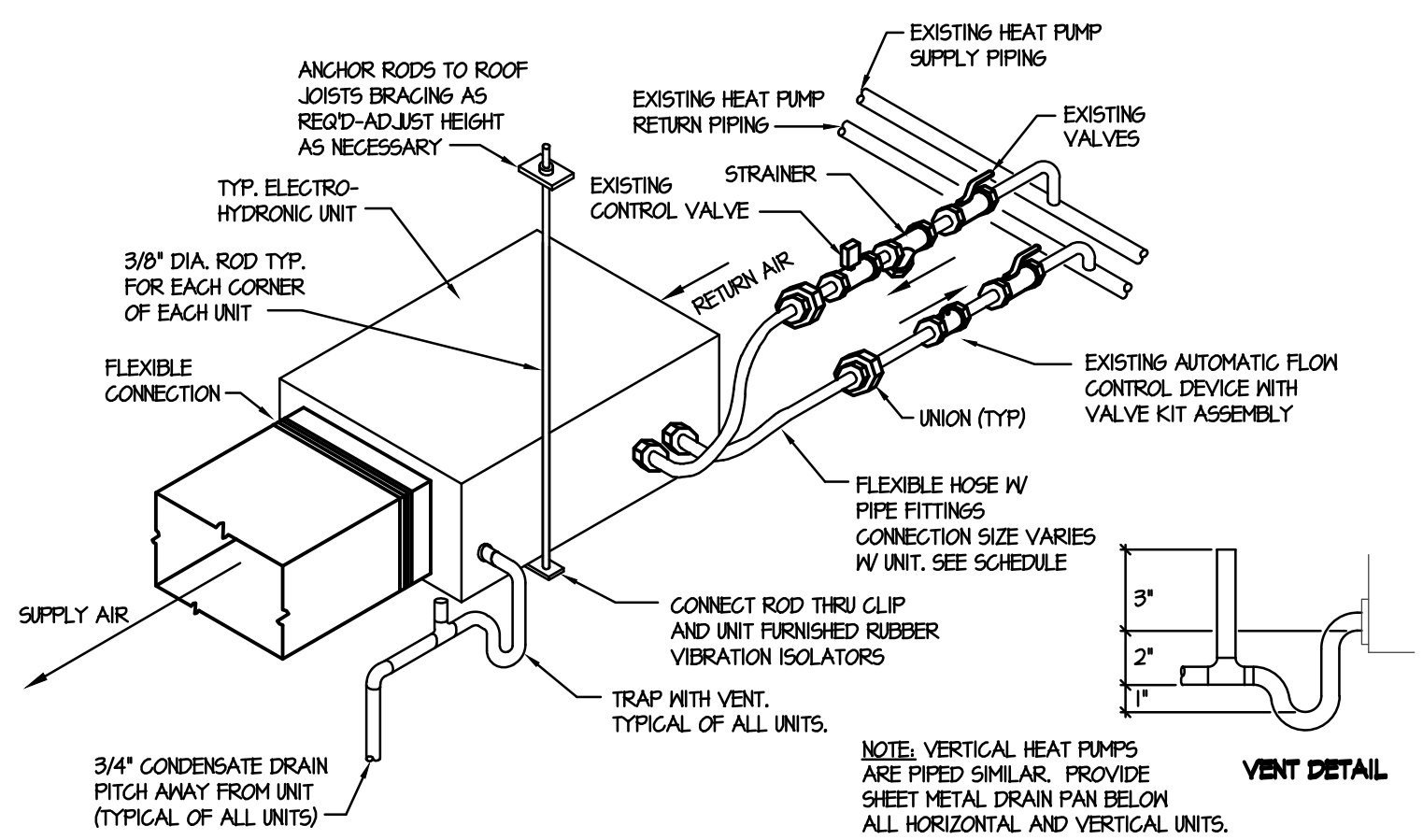
Revisions: △

Project No: 1021900043
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Checked By: C.C.H.
Date: 03/19/2019

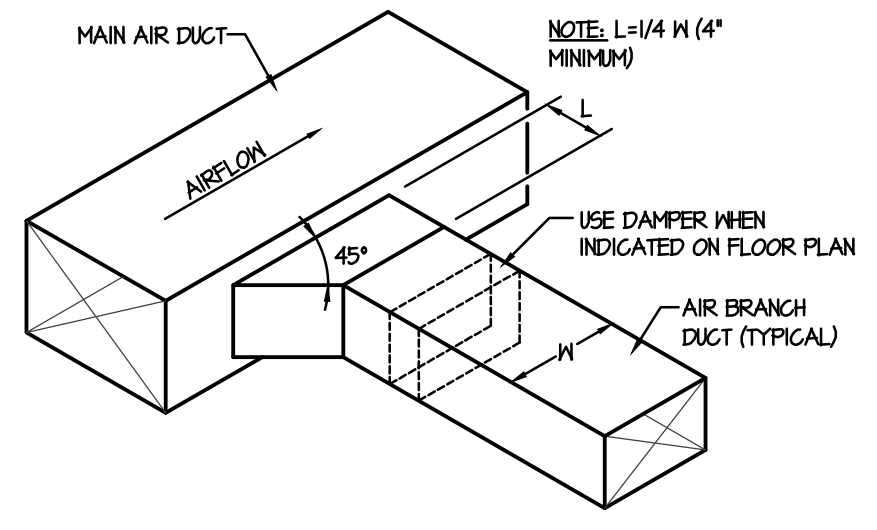
Sheet No:
S3.11



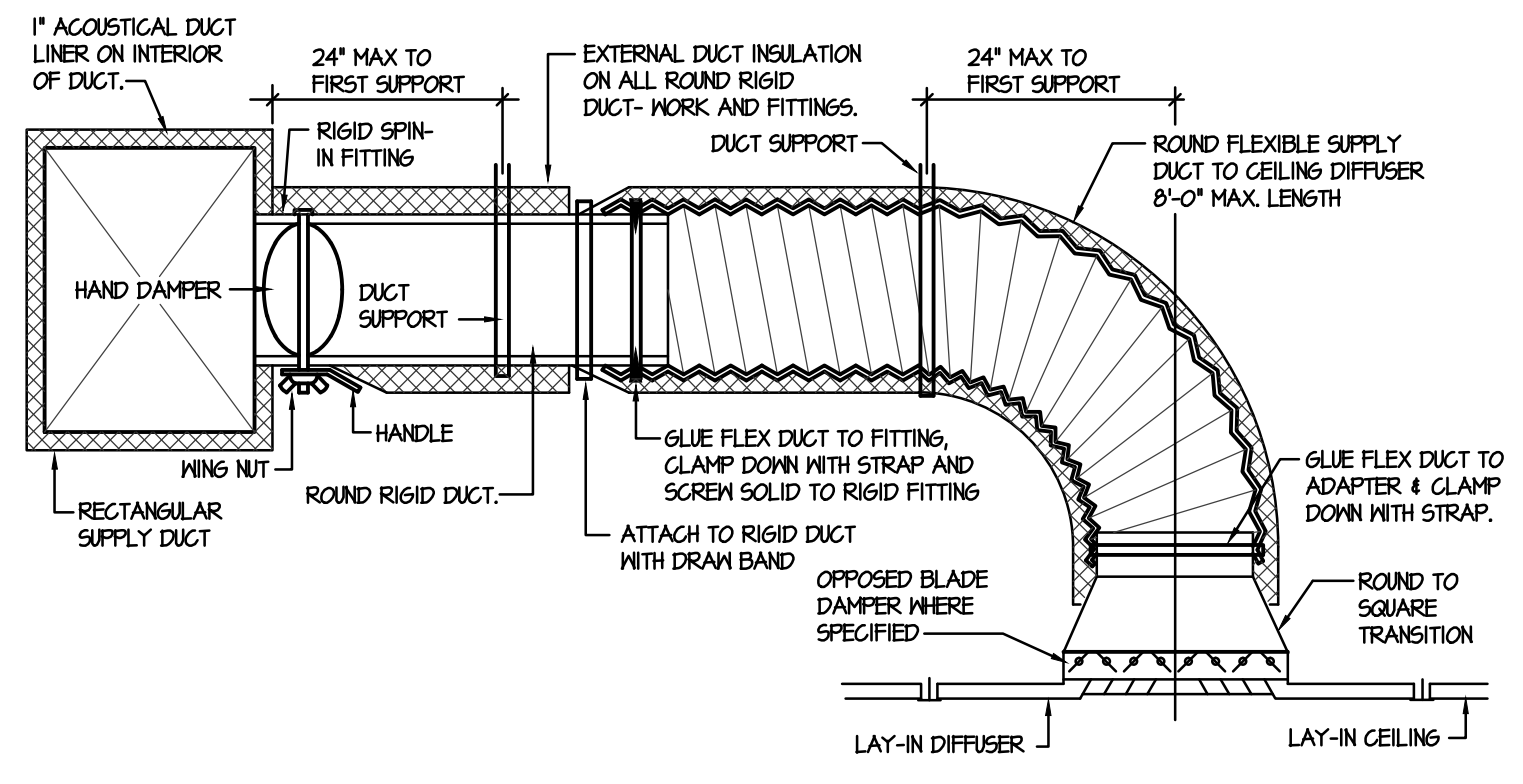
FLEXIBLE DUCT SUPPORT DETAIL
NO SCALE



HEAT PUMP PIPING AND SUPPORT DETAIL
NO SCALE



RECTANGULAR DUCT CONNECTION DETAIL
NO SCALE



CEILING DIFFUSER DETAIL WITH FLEXIBLE DUCT
NO SCALE

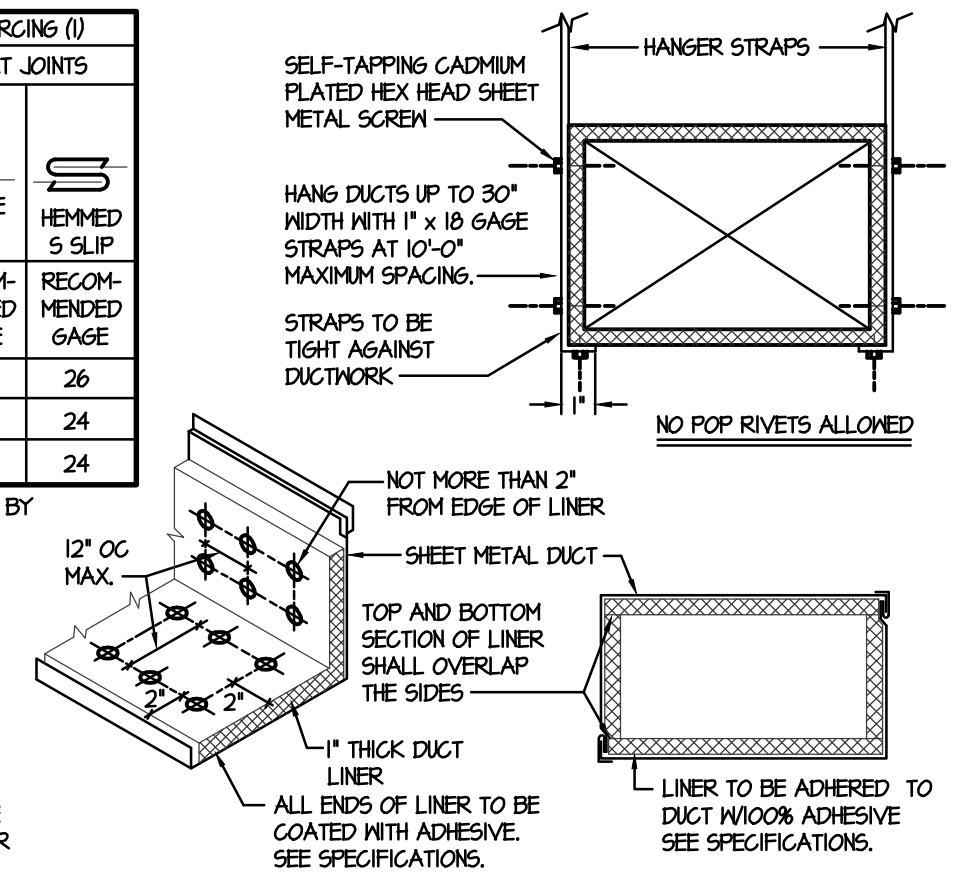
DIMENSION OF LONGEST SIDE, INCHES	SHEET METAL GAGE (ALL FOUR SIDES)	TRANSVERSE REINFORCING (1)	
		MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINTS #1 (OR INTERMEDIATE REINFORCING)	AT JOINTS
UP THRU 12	26	NONE REQUIRED	26 26
13 - 18	24	NONE REQUIRED	24 24
19 - 30	24	1"x1/2" @ 60 IN	- 24

(1) TRANSVERSE REINFORCING SIZE IS DETERMINED BY DIMENSION OF SIDE TO WHICH ANGLE IS APPLIED.

