CITY MANAGER'S OFFICE
CITY OF NEWARK

220 South Main Street · Newark, Delaware 19711
302.366.7000 · Fax 302.366.7035 · www.newarkde.gov

BIDDER

BID SECURITY

INVITATION TO BID (ITB) NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

NOTICE
Do not disassemble. Return intact with
properly completed forms or bid may be rejected.

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

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CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

NOTICE OF LETTING

Sealed bids in response to Invitation to Bid No. 25-01 George Wilson Center Improvements will be received by the Purchasing Division (220 South Main Street; Newark, Delaware 19711) until 2:00 p.m., prevailing time on Tuesday, November 18, 2025, and will be publicly opened and read aloud shortly thereafter. Prevailing wage rates apply to this project. All contractors and subcontractors performing work covered by this contract must pay their workers the State of Delaware prevailing wages and fringe benefits determinations for the classifications.

Alternatively, bids may also be emailed in PDF form to the City Purchasing Division at contracts@newark.de.us by the deadline noted above and will be opened after the closing date and time and will be publicly recorded shortly thereafter. The City's preference is a single PDF copy by email in order to keep this process environmentally friendly. Please note that only emails up to 25 MB in size can be accepted.

There will be a mandatory pre-bid meeting on Wednesday, October 29, 2025 at 9:00 a.m. at the project site, located at 303 New London Rd, Newark, DE 19711.

All questions/requests for information regarding this Invitation to Bid must be submitted via email to contracts@newark.de.us by 5:00 p.m. on Wednesday, November 12, 2025 to allow staff sufficient time to develop answers to questions deemed appropriate. Please submit all questions/requests for information in bulk (e.g., in a Word document attachment to an email) to limit the total number of emails received.

The Invitation to Bid documents may be obtained from the City website at www.newarkde.gov/bids.

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

GENERAL PROVISIONS

1. BIDS

Each bid shall be submitted on the proposal form included herein. The proposal and all other required documents must be submitted in a sealed envelope clearly identified with the bidder's name and marked, "City of Newark – George Wilson Center Improvements". **Bid Documents must be received in the Purchasing Office prior to 2:00 p.m. prevailing time, Tuesday November 18, 2025.** Each bid so submitted shall constitute an irrevocable offer for a period of thirty (30) calendar days following the bid opening date.

Alternatively, bids may also be emailed in PDF form to the City Purchasing Division at contracts@newark.de.us by the deadline noted above and will be opened immediately after the closing date and time and will be publicly recorded shortly thereafter.

Please note that only emails up to 25 MB in size can be accepted—if file sizes are larger than 25 MB, attachments should be broken into multiple emails. The contracts@newark.de.us email address provides auto-response receipt confirmation—if this is not received after sending your bid/message, please ensure your message size is correct or reach out separately for additional confirmation.

2. DEFINITIONS

a. *Agreement:* The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

b. *Contract Documents:* Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

c. *Contractor:* The individual or entity with whom the Owner has entered into the Agreement.

d. *Engineer:* The Owner's consultant engineer. The Engineer for this project is JMT, Inc.

e. *Owner:* The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed. The Owner for this project is the City of Newark.

f. *Shop Drawings:* All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

g. *Site:* Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

h. *Subcontractor:* An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

i. *Work:* The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, as required by the Contract Documents.

3. BID SECURITY

Each bid must be accompanied by a certified check, cashier's check, or bid bond in the amount of ten percent (10%) of the proposed bid price, payable to the City of Newark. Failure to provide the required bid security may be grounds for rejection of the bid. If a bid bond is submitted, the attached "Bond to Accompany Proposal" form must be completed and issued by a surety licensed to operate in the State of Delaware.

If the successful bidder fails or refuses to execute and deliver the contract within twenty (20) calendar days after receiving notice of the award of the contract, the successful bidder shall forfeit to the City for such failure or refusal the security deposited with the bid. Any certified check or cashier's check submitted as security shall be returned to all unsuccessful bidders thirty (30) calendar days after the bid opening date.

4. CONTRACT SURETY BOND

The successful bidder shall provide the City with a Performance Bond and Payment Bond in the full amount of the contract guaranteeing faithful performance of the contract. Such bonds shall be provided to the City with the executed contract within twenty (20) calendar days after receiving notice of award of the contract. Upon receipt of the contract surety bond, the City will return any certified check or cashier's check submitted as bid security by the successful bidder.

If a warranty is included as part of this Invitation to Bid's scope of work, once the project is substantially complete the surety bond shall be converted into a warranty bond for the term of the warranty. Once substantial completion of the project is reached and approved, City staff shall release any remaining retainage and issue a close out letter to the vendor stating the start date of the warranty period. A copy of the above noted warranty bond shall be provided to the City Purchasing Division no later than thirty (30) days from the receipt of the City's close out letter.

5. TAXES

The price(s) quoted shall not include federal or state taxes. If applicable, the successful

bidder shall provide the City with three (3) copies of the required tax exemption forms to accompany the bidder's invoice.

6. AWARDS

The City Manager or designee will review each of the bids submitted and make a recommendation to the City Council on the disposition of the bids. The City Council reserves the right to accept or reject any or all bids or parts of bids as they may determine and to waive any irregularities or defects where the best interest of the City would be served.

7. BID PRICE

For material purchases, the prices shall include all transportation, delivery preparation, and installation charges for the equipment specified. The bid prices shall be F.O.C. Destination and shall not include federal or state taxes. If applicable, the successful bidder/vendor must furnish the City with the necessary tax exception forms in triplicate upon submission of his invoice.

Any prices quoted are those for which the material will be furnished F.O.B. Destination and include all charges that may be imposed during the period of the contract. Unless otherwise specified and agreed upon by both parties in writing, all material shall be designated F.O.B. Destination and have freight included in quotations.

8. UNIT PRICES

In the event of a conflict or error in extension from unit price to total amount, the unit prices shall prevail and shall be considered the correct bid figures. Bidders are cautioned to thoroughly review their bid figures for errors prior to submitting their proposal. The unit price shall include all transportation, delivery, installation and all charges for the goods and services specified in this Invitation to Bid or otherwise by City staff.

9. EQUALS

Where a specific product is specified by catalog or model number, the acceptability of any other "or equal" product shall be subject to the sole judgment of the City of Newark.

10. INQUIRIES/REQUESTS FOR INFORMATION & ADDENDA

All inquiries/requests for information regarding this Invitation to Bid must be submitted via email to contracts@newark.de.us by 5:00p.m. on Wednesday November 12, 2025. These inquiries will be passed along to relevant staff for their review. Please submit all questions/requests for information in bulk (e.g., in a Word document attachment to an email) to limit the total number of emails received. Any answers deemed necessary will be provided via addendum prior to the bid opening date.

Any changes to the Invitation to Bid documents shall be made by written addendum no later than four (4) calendar days prior to the bid opening date, which may be issued with extensions to the bid submittal date (if necessary) to allow adequate time for review and

response. Bidders shall bear the entire responsibility for being sure they have received all such addenda. **The bidder is responsible for submitting a signed letter listing the addenda received for this Invitation to Bid.** All addenda will be posted on the City website at www.newarkde.gov/bids. After the bids have been received, no claim that the bidder did not have complete information will be considered. No verbal agreement or conversation with any officer, agent or employee of the City, either before or after the execution of this contract, shall affect or modify any of the terms or conditions outlined herein.