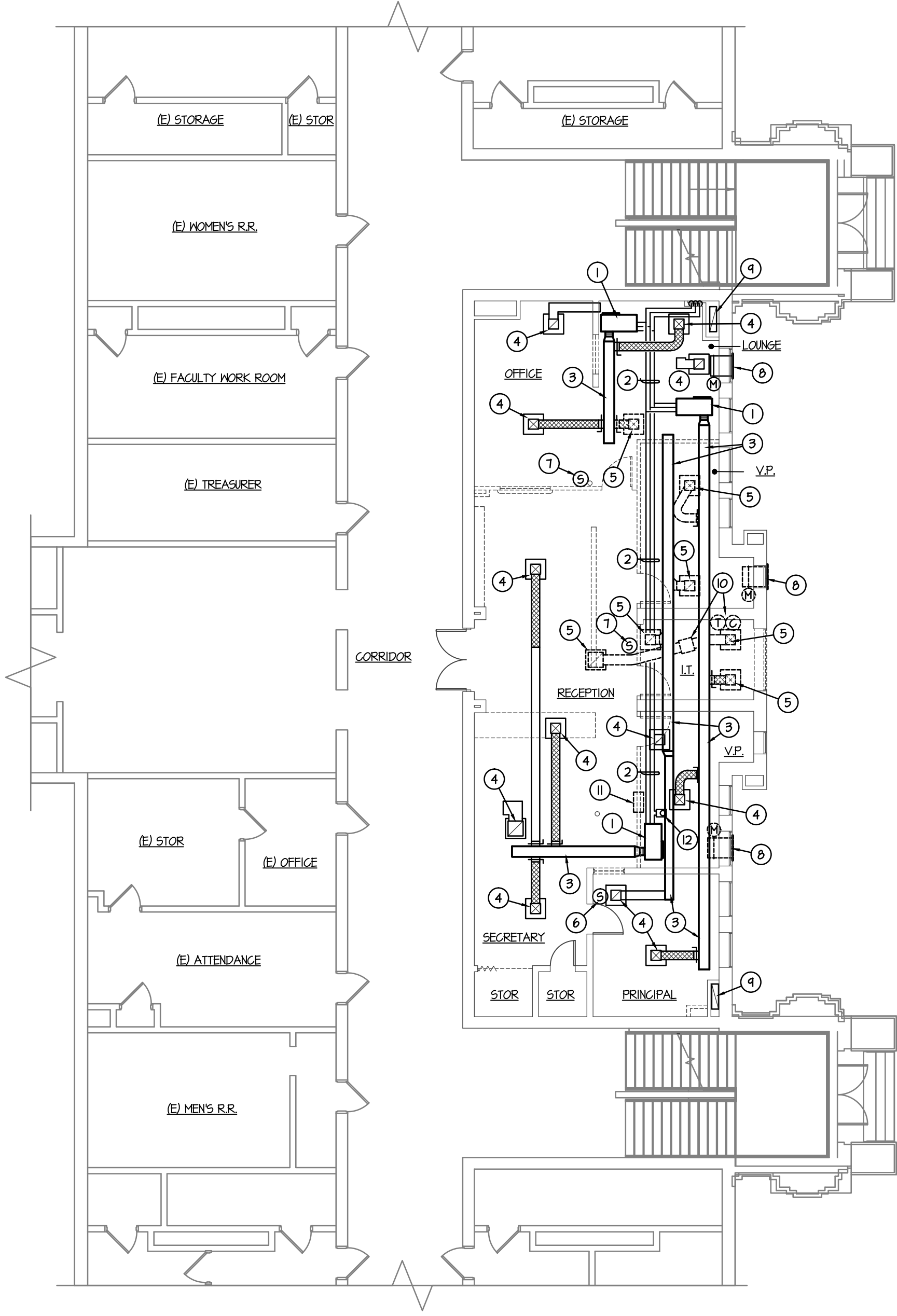
METAL FASTENERS - O-MARK INSULPING, DIRO DTYE FASTENERS OR GRIPNAILS.

GRIP NAILS SHALL BE INSTALLED BY GRIPNAIL AIR HAMMER OR BY AUTOMATIC FASTENER EQUIP.

ENDS OF LINER SHALL BE BUTTED FIRMLY TOGETHER



DUCT CONSTRUCTION AND HANGER DETAIL
NO SCALE



MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

- PLAN NOTES**
- DISCONNECT AND REMOVE EXISTING HEAT PUMP FROM ABOVE CEILING. EXISTING PIPING TO REMAIN. EXISTING TRUNK DUCT TO REMAIN. REFER TO SHEET M1 FOR NEW HEAT PUMP TO BE INSTALLED AND CONNECTED TO EXISTING DUCTWORK AND PIPING.
 - EXISTING PIPING ABOVE CEILING TO REMAIN. PROTECT DURING CONSTRUCTION.
 - EXISTING DUCTWORK TO REMAIN. PROTECT DURING CONSTRUCTION. REFER TO SHEET M1 FOR NEW DUCTWORK TO BE CONNECTED TO EXISTING.
 - EXISTING CEILING DIFFUSER AND/OR RETURN GRILLE TO REMAIN. REMOVE AS REQUIRED FOR NEW CEILING WORK. ADJUST GRILLE LOCATION AS REQUIRED FOR NEW CEILING GRID AND LIGHT FIXTURE LAYOUT.
 - DISCONNECT AND REMOVE EXISTING CEILING DIFFUSER AND/OR RETURN GRILLE. REMOVE ALL ASSOCIATED DUCTWORK BACK TO MAIN TRUNK DUCT AND SEAL EXISTING TRUNK DUCT AIR TIGHT.
 - EXISTING HALL MOUNTED ROOM SENSOR TO REMAIN. REMOVE SENSOR AS REQUIRED FOR NEW HALL FINISH AND RE-INSTALL AFTER WORK HAS BEEN COMPLETED.
 - EXISTING HALL MOUNTED ROOM SENSOR TO BE RELOCATED. REFER TO SHEET M1 FOR NEW SENSOR LOCATIONS. EXTEND EXISTING CONTROL WIRING AND CONDUIT AS REQUIRED FOR NEW LOCATIONS. FIELD VERIFY EXISTING CONDITIONS.
 - EXISTING OUTSIDE AIR LOUVER SLEEVE THRU HALL AND MOTORIZED DAMPER TO BE REMOVED. REMOVE EXISTING CONTROLS TO CORRESPONDING HEAT PUMP UNITS.
 - EXISTING RELIEF AIR CHASE FROM BASEMENT TO ATTIC SPACE TO REMAIN. PROTECT DURING CONSTRUCTION.
 - DISCONNECT AND REMOVE EXISTING HALL MOUNTED THERMOSTAT AND SPEED CONTROLLER, AND EXISTING IN-LINE EXHAUST FAN ABOVE CEILING. FIELD VERIFY EXACT LOCATION OF FAN.
 - REMOVE EXISTING HALL SLEEVE ABOVE CEILING. REFER TO SHEET M1 FOR NEW HALL SLEEVE TO BE INSTALLED ABOVE NEW HALL.
 - EXISTING CONDENSATE PUMP AND ALL ASSOCIATED PIPING TO REMAIN. PROTECT PIPING AND PUMP DURING CONSTRUCTION.

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Sheet:
MECHANICAL DEMOLITION PLAN

Revisions: Δ

GRILLE AND REGISTER SCHEDULE

SYM.	SIZE	THROW	CFM	CONSTR.	FINISH	BRANCH DUCT	F.D.	O.B.	REMARKS
GR-1	15 x 15		600	STEEL	WHITE	12"	NO	NO	PRICE 5MD WITH 24x24 LAY-IN MODULE
GR-1	72 x 12	---	300	ALUM	ANODIZED	(3) 6"	NO	NO	AMERICAN WARNING LE-31 WITH DRAINABLE BLADES AND BIRD/BUG SCREEN.

WATER SOURCE HEAT PUMP SCHEDULE

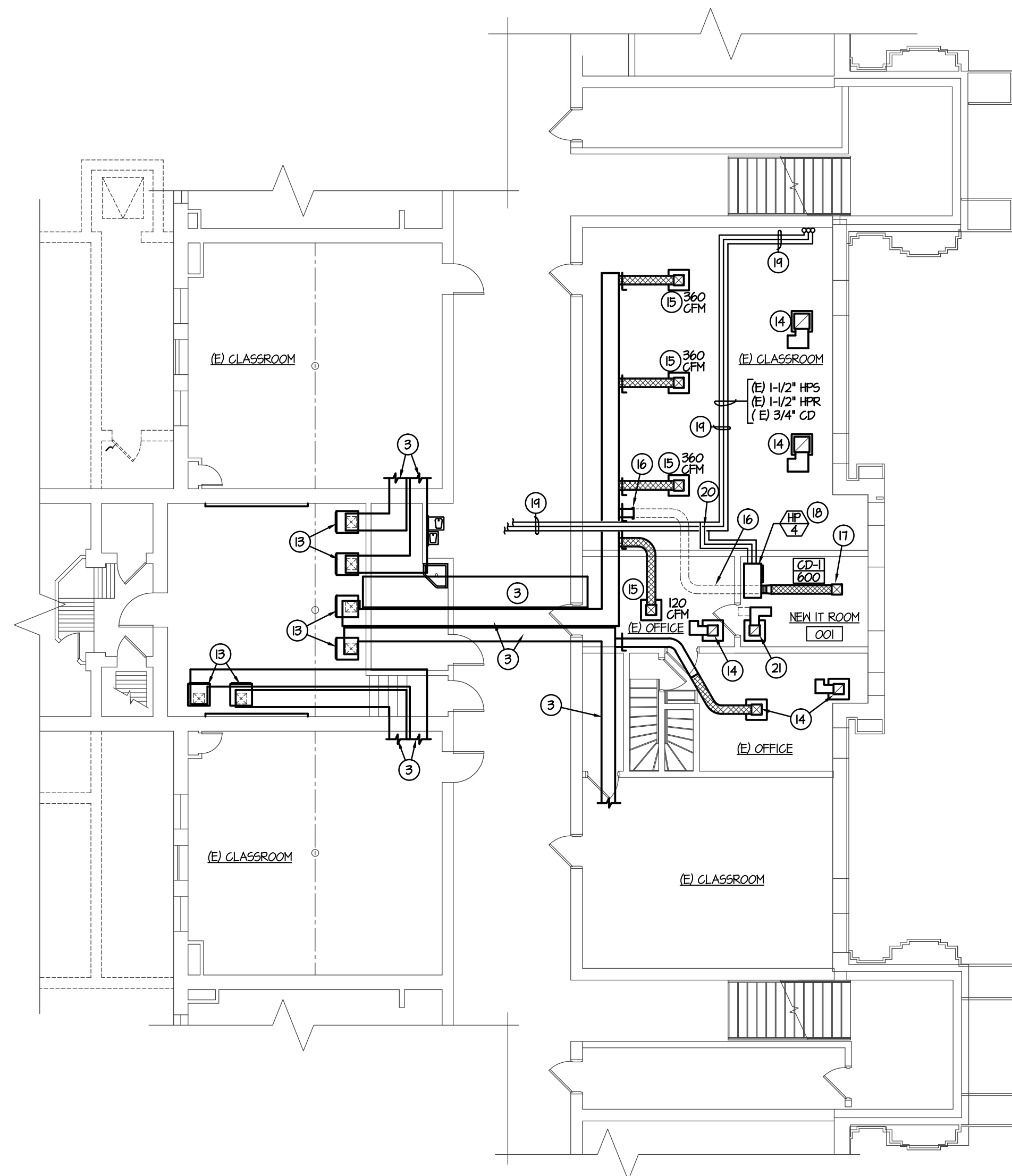
SYM.	TYPE	G.F.M.	O.A.	H.P.	S.P.E.	CHAR.	M.C.A.	HEATING				COOLING				GPM	PD	PIPE SIZE	REMARKS (A)				
								BTU	EAT	LAT	GOP	ENT	LMT	BTU	EAT					LAT	EEER	ENT	LMT
HP-1	HORIZONTAL	550	100	1/8	50"	211/60/1	10.4	21,900	65°F	40°F	4.41	10°F	60°F	18,000	75°F	55°F	13.0	85°F	45°F	4.2	6.4	3/4"	TRANE MODEL GEHE-018-T WITH RIGHT SUPPLY AND LEFT RETURN CONFIGURATION.
HP-2	HORIZONTAL	500	100	1/8	50"	211/60/1	10.4	21,900	65°F	40°F	4.41	10°F	60°F	18,000	75°F	55°F	13.0	85°F	45°F	4.2	6.4	3/4"	TRANE MODEL GEHE-018-T WITH RIGHT SUPPLY AND LEFT RETURN CONFIGURATION.
HP-3	HORIZONTAL	600	100	1/8	50"	211/60/1	10.4	21,900	65°F	40°F	4.41	10°F	60°F	18,000	75°F	55°F	13.0	85°F	45°F	4.2	6.4	3/4"	TRANE MODEL GEHE-018-T WITH RIGHT SUPPLY AND LEFT RETURN CONFIGURATION.
HP-4	HORIZONTAL	600	100	1/8	50"	211/60/1	10.4	21,900	65°F	40°F	4.41	10°F	60°F	18,000	75°F	55°F	13.0	85°F	45°F	4.2	6.4	3/4"	TRANE MODEL GEHE-018-T WITH LEFT SUPPLY AND LEFT RETURN CONFIGURATION.