11. TIME OF COMPLETION AND LIQUIDATED DAMAGES

Contractor shall commence work on a date to be specified by the City in a written "Notice to Proceed" and to fully complete all work under this contract on or before the noted completion date. The contract duration is 150 calendar days from the notice to proceed. Anticipated date for Notice to Proceed will be by issued January 1, 2026 with completion on or before May 31, 2026. Liquidated damages of $500.00 per day may be assessed to the Contractor by the City for each day the contract is extended beyond the completion date. Such damages shall be payable to the City immediately upon notice of a breach of contract completion timelines. Liquidated damages shall not be considered a penalty, but rather a reasonable estimate of the damages that would be suffered by the City in the event of a breach. The City and the contractor shall acknowledge that the actual damages resulting from a breach may be difficult to ascertain and that this provision represents a reasonable estimation of such damages. This provision shall not limit the City's right to pursue any other remedies available under law or equity.

12. LIABILITY INSURANCE

a. The Contractor shall at all times maintain and keep in force such insurance as will protect him from claims under Worker's Compensation Acts, and also such insurance as will protect him and the owner from any such claims for damages for personal injuries, including death, which may arise from operations under this contract, whether such operations be by the Contractor or by any Subcontractor or anyone directly or indirectly employed by any of them.

b. The Contractor shall be required to provide Workers' Compensation (WC)/Employer's Liability (EL) coverage with limits of insurance not less than:

   $1,000,000 Per Accident
   $1,000,000 Per Illness, Employee
   $1,000,000 Per Illness, Aggregate

   The Contractor shall be required to provide Contractors Professional Liability coverage with limits of insurance not less than (requests for waivers of Contractors Professional Liability coverage will be considered by the City on a case-by-case basis):

   $1,000,000 Per Claim
   $1,000,000 Per Aggregate

   The Contractor shall be required to provide Umbrella/Excess Liability coverage with

limits of insurance not less than:

$3,000,000 Each Occurrence
$3,000,000 Aggregate

The Contractor shall be required to provide Commercial General Liability (CGL) coverage with limits of insurance not less than:

$1,000,000 Each Occurrence Limit
$1,000,000 Personal & Advertising Injury Limit
$2,000,000 Annual Aggregate Limit
$2,000,000 Products-Completed Operations Limit
$1,000,000 Business Auto Liability Limit (Owned, Hired, & Non-Owned Autos)

The Contractor, The City of Newark (Owner) and all other parties required of the Contractor shall be included as insured on the CGL, using Additional Insured Endorsements providing coverage as broad as the coverage provided for the named insured Subcontractor.

Subcontractors approved in association with the hiring of a Contractor shall be required to provide Commercial General Liability (CGL) coverage with limits of insurance in equal amount to those required of the Contractor.

c. A copy of the Certificate of Insurance must accompany each bid. The Contractor shall ensure that all insurances required remain valid for the entire term of the contract, inclusive of any term extension(s) and retroactive if claim is made afterward. The Prime Contractor's attention should be directed to other sections of the contract documents in the event additional insurance is required based on the scope of work.

13. APPROVAL

The contractor shall receive approval in writing from the City before ordering any material for work to be done under this contract.

14. STANDARDS AND WARRANTY OF TITLE

No material, supplies, or equipment to be installed as part of the work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which any interest therein or in any part thereof is retained by the seller or supplier. The contractor shall warrant good title to all material, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together by him to the City free from any claims, liens or charges. Neither the contractor nor any person, firm or corporation furnishing any material or labor covered by this contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the contractor for their protection or any right under any law permitting such persons to look to funds due the contractor in the hands of the City. The provisions of this paragraph shall be inserted in all the subcontracts and material

contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

All equipment shall be unused in all component parts and will be the latest current production including all accessories. The specifications will be construed as the minimum required. When the manufacturer's standards exceed these, the standard units will be furnished. All material will be free of defects. Manufacturer's standard warranties shall apply.

15. GUARANTEE

The contractor hereby guarantees all work for a period of two years after the date of completion and final acceptance thereof by the City as follows:

a. Against all faulty or imperfect materials and against all imperfect, careless, and/or unskilled workmanship.

b. The contractor agrees to replace with proper workmanship and materials, and to re-execute, correct or repair without cost to the City, any work which may be found to be improper or imperfect and/or which fails to perform as specified.

c. The guarantee obligations assumed by the contractor under these contract documents shall not be held or taken to be in any way impaired because of the specifications, indication or approval by or on behalf of the City of any articles, materials, means, combination of things used or to be used in the construction, performance and completion of the work or any part thereof.

d. No use or acceptance by the City of the work or any part thereof, nor any failure to use the same nor any repairs, adjustments, replacements, or corrections made by the City due to the contractor's failure to comply with any of his obligations under the contract documents, shall impair in any way the guarantee obligations assumed by the contractor under these contract documents.

16. EEO AND LICENSING

The contractor shall be licensed to do business in the State of Delaware and shall be registered as a contractor in the City of Newark and possess all other required licenses. The contractor shall also be a fair and equal opportunity employer.

17. PREFERENCE FOR DELAWARE LABOR

According to State law, any person, company or corporation who violates the requirements of Title 29, Section 6962, of the Delaware Code regarding preference for Delaware Labor shall pay a penalty to the State Secretary of Finance equal to the amount of compensation paid to any person in violation of this Section. This regulation is waived if it is in conflict with Federal requirements.

18. PREVAILING WAGES

The work to be done under this ITB is partially funded by State of Delaware, therefore prevailing wages are required for all workers.

19. VENDOR REQUIREMENTS FOR FEDERALLY FUNDED PROJECTS

If this ITB is funded through the State Revolving Loan Fund, a federal grant, or any other federal funding, the the awarded vendor and subcontractors must be registered at www.sam.gov before contract agreements are signed. The awarded vendor and subcontractors must also show proof of SAM registration and good standing through the SAM portal before contract agreements are signed. SAM (System for Award Management) is the primary supplier database for the U.S. Federal Government.

The City of Newark shall not conduct business with vendors that are debarred or otherwise flagged/blacklisted if the project is funded using federal money. If a vendor or subcontractors are determined to be debarred at any point during the term of a contract, this will be seen as grounds for termination of the contract, and potentially grounds for termination from other contracts held with the City, if any.

20. NONCOLLUSION

The bidder shall not, either directly or indirectly, enter into any agreement, participate in any collusion, or otherwise take any action in restraint of free competitive bidding in connection with this contract.

21. EXCEPTIONS & OMISSIONS

Any and all exceptions which are taken to the specifications and terms and conditions outlined herein shall be noted in the space provided on the proposal form. The listing of any exception may be grounds for rejection of a bid.

Further, the bidder recognizes that the City of Newark is not in the business of preparing specifications, and any omissions in this ITB/RFP must be strictly addressed by the firm with the submittal of its proposal.

22. INCREASE AND/OR REDUCTION OF ESTIMATED QUANTITIES

a. The contractor's attention is directed to the fact that the quantities indicated in this contract are approximate and may be increased or decreased by the engineer. An increase or a reduction in these quantities will in no way alter the unit prices bid by or paid to the contractor.

b. The City shall also have the right to delete any portion of this contract or to update specific quantities as needed. Regardless of any changes, deletions, or additions authorized by the City, all work done or purchases made under this contract shall be based on the unit prices stipulated by the contractor in his proposal.

23. PAYMENT

No invoice will be processed for payment until the goods and/or services have been delivered and verification is made that the specifications under this contract have been met. Progress payments, when requested, will be evaluated and approved for payment based on work completed to date. If applicable, upon written request from the Contractor, payment for material stored on site may be made at 50% of the material's invoice price; full payment will be made after the material is installed. Payment for all services complete or goods received will be made within thirty (30) days of final acceptance by the City.

The City of Newark will not disperse payment to any vendor via paper check. As such, all bidders acknowledge that electronic fund transfer (EFT) payments are acceptable. The successful bidder will be required to submit EFT payment information to the City at the time of contract execution.

24. BASIS OF PAYMENT

Payment for these items shall be included in the unit prices for each item as described in the Proposal. All other items, methods, and materials necessary to complete the work as described above shall be incidental to the bid item the work is being completed under.