(A) HEAT PUMPS TO BE PROVIDED WITH OVERFLOW SWITCH.
(B) OR APPROVED EQUAL PRIOR TO BIDDING. SEE SPECIFICATIONS FOR OTHER PRE-APPROVED MANUFACTURERS

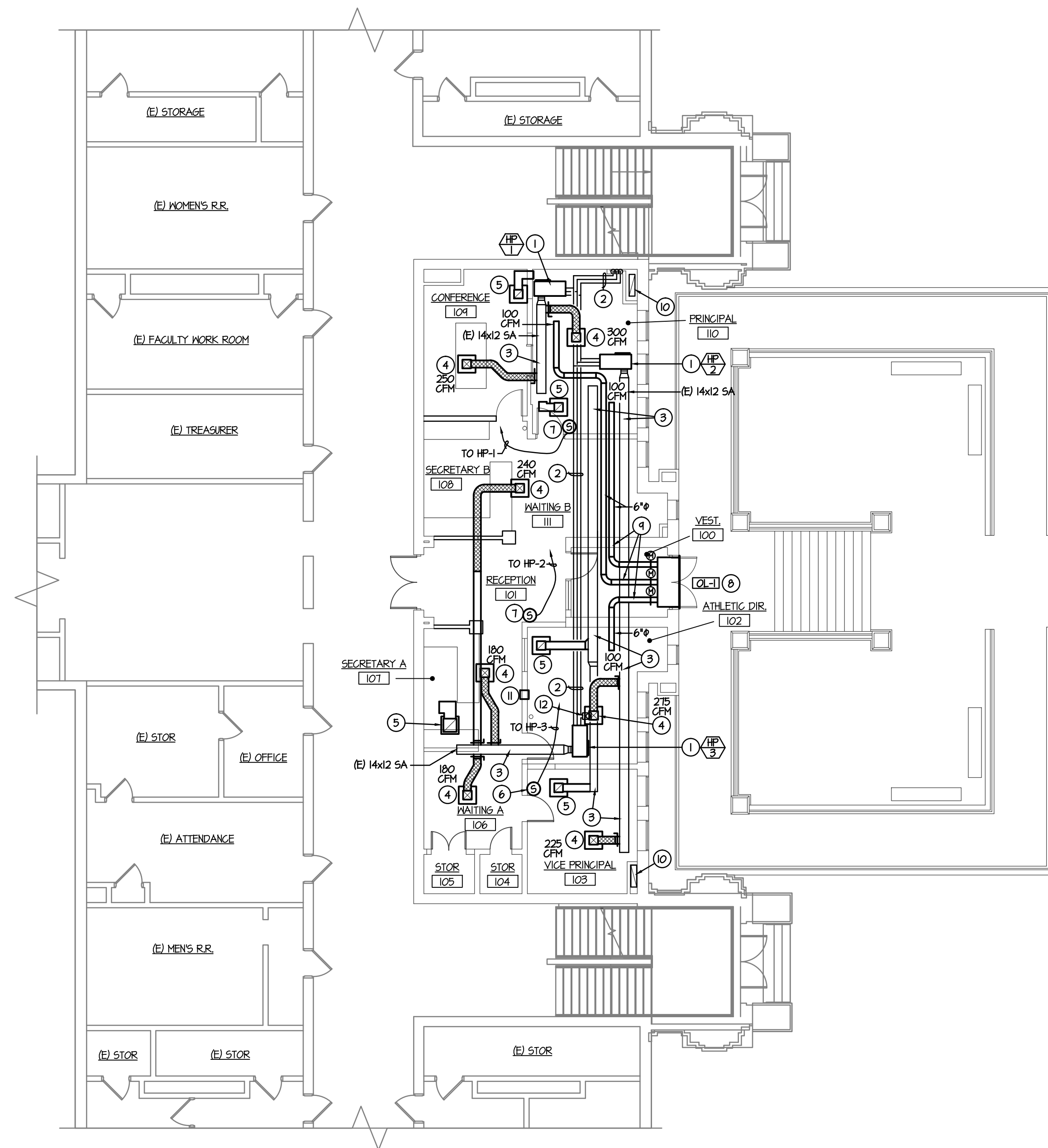
Professional Engineer
REGISTERED ENGINEER
DATE: 3/5/14
STATE OF IDAHO
C. SUDWEEKS

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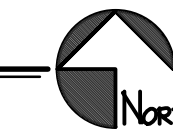
Project No: 18027
Drawn By: M.JENSEN
Checked By: D.SUDWEEKS
Date: 3/4/2019
Sheet No: **MO.1**



BASEMENT MECHANICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL I MECHANICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"



PLAN NOTES

- 1 PROVIDE AND INSTALL NEW HEAT PUMP AS SPECIFIED ABOVE CEILING. CONNECT TO EXISTING PIPING WITH NEW HOSE KITS. CONNECT TO EXISTING TRUNK DUCT WITH NEW FLEXIBLE CONNECTION. FIELD VERIFY SIZE AND LOCATION OF EXISTING PIPING AND DUCTWORK.
- 2 EXISTING PIPING ABOVE CEILING TO REMAIN. PROTECT DURING CONSTRUCTION. PROVIDE NEW HOSE KITS FOR CONNECTION TO NEW HEAT PUMPS.
- 3 EXISTING DUCTWORK TO REMAIN. PROTECT DURING CONSTRUCTION. CONNECT NEW DUCTWORK TO EXISTING AS REQUIRED. FIELD VERIFY EXACT SIZES AND LOCATIONS.
- 4 EXISTING CEILING DIFFUSER TO REMAIN. REMOVE AS REQUIRED FOR NEW CEILING WORK AND RE-INSTALL AFTER WORK HAS BEEN COMPLETED. ADJUST GRILLE LOCATION AS REQUIRED FOR NEW CEILING GRID AND LIGHT FIXTURE LAYOUT. BALANCE EXISTING DIFFUSER TO CFM AS SHOWN.
- 5 EXISTING RETURN GRILLE TO REMAIN. REMOVE AS REQUIRED FOR NEW CEILING WORK AND RE-INSTALL AFTER WORK HAS BEEN COMPLETED. ADJUST GRILLE LOCATION AS REQUIRED FOR NEW CEILING GRID AND LIGHT FIXTURE LAYOUT. RECONNECT TO EXISTING DUCTWORK.
- 6 EXISTING WALL MOUNTED ROOM SENSOR TO REMAIN. REMOVE SENSOR AS REQUIRED FOR NEW WALL FINISH AND RE-INSTALL AFTER WORK HAS BEEN COMPLETED.
- 7 RELOCATE EXISTING WALL MOUNTED ROOM SENSOR TO NEW LOCATION AS SHOWN. EXTEND EXISTING CONTROL WIRING AND CONDUIT AS REQUIRED FOR NEW LOCATION. FIELD VERIFY EXISTING CONDITIONS.
- 8 PROVIDE AND INSTALL NEW OUTSIDE AIR LOUVER ABOVE DOOR COMPLETE WITH PLENUM DUCT. ATTACH (2) NEW 6" Ø BRANCH DUCTS TO PLENUM WITH MOTORIZED DAMPER IN EACH DUCT. INTERLOCK DAMPER WITH CORRESPONDING HEAT PUMP UNITS) AND WITH EXISTING BUILDING CONTROLS.
- 9 PROVIDE NEW MOTORIZED DAMPER IN 6" Ø OUTSIDE AIR DUCT NEAR LOUVER LOCATION. RUN 6" Ø ABOVE CEILING AS SHOWN TO HEAT PUMP LOCATIONS. INTERLOCK DAMPER WITH CORRESPONDING HEAT PUMPS) AND WITH EXISTING BUILDING CONTROL SYSTEM. BALANCE TO CFM AS INDICATED. COORDINATE ROUTING OF NEW 6" Ø DUCT WITH EXISTING SUPPLY AND RETURN DUCTS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.
- 10 EXISTING RELIEF AIR CHASE FROM BASEMENT TO ATTIC SPACE TO REMAIN. PROTECT DURING CONSTRUCTION.
- 11 PROVIDE 12x10 SLEEVE THRU NEW WALL AND ABOVE CEILING FOR RETURN AIR TRANSFER. FIELD VERIFY EXISTING CONDITIONS AND LOCATIONS OF EXISTING CONCRETE, PIPING, AND DUCTWORK ABOVE CEILING. ADJUST SLEEVE LOCATION AS REQUIRED.
- 12 EXISTING CONDENSATE PUMP AND ALL ASSOCIATED PIPING TO REMAIN. FIELD VERIFY EXACT LOCATION AND PROTECT DURING CONSTRUCTION.
- 13 EXISTING HEAT PUMP UNITS TO REMAIN. ALL ASSOCIATED PIPING AND DUCTWORK TO REMAIN UNLESS NOTED OTHERWISE. FIELD VERIFY EXACT SIZES AND LOCATION OF ALL EXISTING PIPING AND DUCTWORK.
- 14 EXISTING CEILING DIFFUSER AND/OR RETURN GRILLE TO REMAIN. PROTECT DURING CONSTRUCTION.
- 15 EXISTING CEILING DIFFUSER TO REMAIN. RE-BALANCE EXISTING DIFFUSER TO CFM AS INDICATED.
- 16 DISCONNECT EXISTING 4" Ø BRANCH DUCT AND CAP NEAR EXISTING TRUNK DUCT. REMOVE EXISTING BRANCH DUCT AND CEILING DIFFUSER IN EXISTING OFFICE. (SEE NOTE 17)
- 17 REPLACE EXISTING CEILING DIFFUSER WITH NEW DIFFUSER AS CALLED OUT. CONNECT NEW DIFFUSER TO NEW HEAT PUMP UNIT ABOVE CEILING WITH 12" Ø FLEX DUCT. BALANCE TO 600 CFM. SUPPORT DIFFUSER FROM STRUCTURE.
- 18 PROVIDE AND INSTALL NEW HEAT PUMP AS SPECIFIED. MOUNT HEAT PUMP ABOVE NEW LAY-IN CEILING. CONNECT TO NEW CEILING DIFFUSER AS SHOWN. CONNECT TO NEW HEAT PUMP SUPPLY AND RETURN LINES AND TO EXISTING CONDENSATE DRAIN LINE ABOVE CLASSROOM CEILING. HEAT PUMP TO HAVE INTERNAL CONDENSATE PUMP.
- 19 EXISTING 1-1/2" HEAT PUMP SUPPLY AND RETURN PIPING AND EXISTING 3/4" CONDENSATE DRAIN LINE ABOVE CLASSROOM CEILING TO REMAIN.
- 20 CONNECT NEW 3/4" HEAT PUMP SUPPLY AND RETURN TO EXISTING CORRESPONDING PIPING ABOVE CLASSROOM CEILING. CONNECT TO 3/4" CONDENSATE RETURN LINE TO EXISTING. RUN NEW PIPING TO NEW HEAT PUMP AS SHOWN.
- 21 ROTATE EXISTING SOUND BOOT AS REQUIRED TO LEAVE RETURN AIR ABOVE NEW I.T. ROOM CEILING. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND LOCATION OF EXISTING RETURN AIR GRILLE AND BOOT.

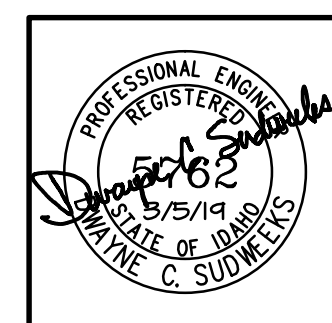
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MECHANICAL FLOOR PLAN

Revisions: Δ

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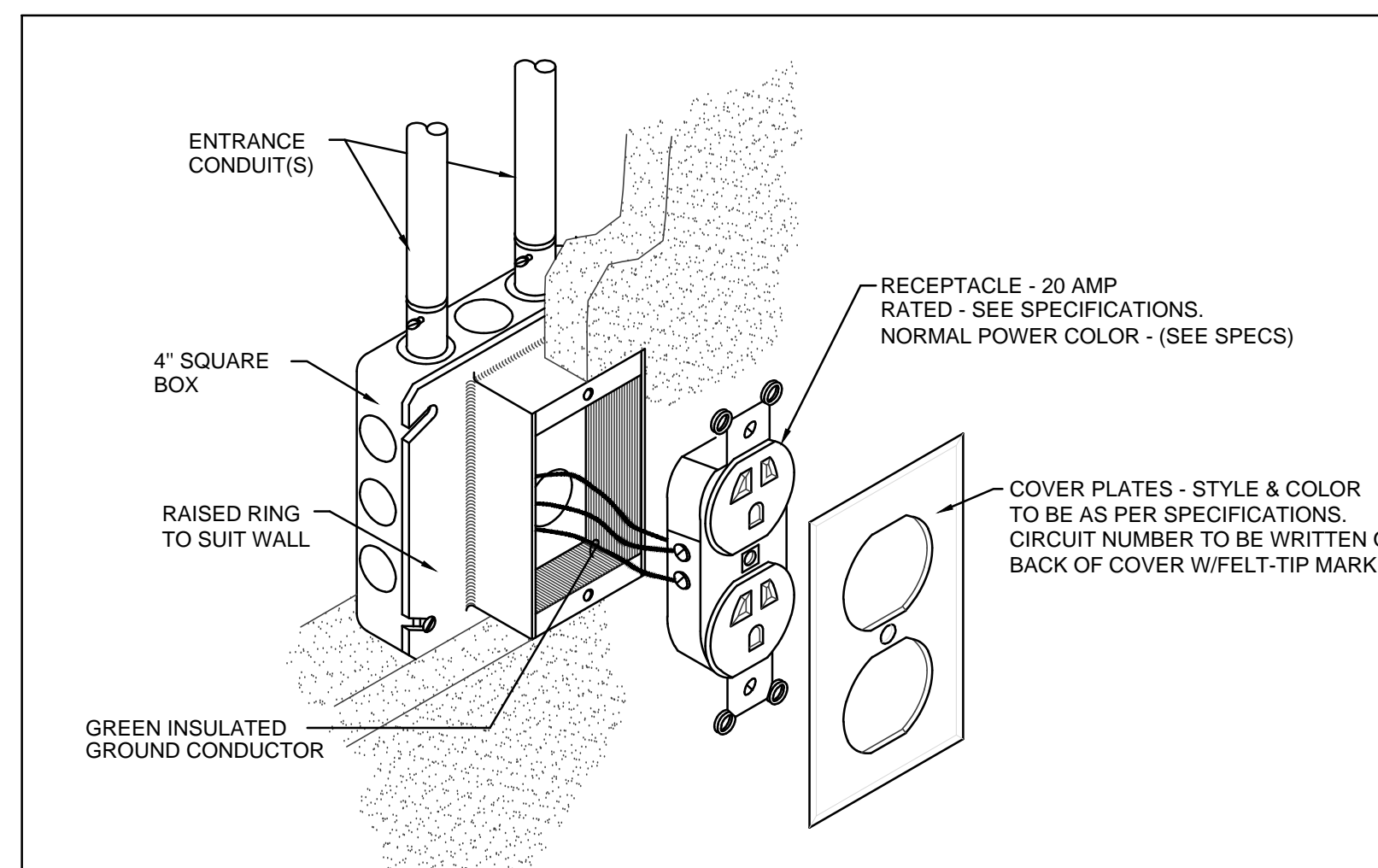
Project No: 18077
Drawn By: M. JENSEN
Checked By: D. SUOWEENS
Date: 3/4/2019
Sheet No: **M1.1**