25. RETAINAGE

The City will retain 5% of the progress payments until such time as the project is complete and accepted by the City.

26. RELEASE OF LIENS

The Contractor is required to provide documentation stating that all liens filed against the Contractor have been paid before the final 5% retainage is released to the Contractor.

27. ADVERTISEMENT

It is further agreed that any bidder/contractor submitting bids will not use the name of the City in any advertisement without first obtaining the written consent of the City Manager or their designee. All such requests should be submitted in writing to contracts@newark.de.us.

28. CONTRACTOR'S UNDERSTANDING

It is understood and agreed that the contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground; the character, quality and quantity of the material which will be required; the character of equipment needed preliminary to and during the prosecution of the work; the general and local conditions; all permit restrictions and conditions; and all other matters which can in any way affect the work under this contract. No verbal agreement or conversation with any officer, agent, or employee of the City of Newark, either before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.

29. LIST OF SUBCONTRACTORS' CERTIFICATION

a. Each bidder shall execute and submit with his bid, on the form provided herein, a list of subcontractors, including complete names and addresses, whose services the bidder intends to use in performing all work under the contract. Bids submitted without such a list, or with a list not completely or properly executed, are subject to rejection.

b. Each bidder is required to notify all subcontractors that they are obligated to comply with the provisions of Federal and State law as they pertain to this project, and that they must submit evidence of such compliance upon notice or request. The bidder shall certify his compliance with this requirement on the list of subcontractors.

c. After the contract has been awarded, the successful bidder shall not substitute another subcontractor for any subcontractor whose name was set forth on the list of subcontractors which accompanied his bid, without the written consent of the City.

30. INDEMNIFICATION

The contractor shall solely be responsible and liable for the accuracy and completeness of all work performed and shall agree to indemnify, defend and hold harmless the City of Newark, its officers, agents and employees, from and against any and all claims, actions, suits and proceedings arising out of, based upon or caused by negligent acts, omissions or errors of or the infringement of any copyright of patent, by the contractor, its officers, agents, employees or subcontractors, in the performance of the contracted agreement.

31. TERMINATION OF AGREEMENT

This agreement may be terminated by the City upon thirty (30) days written notice if the contractor fails to perform satisfactorily in accordance with the terms and conditions of the contract. In the event this agreement is terminated, the contractor shall be paid for services satisfactorily rendered up to the termination date.

32. INTENT OF SPECIFICATIONS

It shall be the Contractor's responsibility to furnish the goods and services specifically indicated in the scope of work and specifications and such other as may be required to meet the intent of the specifications, drawings, or as may be necessary to provide the operation intended by the City.

33. FAMILIARITY WITH PROPOSED WORK

A complete understanding of the conditions as they exist is required by careful personal examination of the work at the site. Each contractor bidding must completely satisfy himself as to the exact nature and existing conditions of the work area. The contractor also shall carefully examine the plans, specifications, and the contract forms for the work contemplated. Failure to do so will not relieve the successful contractor of his obligation to carry out the provisions of the contract.

The contractor shall not, at any time after the execution of the contract, set up any claims whatsoever based upon insufficient data or incorrectly assumed conditions, nor shall claim any misunderstanding in regard to the nature, conditions or character of the work to be done under this contract, and shall assume all risks resulting from any change in the conditions which may occur during the progress of the work.

The Contractor is solely responsible to identify, obtain, and pay for all required permits, licenses, and approvals required by any and all State, local, or Federal authorities or governmental agencies to complete the Work.

34. FINAL INSPECTION

All delivered goods and services will be subject to inspection by the City of Newark, Delaware. If in any way an item fails to meet the terms of the contract, it may be rejected or liquidated damage charges made. The decision of the City will be final, and any rejected items or materials will have to be replaced at the expense of the vendor.

35. OWNERSHIP OF MATERIAL

All documents prepared and submitted pursuant to this RFP or ITB shall be property of the City upon submittal and will be subject to staff and public review and discussion in association with our public bidding and formal proposal process. Any information or documents deemed proprietary shall be so marked at time of submittal and limited to detail where the disclosure of contents could be prejudicial to competing offerors during the process of negotiation, and any commercial or financial information of a privileged or confidential nature.

36. REGULATIONS AND EXCEPTIONS

The application of lead paint as defined in Title 16, Chapter 30M of State Code and Chapter 7 of City Code as part of this contract is prohibited. The contractor will be subject to fines as outlined in State and City Code if it is determined that lead paint was applied in violation of State and City code.

Safety Data Sheet information for all paints applied to internal or external structures shall be provided to the City for review and approval prior to application. The contractor will be required to remove and remediate any lead paint to the satisfaction of the City, at no cost to the City. Prior to commencing removal and remediation efforts, the contractor shall provide a written remedial action plan which includes health safety protection requirements for both employees and the public for review and approval by the City and/or DNREC/DHSS. Any and all sample results that are generated as a result of improper application of lead paint shall be provided to the City within 5 working days of being received by the contractor. The contractor will also be required to replace all paint removed with non-lead paint to the satisfaction of the City, and at no cost to the City.

Failure to adequately remove, remediate, and replace lead paint applied in violation of State and City Code as outlined herein will be considered a breach of contract.

37. RESTORATION OF DISTURBED AREAS AND CLEAN UP

Upon completion of the work, all related work, such as lawns, curbs, sidewalks, fences, shrubbery, and driveways that have been disturbed shall be restored to their original condition and in accordance with City of Newark Standards and Specifications. The area shall be cleared of all tools, equipment and refuse resulting from the project. The contractor shall, at the end of each day, leave the areas in which he has worked, free of debris and safely secure his material and equipment.

38. DEBRIS COLLECTION AND DISPOSAL

The Contractor is responsible for collection, removal, transport, and lawful disposal of construction debris and or materials.

39. INSPECTION OF MATERIAL AND WORK

a. Workmanship shall be of good quality and all work and material shall be at all times subject to the inspection of the City of Newark or their duly authorized representatives. The Contractor shall provide reasonable and necessary facilities for such inspection. If required by the City of Newark, the contractor shall take down or uncover portions of the finished work.

b. The Contractor agrees that in case any of the material or work, or both, shall be rejected as defective or unsuitable by the city, material and the work shall be done again immediately to the satisfaction and approval of the city at the cost and expense of the Contractor.

c. Any omission or failure on the part of the City of Newark or inspectors to disapprove or reject any defective work or materials shall not be construed to be an acceptance of any defective work or material.

d. In case the City should not consider the defect of sufficient importance to require the contractor to replace any imperfect work or materials, the City shall have the power to make an equitable deduction from the stipulated price.

e. Neither the inspection nor supervision of the work, nor the presence or absence of an inspector shall relieve the contractor of any of his obligations under the contract or of making his work conform to the specifications.

40. FORCE MAJEURE OCCURRENCE

Upon the occurrence of a force majeure event, the City of Newark shall immediately notify the awarded vendor. In this instance, the City shall be excused from any further financial or contractual obligations for as long as such circumstances prevail. As used in this document, a “force majeure occurrence” means acts of God; acts of the public enemy; acts of the State and any other governmental entity in its sovereign or contractual capacity; fires; floods; epidemics or pandemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; unusually severe weather; or other unusual event outside of the reasonable control of a party hereto that prevents a party to this

Agreement from performing its contractual obligations.

41. SEVERABILITY

If any provision of this contract (general, special, technical, or other) shall be held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision of this contract is invalid or unenforceable, but that by limiting such provision it would become valid and enforceable, then such provision shall be deemed to be written, construed, and enforced as so limited.

42. BIDDER'S QUALIFICATIONS

No contract will be awarded to any bidder who in the judgment of the City is not a responsible or fit bidder, or is not prepared with all the necessary experience, capital, organization, and equipment to conduct and complete the work for which the bidder proposes on the proposal form.