ELECTRICAL SYMBOL SCHEDULE	
	FLUORESCENT FIXTURE
	EMERG. FIXTURE WITH EMERG. BATTERY PACK, CONNECTED TO UNSWITCHED LEG OF LIGHTING CIRCUIT.
	NIGHT LIGHT FIXTURE, CONNECTED FIXTURE TO UNSWITCHED LEG OF LIGHTING CIRCUIT.
	EXIT SIGN, WALL OR CEILING MOUNT & DIRECTIONAL ARROWS AS INDICATED ON DRAWINGS, CONNECT TO UNSWITCHED LEG OF NEAREST LIGHTING CIRCUIT.
	CEILING MOUNTED FIXTURE
	WALL MOUNTED FIXTURE
	RECESSED CAN FIXTURE
	EMERGENCY WALL LIGHT WITH 90MIN. BATTERY
	TRAC LIGHT SYSTEM
	SINGLE POLE SWITCH (SEE SUBSCRIPTS)
	DUAL-LEVEL SWITCHES; IN-BRAND AND OUT-BRAND LAMPS SHALL BE SWITCHED SEPARATELY. (SUBSCRIPT APPLIES TO BOTH SWITCHES)
	3 = 3-WAY 4 = 4-WAY F = EXHAUST FAN TIMER (INTERMATIC MODEL E400 SERIES) T = THERMAL OVERLOAD SWITCH W/PILOT LIGHT P = 1-POLE SWITCH WITH PILOT LIGHT. (SEE SPECS) M = SWITCH SUPPLIED W/ EQUIPMENT (INSTALLED BY E.C.) WP = WEATHERPROOF
	WALL BOX DIMMER SWITCH. (SWITCH TO BE COMPAT. W/LOAD SERVED) LED 0-10V. LEVITON RENIOR II #AW5MG-7D. W/MATCHING WALL PLATE OR EQUAL. (COLOR TO MATCH WIRING DEVICES)
	SWITCH MOUNTED OCCUPANCY SENSOR, LINE VOLTAGE, W/COVERPLATE, (COLOR TO MATCH WIRING DEVICES) P = PASSIVE INFRARED 1-POLE [WATTSTOPPER # PW-302] P2 = PASSIVE INFRARED 2-POLE [WATTSTOPPER # PW-302] D = DUAL TECHNOLOGY 1-POLE [WATTSTOPPER # DSW-100] D2 = DUAL TECHNOLOGY 2-POLE [WATTSTOPPER # DSW-200]
	CEILING MOUNTED OCCUPANCY SENSOR BLANK + DUAL TECH., LINE VOLTAGE [WATTSTOPPER #DT-355] L = LARGE AREA, ULTRASONIC LOW VOLTAGE [WATTSTOPPER #WT-2205] H = HALLWAY, ULTRASONIC LOW VOLTAGE [WATTSTOPPER #WT-2255] R = RESTROOM, DUAL TECH., LINE VOLTAGE, 2-POLE [SENSOR SWITCH #CMR-PDT-2-PL], (1) RELAY FOR LTG., (1) RELAY FOR EXHAUST FAN (30 MIN. DELAY) D = INTEGRAL DAYLIGHT SENSOR TO AUTOMATICALLY CONTROL FIXTURES IN DAYLIGHT ZONES W = WALL MOUNTED ON/OFF DIM. *PROVIDE LOW VOLTAGE SENSORS WITH POWER/RELAY PACK(S) AS REQUIRED FOR OPERATION. [WATTSTOPPER #BZ-50]
	PHOTOELECTRIC CELL/SWITCH
	TIME CLOCK SWITCH
	PUSHBUTTON (AS INDICATED ON DRAWINGS)
	DUPLEX RECEPTACLE
	BOTTOM HALF OF RECEPTACLE SHALL BE SWITCHED
	DOUBLE DUPLEX OUTLET (4-PLEX)
	CEILING MOUNTED DUPLEX RECEPTACLE
	AC=ABOVE COUNTER USB=RECEPTACLE W/USB CHARGER GF=GROUND-FAULT CR=CORD REEL (SEE DETAIL) IG=ISOLATED GROUND S=SURGE SUPPRESSION TR=UL TAMPER RESISTANT WP=WEATHERPROOF COVER W/GFCI RECEPT. TV= RECEPT. FOR TV. SEE ARCH. ELEVATION DWGS FOR MTG. HEIGHT
	50A 208V 1Ø WELDER OUTLET
	FLOORBOX - POWER ONLY (2-DUPLEX RECEPTACLES)
	MULTI-SERVICE AV FLOOR BOX, LEGRANDE 10 GANG, WITH (4) DUPLEX RECEPTACLES AND ALL ACCESSORIES, FRAMES, PLATES ETC FOR ALL AV AND DATA CABLES AS DIRECTED BY OWNER. EC SHALL COORDINATE ALL REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN.
	DISCONNECT SWITCH (SIZE AND TYPE AS INDICATED) F=FUSED DISCONNECT (FUSE PER EQUIP. NAMEPLATE) B=ENCLOSED CIRCUIT BREAKER V=VP (PROVIDED BY M.C. CONNECTED AND INSTALLED BY E.C.)
	COMBINATION STARTER & FUSED DISCONNECT SWITCH, 3 SETS OF NOINC CONTACTS, CONTROL XFMR, FUSE PER EQUIP. NAMEPLATE
	MAIN DISTRIBUTION PANELBOARD
	BRANCH PANELBOARD
	TELEPHONE / DATA BOARD (GRND AS PER UTIL. CO)
	BRANCH CIRCUIT - CONCEALED
	BRANCH CIRCUIT - IN FLOOR OR UNDERGROUND
	BRANCH CIRCUIT - HOME-RUN TO PANEL
	DRAWING NOTE (ON THE SHEET WHERE SHOWN)
	MECHANICAL EQUIPMENT OR DETAIL SYMBOL
	JUNCTION BOX
	THERMOSTAT W/ 3/4" CONDUIT W/PILOT CORD TO MECH. UNIT
	HVAC SYSTEM SENSOR - SEE MECHANICAL
	CROSS LINES SHOW # OF PHASE/NEUTRAL CONDUCTORS IF MORE THAN TWO. EQUIPMENT ISOLATED GROUNDING CONDUCTORS ARE NOT SHOWN. PROVIDE GREEN EQUIP. GROUNDING CONDUCTOR FOR ALL CIRCUITS AND ADDITIONAL ISOLATED GROUND WHERE INDICATED.
	FAN MOTOR CONNECTION POINT
	MOTOR CONNECTION POINT
	A.F.F. ABOVE FINISHED FLOOR
	B.F.G. BELOW FINISHED GRADE
	E.C. ELECTRICAL CONTRACTOR
	G.C. GENERAL CONTRACTOR
	M.C. MECHANICAL CONTRACTOR
	N.L. NIGHT LIGHT (CONNECT TO UNSWITCHED LEG OF LTG CIRCUIT)
	N.T.S. NOT TO SCALE
	V.I.F. VERIFY IN FIELD
* SEE MECHANICAL DRAWINGS FOR CONDUIT DESTINATION AND ROUGH-IN BOX MUD RING ORIENTATION.	

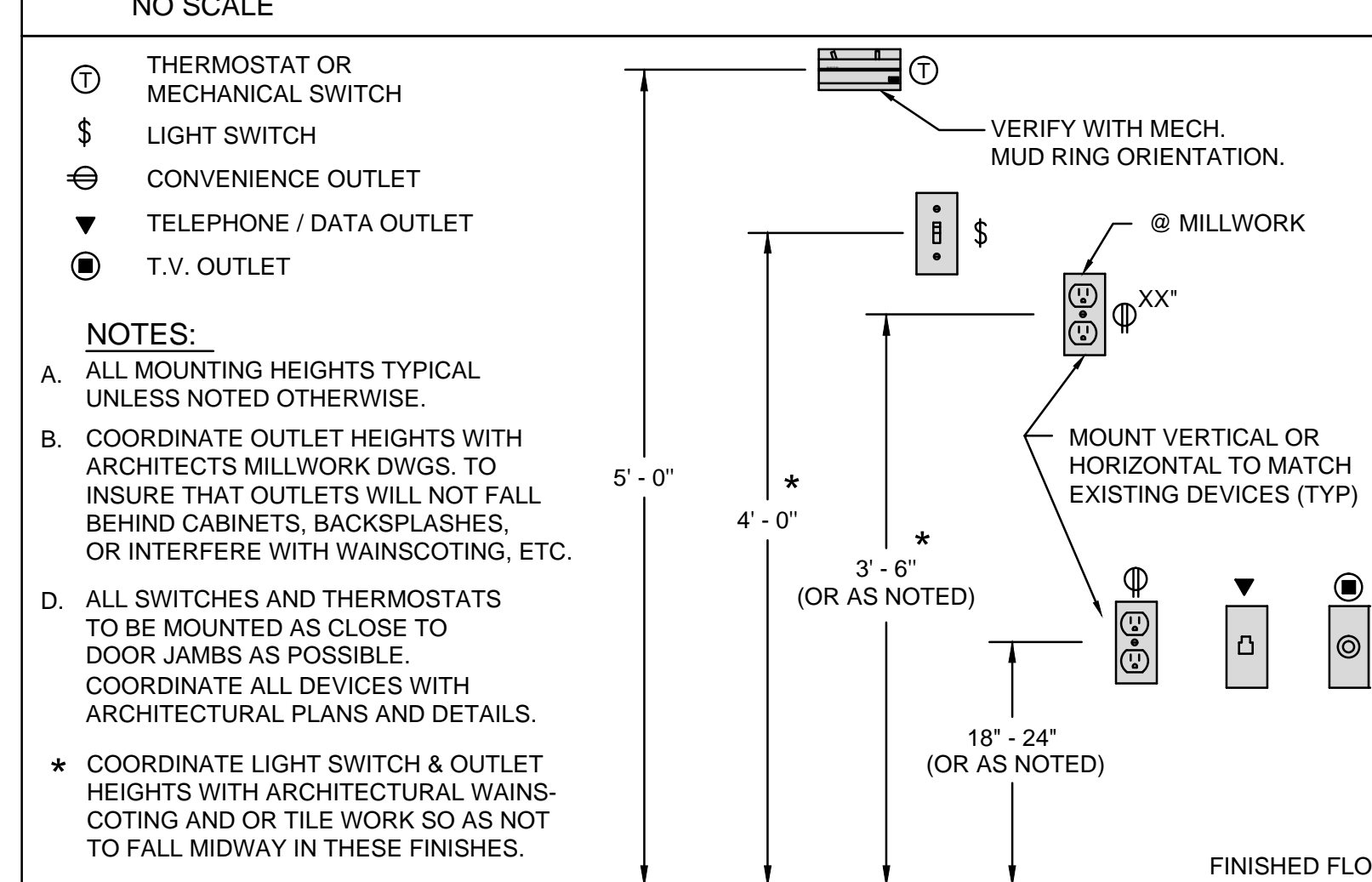
DATA/COMM. SYMBOL SCHEDULE	
	TELEPHONE OUTLET (L=# OF CABLES, X=CONDUIT SIZE SEE BELOW)
	DATA OUTLET (L=# OF CABLES, X=CONDUIT SIZE SEE BELOW)
	TELE/DATE OUTLET (L=# OF CABLES, X=CONDUIT SIZE SEE BELOW)
	DATA OUTLET - ABOVE CEILING (L=# OF CABLES)
	TELEPHONE & DATA OUTLET NOTES: 1. UTILIZE 4 11/16" DEEP BOX WITH REQUIRED MUDRING AND CONDUIT TO IT ROOM. TERMINATE WITH INSULATED THROAT BUSHING. PROVIDE CITY OF CABLES INDICATED FROM OUTLET TO NEAREST TELE/DATE ROOM. SEE DWGS FOR ADDITIONAL INFORMATION. PROVIDE J-HOOKS 3FT ON CENTER ABOVE ACCESSIBLE CEILING FOR SUPPORT OF CABLING. 2. CONDUIT SIZES (X) 2-1/2", 3-3/4" & 4-1/2"; OR (2) 1" 3. NO LABEL INDICATES: 4 11/16" DEEP BOX WITH 1-GANG MUDRING AND 1" CONDUIT TO ABOVE NEAREST ACCESSIBLE CEILING/CABLE TRAY. TERMINATE WITH INSULATED THROAT BUSHING (UNO). PROVIDE WITH PULL STRINGS.
	AV OUTLET: RUSSELL ENCLOSURE NSAV52M (1) POWERKIT HBL INSOKIPS, AND (1) 4-PORT DATA PLATE HBL NSP14W.
	OTHER ITEMS BY E.C. SHALL BE FROM DATA COMPARTMENT OF ENCL. TO IT ROOM. INSTALL (1) COAX CABLE AND (1) CAT 5E CABLE. MAKE ALL TERMINATIONS.
	CEILING MOUNTED SPEAKER AND BACKBOX
	VOLUME CONTROLLER

- PROJECT GENERAL NOTES:**
- ELECTRICAL CONTRACTOR SHALL COORDINATE ALL LAMP TYPES WITH FIXTURE TYPE BEFORE ORDERING.
 - ELECTRICAL CONTRACTOR SHALL REFER TO THE MECHANICAL DRAWINGS FOR EXACT LOCATION OF ALL MECHANICAL EQUIPMENT AND ELECTRICAL CONNECTIONS.
 - ELECTRICAL CONTRACTOR SHALL PROVIDE MINIMUM WORKING CLEARANCE AS PER NEC BEFORE INSTALLING ANY ELECTRICAL PANELS FOR CABINETS.
 - INSTALL ALL LIGHT FIXTURES IN MECHANICAL ROOM AFTER THE MECHANICAL EQUIPMENT IS IN PLACE. ADJUST AS NECESSARY. PROVIDE CHAIN SUSPENSION KITS AS REQUIRED.
 - REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT FIXTURE LOCATIONS, CEILING TYPES, ETC.
 - ALL FLUORESCENT FIXTURES SHALL BE SUPPLIED WITH T8 (35K) LAMPS AND ELECTRONIC BALLASTS WITH -20% THD, UNLESS INDICATED OTHERWISE.
 - ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONCRETE PADS AS REQUIRED ON ALL ELECTRICAL EQUIPMENT.
 - CONFIRM EXACT LOCATIONS OF ALL TELEPHONE / DATA OUTLETS WITH OWNER PRIOR TO ROUGH-IN.
 - ELECTRICAL CONTRACTOR SHALL MOUNT SWITCHES AT 48" AND MOUNT CONVENIENCE OUTLETS AT 18" OR AS SHOWN ON PLANS TO MEET HANDICAPPED REQUIREMENTS.
 - LOCATE SWITCHES, OUTLETS, ETC., SHOWN AT ROOM ENTRY DOORWAYS, AS CLOSE TO DOOR FRAME AS POSSIBLE, SO AS NOT TO INTERFERE WITH ROOM CABINETS, ETC.
 - SUPPORT ALL LIGHT FIXTURES INDEPENDENT OF CEILING.
 - ELECTRICAL CONTRACTOR SHALL OBTAIN ALL APPLICABLE PERMITS FOR THIS WORK AND PAY ASSOCIATED FEES.
 - MAINTAIN 24" MIN. CLEARANCE FROM ALL COMMUNICATIONS CABLES AND ELECTRONIC BALLASTS.
 - ALL BATTERY EXIT AND EMERGENCY LIGHTING TO BE CONNECTED TO THE UNSWITCHED LEG OF THE LIGHTING CIRCUIT IN THE AREA AS PER CODE.
 - UNLESS SPECIFICALLY INDICATED OTHERWISE, THE ELECTRICAL CONTRACTOR TO COORDINATE WITH ANY SPECIAL SYSTEMS SUPPLIER (CONTR. EX. DENTAL, MEDICAL, KITCHEN EQUIPMENT ETC. THE EXACT ROUGH-IN REQUIREMENTS FOR THESE EQUIPMENT, ALSO UNLESS INDICATED OTHERWISE, THE ELECTRICAL CONTR. TO BE RESPONSIBLE FOR FINAL CONNECTIONS TO ALL SPECIAL EQUIPMENT.
 - ALL CONDUIT / RACEWAY / CABLES, TO BE CONCEALED IN WALLS OR ABOVE CEILING. IF ANY SURFACE WORK IS NECESSARY, IT SHALL BE APPROVED BY THE ARCHITECT / ENGINEER PRIOR TO DOING ANY WORK.
 - E.C. SHALL VISIT THE SITE PRIOR TO BID AND THOROUGHLY INVESTIGATE THE EXISTING CONDITIONS, AS THEY RELATE TO THE SCOPE OF WORK DESCRIBED. MAKE NECESSARY PROVISIONS IN THE BASE BID TO ADEQUATELY ACCOMMODATE THESE CONDITIONS.
 - JUNCTION BOXES FOR LIGHTING CIRCUITING ARE NOT SHOWN FOR CLARITY. THE E.C. IS RESPONSIBLE FOR PROVIDING AND INSTALLING ALL JUNCTION BOXES REQUIRED FOR CIRCUITING OF ALL LIGHT FIXTURES THAT ARE NOT LISTED FOR "THROUGH-BRANCH CIRCUIT WIRING".

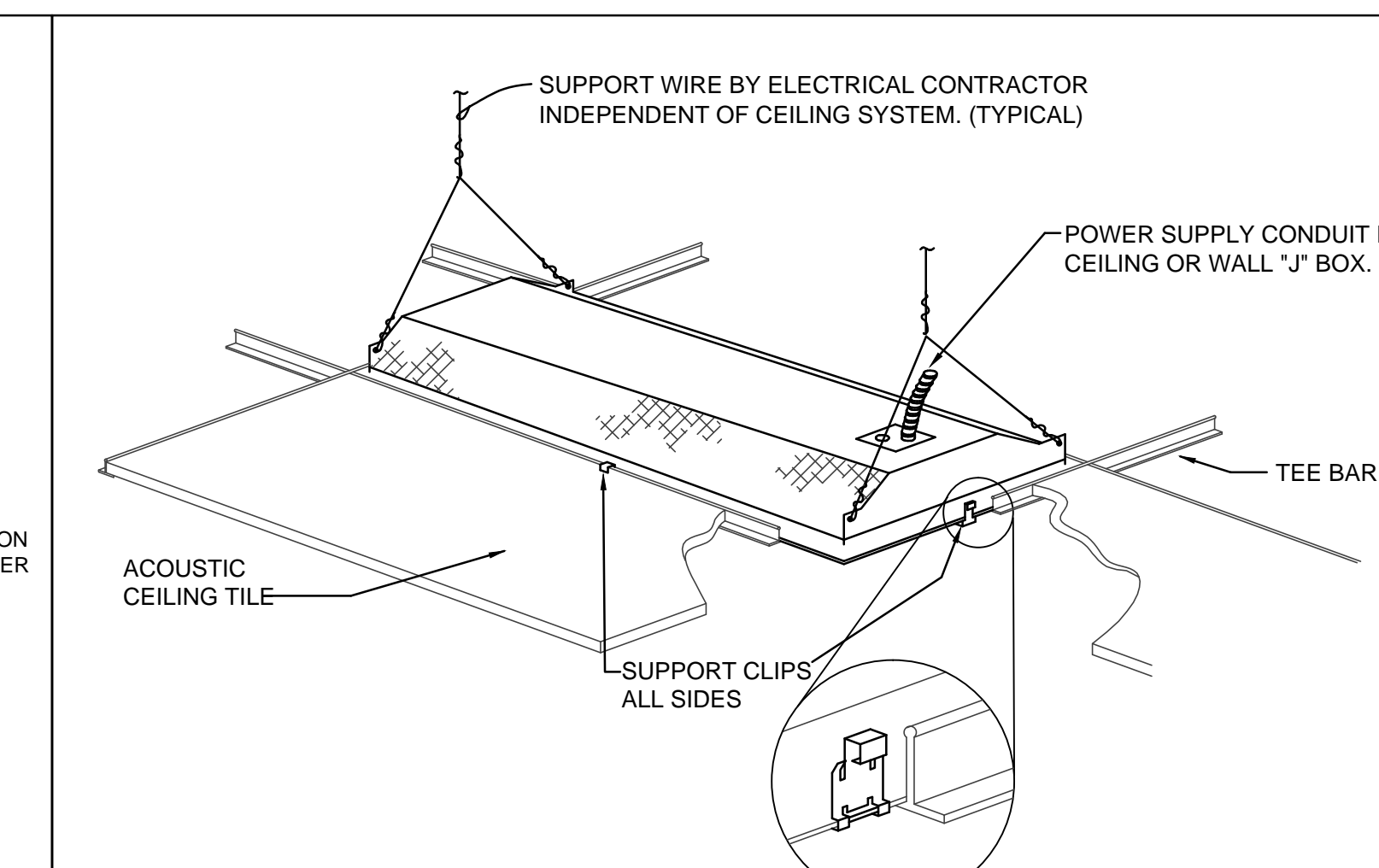
SPECIAL NOTE FOR UTILITY COMPANY LIGHTING REBATES & INCENTIVES:
IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PREPARE ALL REQUIRED APPLICATIONS AND INFORMATION REQUIRED TO PROVIDE THE OWNER WITH THE MAXIMUM AMOUNT OF REBATE DOLLARS FROM THE LOCAL UTILITY COMPANY. THE ELECTRICAL CONTRACTOR SHALL SUBMIT VERIFICATION OF THE UTILITY COMPANY PRE-APPLICATION APPROVAL PRIOR TO ORDERING ANY MATERIALS.



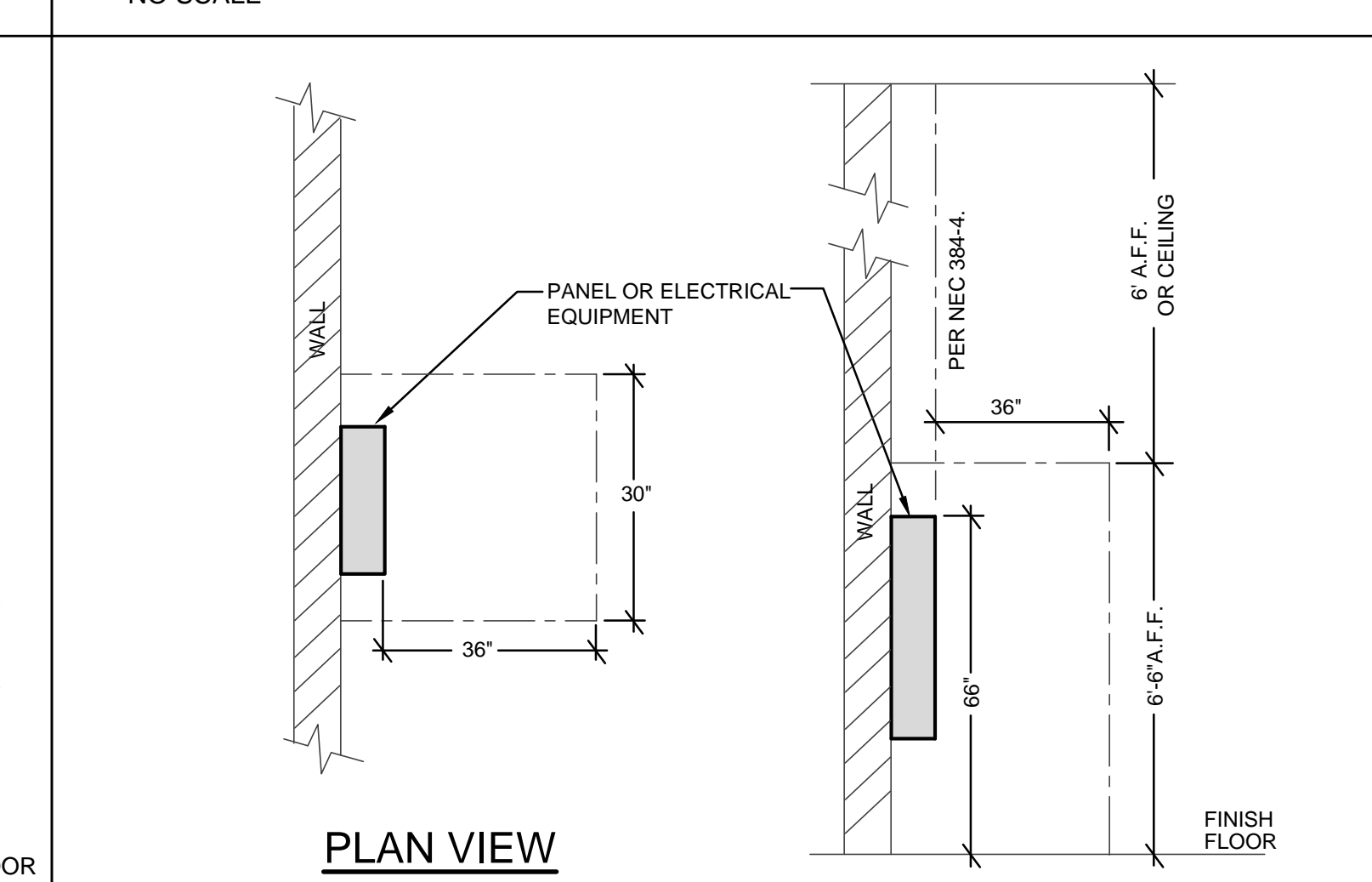
RECEPTACLE MOUNTING DETAIL
NO SCALE



TYPICAL DEVICE MOUNTING HEIGHTS DIAGRAM
NO SCALE

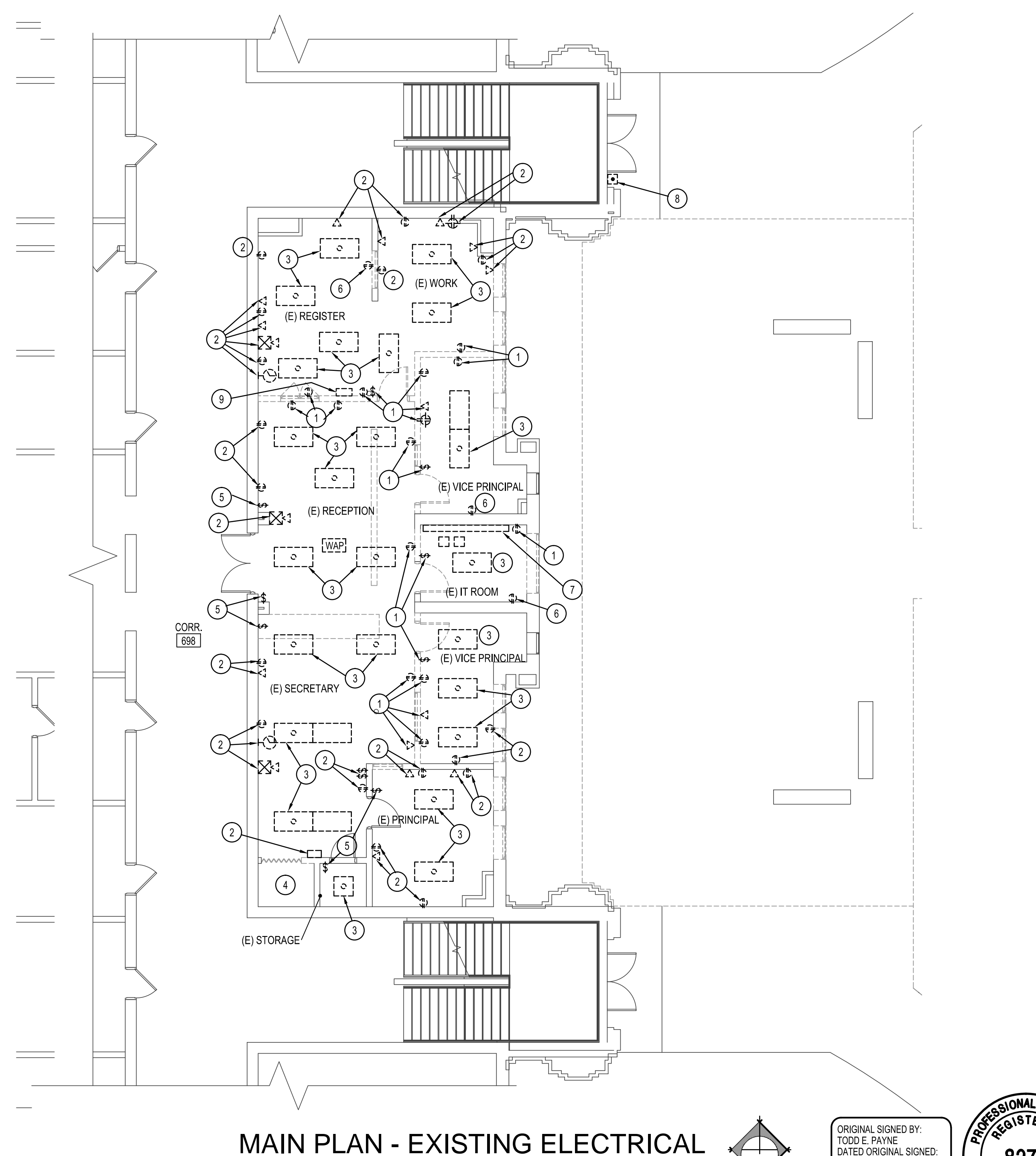


RECESSED LIGHT FIXTURE MOUNTING DETAIL
NO SCALE



ELECTRICAL EQUIP. CLEARANCE DETAIL
NO SCALE

ELECTRICAL SPECIFICATIONS		
1. INTENT: Provide and install complete and operable electrical systems including but not limited to; lighting, power, receptacles, data, fire alarm and etc. Provide all required connections to all Mechanical and Plumbing equipment, as indicated and required, including all conduits, wiring and controls. Coordinate with mechanical contractor and drawings.	6. MATERIALS AND WORKMANSHIP: All workmanship shall be performed by skilled electricians using the best standard practices of the trade. All materials shall, unless otherwise noted, be new and in perfect condition and working order. All material for similar uses shall be of the same type, material and manufacturer for ease of future maintenance. All equipment shall be readily accessible for maintenance and repairs. All materials, fixtures and equipment shall be covered or sealed upon installation so as to provide for safety and to insure that operation and appearance will be maintained after subsequent construction operations.	10. CONDUIT: All conduit material and installation methods shall be as allowed by the NEC, local AHJ and as directed by the owner.
2. COMPLIANCE WITH CODES: All work and material shall comply with all applicable codes, safety orders, laws, ordinances and regulations of governing authorities and other agencies having jurisdiction including regulations of the State and Local Fire Marshall, unless detailed as specified to a more restrictive standard or higher requirement.	7. EXECUTION: Raceway installation: Separate underground conduits in a common trench 4" minimum horizontally, 12" minimum from other utility lines. Minimum conduit depth shall be 18". Coordinate conduit installation with pipes, steel, footings and ducts installed by other trades. Install conduit runs exposed to view parallel or at right angles to structural members, walls or building lines. Support conduit with one-hole malleable fabric form and tape straps, fastened with screws.	11. CONDUCTORS: Type THWN or THHN copper wire insulated for 600V. Smallest wire shall be #14 AWG unless noted otherwise. All wiring shall be Copper unless indicated otherwise. Type MC cable shall be permitted, provided it is installed in concealed areas and installation complies with the Local AHJ and NEC requirements. Type NM cable is NOT allowed. Use "Isol Yellow" pulling compound for all wire pulls. Use Scotchlock connectors for all splices in #12 wire and tape bolted pressure connectors for larger wire.
3. INTERPRETATION OF DRAWINGS: The electrical drawings are essentially diagrammatic in that all provisions necessary to structural, architectural, mechanical and plumbing systems can not be shown. All installations shall be adjusted as necessary to conform and to avoid obstructions, without additional cost to the owner. All work, material and equipment called for by notes, schedules or otherwise indicated on the drawings shall be furnished and installed as though fully set forth in these specifications.	8. OPERATING AND ADJUSTING: The owner reserves the right to operate any systems of equipment prior to final completion and acceptance of the work. Such preliminary operation shall not be construed as an acceptance of any work. Each piece of equipment and all of the systems shall be adjusted to insure proper functioning and shall be left in first class operating condition.	12. GROUNDING: All conduit, branch circuits, feeders and etc. shall be provided with a grounding conductor. All grounding conductors shall be insulated and green in color, size as shown.
4. VISITING THE SITE: Contractor shall visit the site and become acquainted with conditions to be encountered. Extra funds will not be allowed due to failure to examine the site and to included existing conditions in bid price.	9. CUTTING AND PATCHING: Do all drilling and cutting as necessary for installation of equipment or conduit. Cutting or drilling of structure is only permitted with prior approval of the owner and structural engineer. Where cutting and patching of work is necessary, use the same materials, workmanship and finish to neatly match all surrounding work.	13. WIRING DEVICES: Devices shall be Standard type. Specification grade. Color to match existing. Decora style devices are prohibited. Utilize GFCI and Tamper-proof devices in all locations as defined by the NEC. Wiring devices shall be as installed as allowed by the NEC, local AHJ.
5. COORDINATION WITH UTILITIES: These plans have been prepared without utility company commitments. The contractor shall verify exact requirements for the electrical, telephone and communication services with the utility company representatives and provide all work and pay all costs for a complete and operating systems, as directed by the governing utilities.		14. DEVICE PLATES: Devices plates shall match existing.
		15. LIGHTING FIXTURES: As selected by owner and/or indicated in schedules. All light fixtures shall be installed and connected by the Electrical Contractor.
		16. SERVICE EQUIPMENT & PANELBOARDS: Service Equipment: Shall be rated as such and shall comply with local utility co. requirements. Panelboards: Shall be provided with typed written directories indicating loads being served. Maintain all required clearances around equipment as required by the NEC. All equipment dimensions to be field verified.
		17. CLEAN-UP: Upon completion of the work, prior to final inspection, thoroughly clean all exposed fixtures, trim and equipment and leave the entire installation in a neat, clean and usable condition. Remove all cement, paint, grease, oil and other foreign substances.
		18. TEST: Test all conductors for shorts, opens, grounds or other defects. Correct any defective work and re-test. Demonstrate continuous satisfactory operation of all electrical systems and equipment. Provide training to the owner on electrical systems as needed for owner operation and maintenance of building.
		19. GUARANTEE: Prior to final acceptance of the project, deliver to the owner a written one year guarantee on all workmanship, materials and equipment and agree to repair or replace all such defective items promptly that may occur during the warranty period; including repair or replacement of the premises that may be damaged due to faulty work and materials furnished under contract.
		20. TELE/DATE CABLING SYSTEM: Provide and install a tele/data cabling as directed by owner; include all required cabling, terminations, patch panels and etc. for a complete installation.



MAIN PLAN - EXISTING ELECTRICAL
SCALE: 1/8" = 1' - 0"

- KEY NOTES**
- E.C. SHALL DISCONNECT AND REMOVE EXISTING DEVICE IN CONFLICT WITH REMOVAL. REMOVE ALL ASSOCIATED CONDUIT AND CONDUCTORS BACK TO NEXT ACTIVE J-BOX OR SOURCE. PROTECT, MAINTAIN AND/OR REESTABLISH ELECTRICAL CONTINUITY TO ALL EXISTING DEVICES TO REMAIN.
 - EXISTING DEVICE TO REMAIN. PROTECT, MAINTAIN AND/OR REESTABLISH SERVICE TO THIS DEVICE.
 - DISCONNECT AND REMOVE EXISTING LIGHT FIXTURE. MAINTAIN CIRCUIT FOR USE WITH NEW LIGHTING SCHEME.
 - PROTECT, MAINTAIN AND/OR REESTABLISH EXISTING INTERCOM EQUIPMENT IN THIS ROOM.
 - REMOVE EXISTING LIGHT CONTROL. PROVIDE BLANK COVER OVER EXISTING SWITCH BOX. PROVIDE NEW LIGHTING CONTROLS AS SHOWN. BLANK PLATE SHALL MATCH WALL COLOR.
 - REPLACE EXISTING DEVICE WITH NEW TAMPER RESISTANT DEVICE. DEVICE COLOR AND PLATE SHALL MATCH NEW DEVICES ON PROJECT.
 - DISCONNECT AND REMOVE EXISTING STAT AND SPEED CONTROL SWITCH. REMOVE CONDUCTORS BACK TO SOURCE AND LABEL SPARE.
 - CAREFULLY PROTECT AND MAINTAIN EXISTING ACCESS CONTROL. REESTABLISH EXISTING SYSTEM AT NEW RECEPTION DESK FOR USE BY STUDENTS.
 - EXISTING ALARM CONTROL PANEL IN CONFLICT WITH REMOVAL. DISCONNECT AND REMOVE. REMOVE ALL ASSOCIATED CONDUIT AND WIRE.

Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
EXISTING ELECTRICAL, SCHEDULES AND SPECS.

Revisions:

BID SET

Project No: 18027
Drawn By: MP
Checked By: MP
Date: 3/19/2019

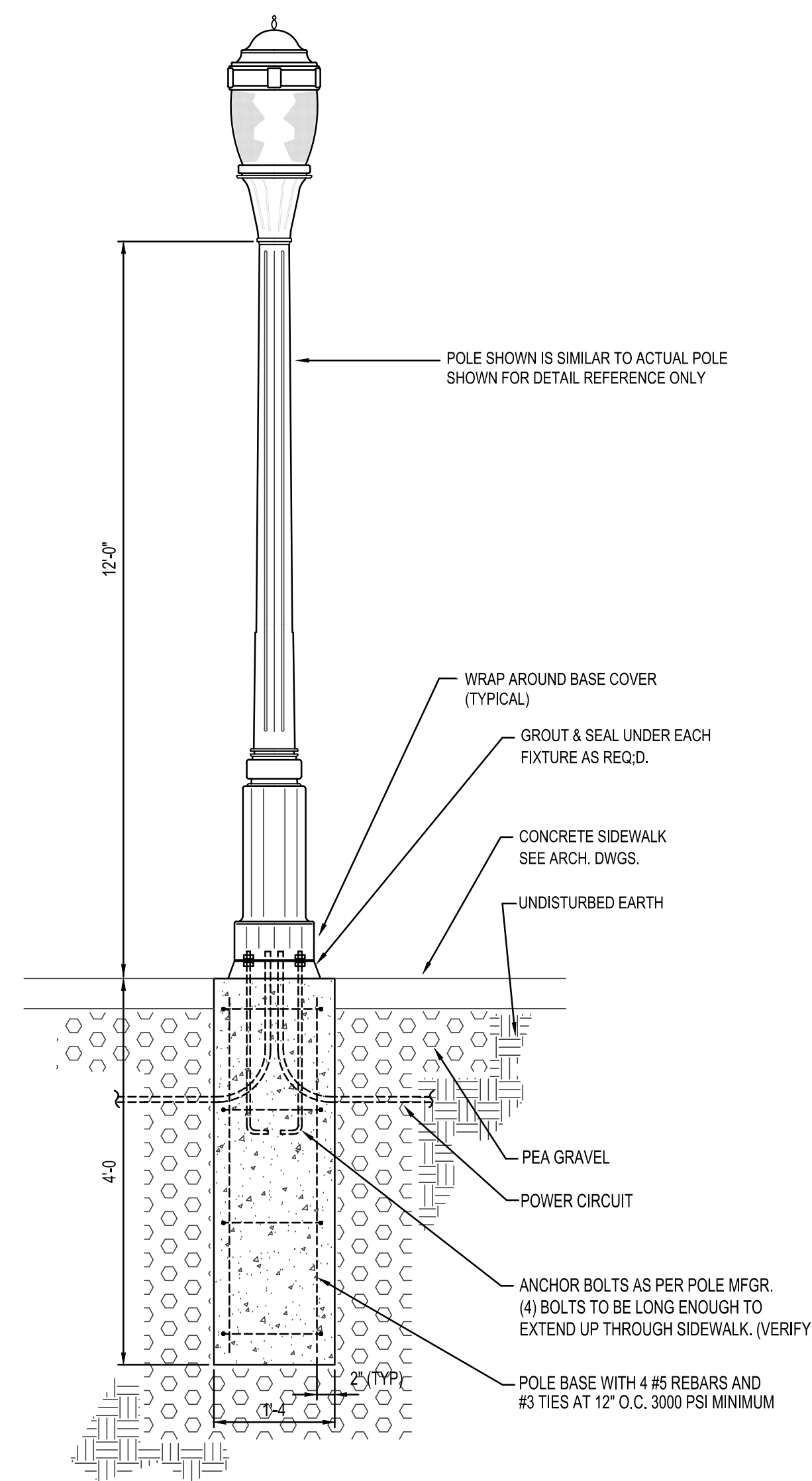
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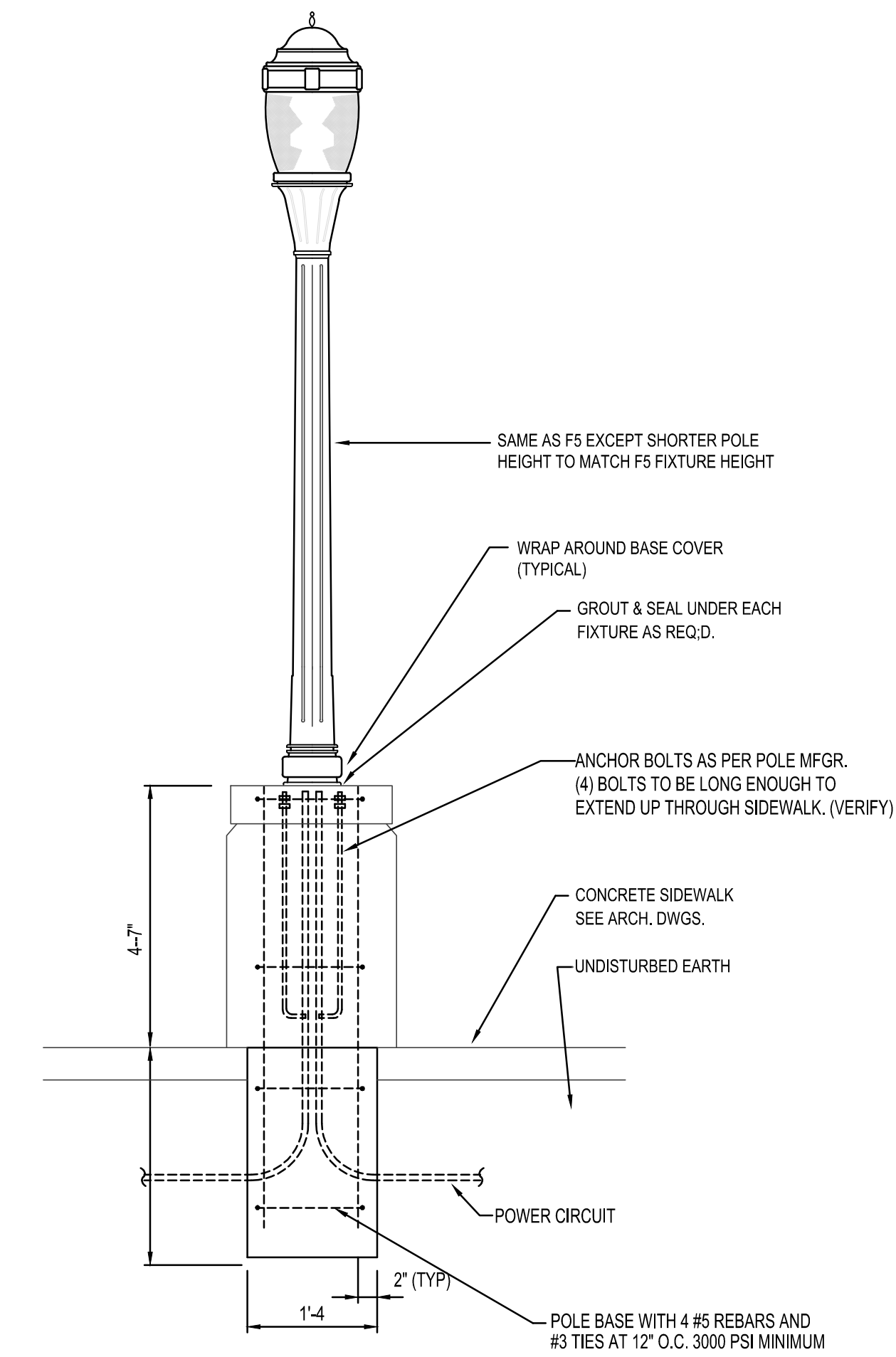
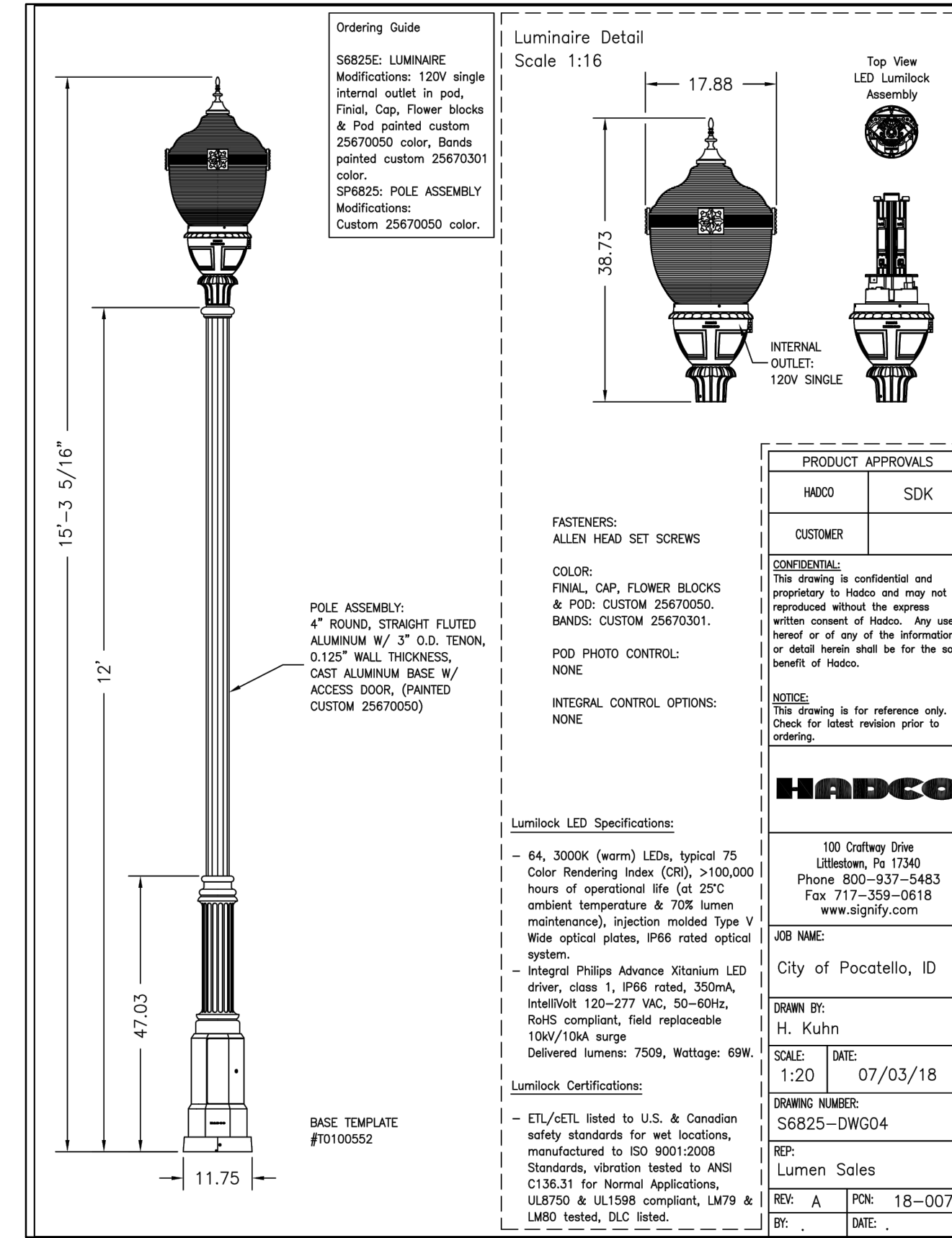
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8270
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DATED ORIGINAL SIGNED:
3-19-2019
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DETAIL - TYPICAL F5 FIXTURE / POLE / BASE
SCALE: NONE



DETAIL - TYPICAL F6 FIXTURE / POLE / BASE
SCALE: NONE

KEY NOTES

- 1 CONNECT NEW LIGHTING TO EXISTING CIRCUIT. INSTALL NEW CONTROLS AS SHOWN.
- 2 CONNECT OCC. SENSORS IN PARALLEL SUCH THAT EITHER WILL ACTIVATE ALL LIGHTS IN THIS ROOM.
- 3 CONTROL THIS CIRCUIT WITH TIME CLOCK. PROGRAM PER OWNER.
- 4 INSTALL DEVICE IN MILLWORK. COORDINATE WITH MILLWORK SHOP DRAWINGS.
- 5 NEW ACCESS CONTROL BY OWNER. E.C. SHALL PROVIDE AND INSTALL A 4 SQ. I-BOX WITH SINGLE GANG MUD RING WITH 3/4\"/>

LIGHT FIXTURE SCHEDULE 1, 2, 3							
TYPE	DESCRIPTION	MOUNT	VOLT	LAMPS	MFR.	CATALOG #	NOTES
F1	2x4 FLAT PANEL	RECESSED	120/277	INCLUDED	LITETRONICS	FP040UF400LP	
F2	LED RECESSED CAN	RECESSED	120/277	INCLUDED	LITHONIA	LDN6 40 15 L06 AR LSS MVOLT E210	
F3	DECORATIVE LED PENDANT	MOUNTING LENGTH PER ARCH	120	8W LED A-21	MINKA LAVERY	2254-576/G2254	
F4	2x2 FLAT PANEL	RECESSED	120/277	INCLUDED	LITETRONICS	FP030UF2400LP	
F5	PERIOD LED LIGHT POLE TO MATCH POCATELLO CITY STANDARDS	POST	120/277	LED INCLUDED	HADCO	SEE DRAWING NO. S8825-DWG04	
F6	SAME AS F5 EXCEPT MOUNTED ON STAIR PIER	PIER	120/277	LED INCLUDED	HADCO	SAME AS F5 EXCEPT POLE HEIGHT SHORTENED BY 4'-7"	
F7	BATTERY EXIT LIGHT	CEILING	120/277	INCLUDED	COOPER	APX7-G	
F8	2 FT. VANITY LED WITH INTEGRAL OCC SENSOR	WALL ABOVE DOOR	120/277	INCLUDED	LITHONIA	BL/WP2 3400LM LP840 MINI E21 MVOLT ADPT MSDPDT7ADCX	

FIXTURE NOTES:

1. THE SUFFIX 'EM' DENOTES A FIXTURE SUPPLIED WITH AN EMERGENCY BATTERY DRIVER. CONNECT BATTERY DRIVER TO THE UNSWITCHED LEG OF THE EMERGENCY LIGHTING CIRCUIT. WIRE SUCH THAT UNDER NORMAL POWER CONDITIONS THE FIXTURE WILL OPERATE WITH THE INDICATED SWITCHING.
2. ALL BATTERY FIXTURES ARE TO BE CONNECTED TO THE UNSWITCHED LEG OF LIGHTING CIRCUIT FEEDING THE AREA.
3. "NL" DENOTES A FIXTURE CONNECTED TO THE UN SWITCHED LEG OF THE LIGHTING CIRCUIT FOR USE AS A NIGHT LIGHT.
4. COLOR SHALL BE SELECTED BY ARCHITECT.
5. E.C. SHALL COORDINATE MOUNTING WITH ARCH. STAIR DETAILS PRIOR TO ROUGH-IN.

Project:
POCATELLO HIGH SCHOOL - ENTRANCE RENOVATION

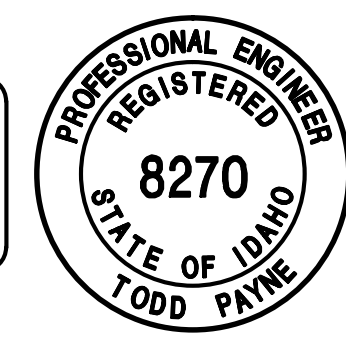
325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
ELECTRICAL DETAILS AND SCHEDULES

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TODD E. PAYNE
DATED ORIGINAL SIGNED:
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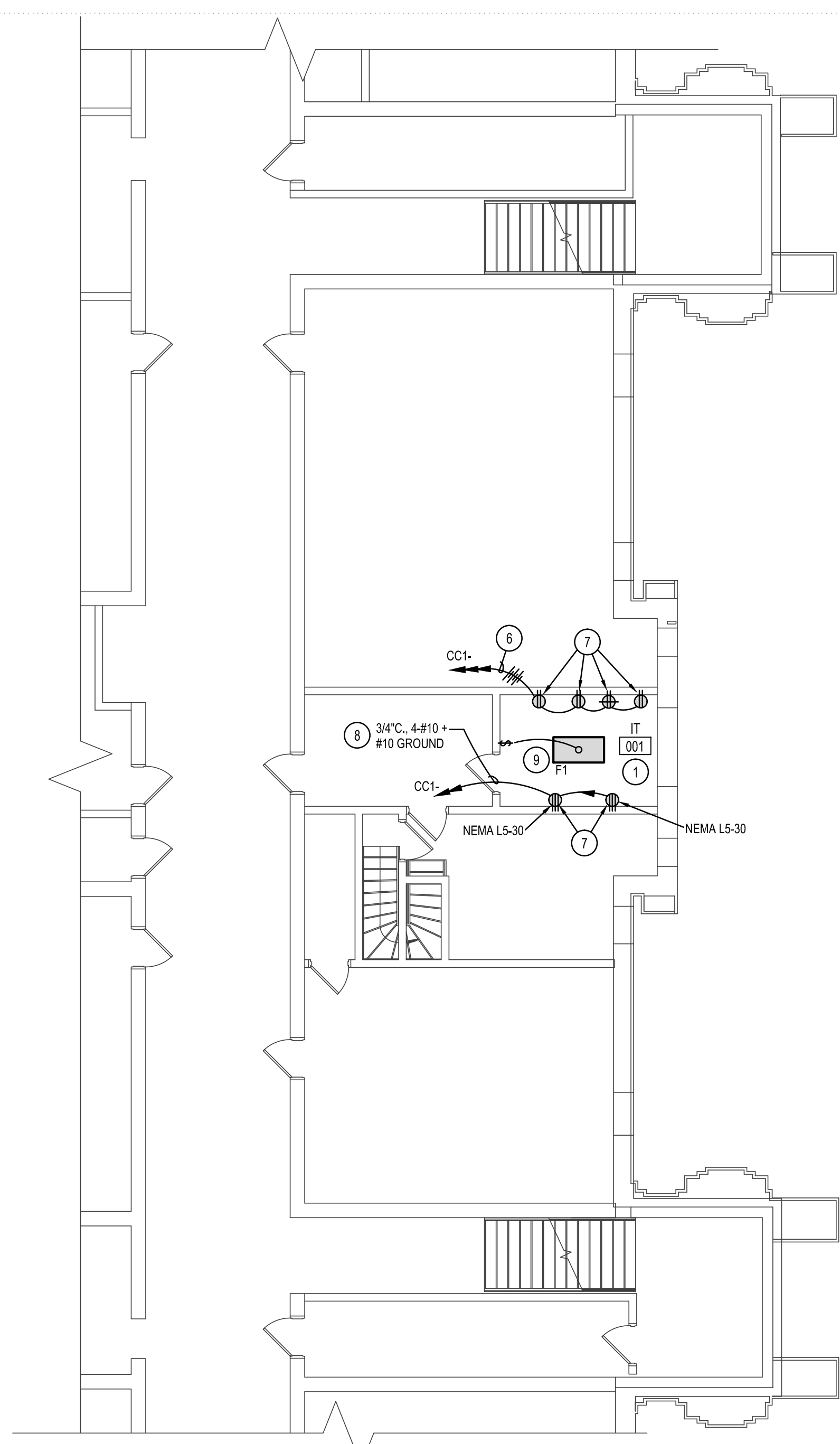


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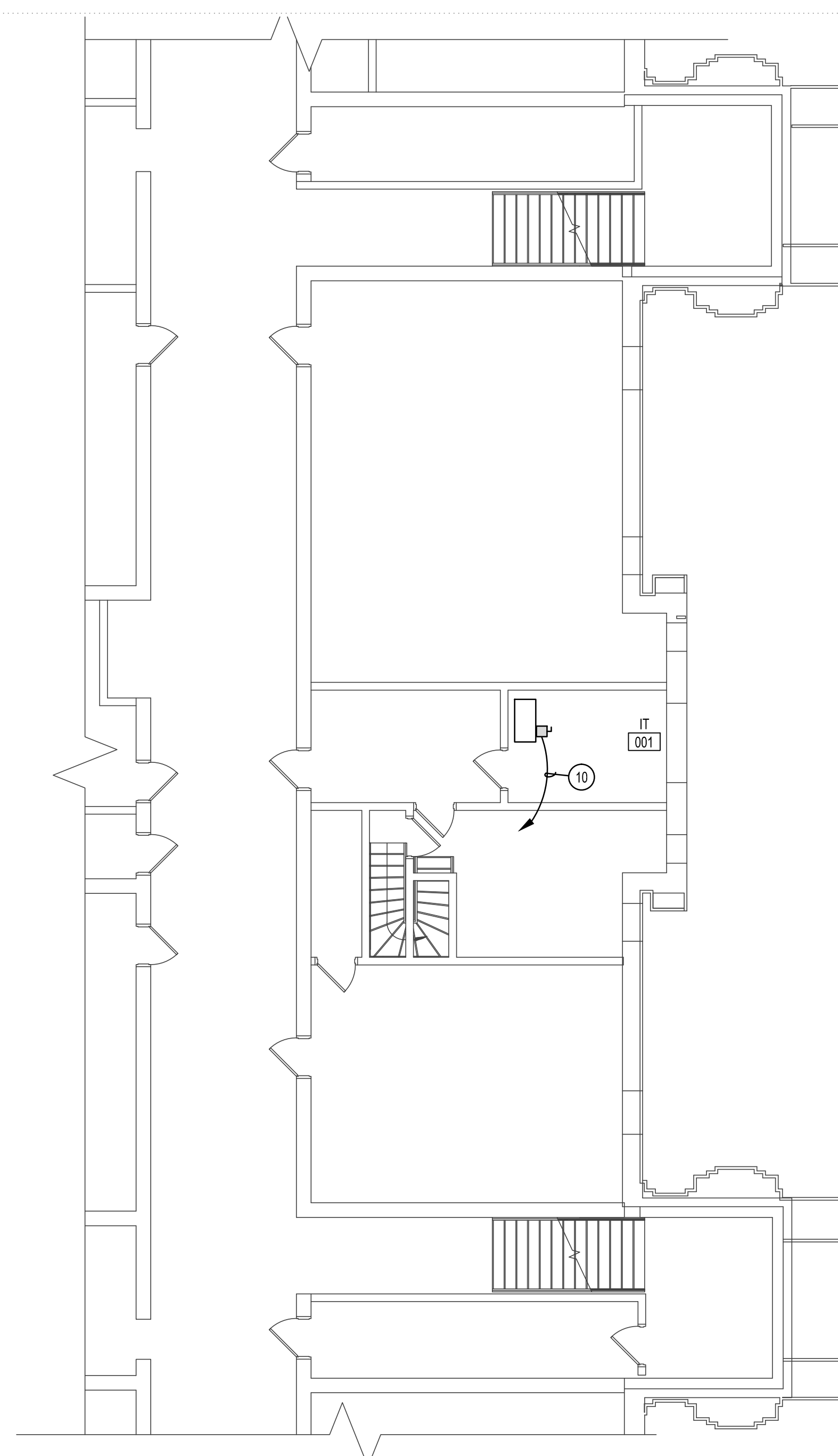
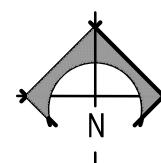
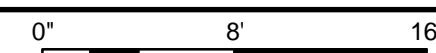
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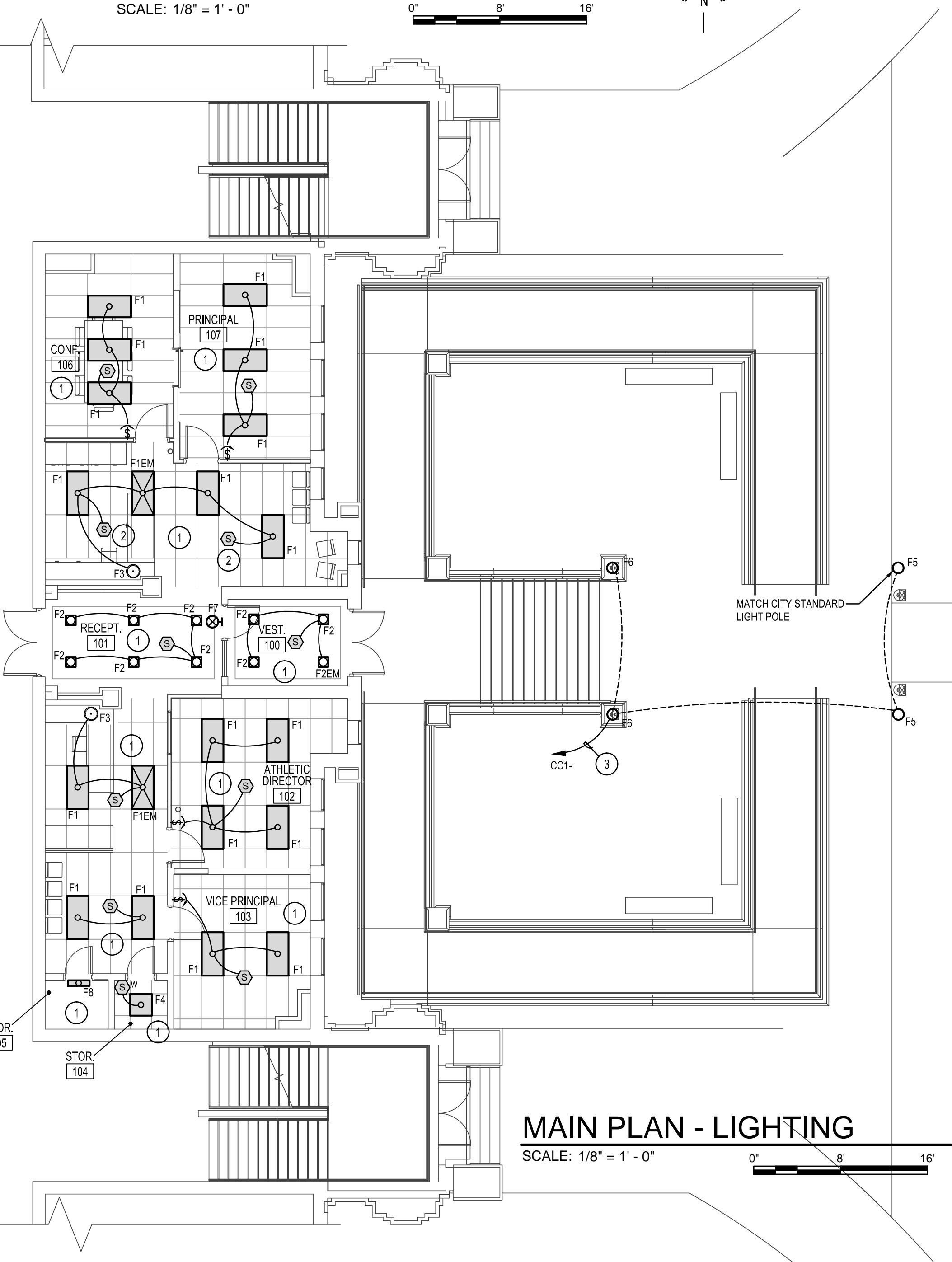
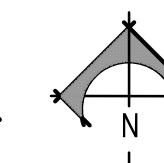
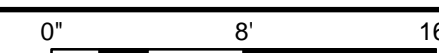
BASEMENT PLAN - ELECTRICAL

SCALE: 1/8" = 1' - 0"



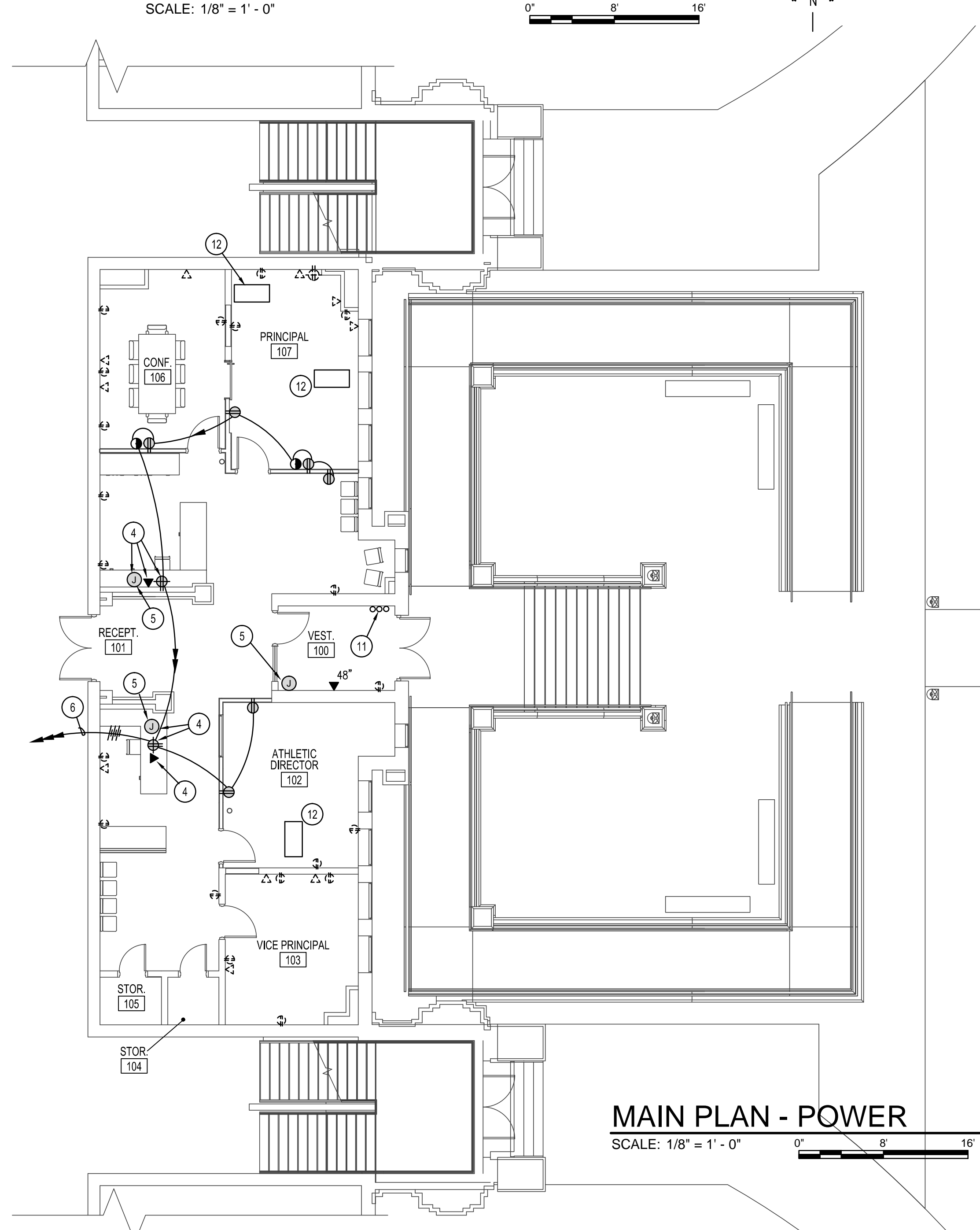
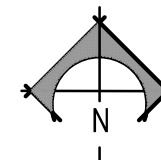
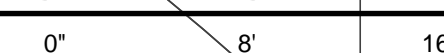
BASEMENT PLAN - MECH. CONNECTIONS

SCALE: 1/8" = 1' - 0"



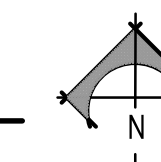
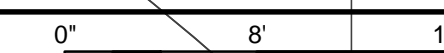
MAIN PLAN - LIGHTING

SCALE: 1/8" = 1' - 0"

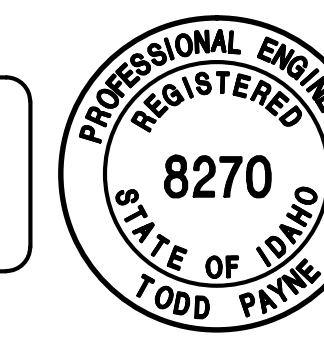


MAIN PLAN - POWER

SCALE: 1/8" = 1' - 0"



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DATED ORIGINAL SIGNED:
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ON FILE AT:
PAYNE ENGINEERING INC.



P.E. JOB #1913



Project:
**POCATELLO HIGH SCHOOL -
ENTRANCE RENOVATION**

325 N ARTHUR AVE
POCATELLO, ID 83204

Sheet:
**ELECTRICAL
FLOOR PLANS**

Revisions: Δ

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