43. SAFETY REQUIREMENTS

The Contractor shall comply with the requirements and standards of the Occupational Safety and Health Act (OSHA) and all other state and local laws, ordinances, and codes governing all work associated with the executed contract.

For construction projects, the Contractor shall maintain on-site and in all vehicles at all times spill response equipment appropriate for the types and quantities of fluids and/or materials that may be subject to spillage during the project. All discharges to the storm drainage system or surface waters are strictly prohibited. In the event that a spill reaches the storm drainage system and/or surface waters, the contractor shall notify the Public Works and Water Resources Department immediately at 302-366-7000. The Contractor will also be responsible for spill response and clean-up at no cost to the owner. If the Contractor fails to respond to and clean up a spill to the satisfaction of the owner, the owner will perform clean up and bill the Contractor for 150% of the personnel time and material expenses incurred by the City as necessary for the response.

44. REFERENCES

Bidders must provide three (3) business references consisting of current or previous (within the last five (5) calendar years) customers where similar services are/were provided.

45. COUNTERPARTS AND ELECTRONIC SIGNATURE

The Agreement with the awarded vendor may be executed in counterparts, each of which shall be deemed an original, but which together shall constitute one and the same document. Through submission of a proposal in response to this ITB, vendors understand and agree that they have the right to execute an Agreement through paper or through electronic signature technology, which is in compliance with state and federal law governing electronic signatures. Vendors submitting a proposal in response to this ITB additionally

agree that, to the extent they sign electronically, their electronic signature is the legally binding equivalent to their handwritten signature and shall be considered an original signature on an original document, including when transmitted as a PDF file. No vendors submitting a proposal in response to this ITB shall claim that a party's electronic signature is not legally binding, or object to the admissibility of an Agreement with the City in any legal proceeding.

46. ITEMS TO BE EXECUTED AND SUBMITTED WITH BID

Bidders are notified that the proposal, insurance documentation, and bid security must be executed and completed in full and submitted with the bid at the time of bidding, or bid may be subject to rejection.

The bidder shall submit the following with the bid:

A. Proposal
B. Executed Bid Bond or Cashier's Check
C. Acknowledgement of Addendum(a)
D. www.sam.gov information
E. Exceptions or qualifications to the ITB documents
F. List of subcontractors
G. References
H. Non-collusion statement

47. ITEMS TO BE SUBMITTED WITH SIGNED CONTRACT

A. Construction Schedule
B. Performance/surety bond
C. Vendor forms as required by the City of Newark
D. Insurance documentation showing required coverages and the City of Newark as the certificate holder

CITY OF NEWARK

Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

SCOPE OF WORK

1. SCOPE OF WORK

The George Wilson Center Improvements project includes, but is not limited to, site and facility accessibility improvements and the selective demolition, renovation, and new construction within the existing building. The scope includes removal and installation of new finishes and fixtures, enlargement of an existing room using non-structural partitions, and complete renovation of existing toilet rooms, including correction of floor slab elevations, installation of new plumbing fixtures, the addition of one all-gender restroom, and accessory upgrades. The correction of floor slab elevations at existing toilet rooms includes correcting existing and new slab elevations to achieve proper slope and drain connections. General building improvements including flooring replacement, interior finishes replacement, and exterior finishes replacement as shown on the attached drawings. Plumbing, electric, and HVAC improvements are required for improvements and include, but not limited to, upgrades to existing lighting, replacement of plumbing fixtures, relocation of existing hot water heaters, exhaust fan, and grease trap and new piping, venting, and insulation as required to ensure complete operational systems.

2. LOCATION

The project is located at 303 New London Rd, Newark, DE 19711 within the extents of the City of Newark's municipal limits.

3. PERMITS, CERTIFICATIONS, LAWS AND ORDINANCES

The Contractor shall perform the work in accordance with all local, state and federal laws and ordinances.

The Contractor is required to have or obtain a City Contractor's License and State of Delaware business license prior to starting the work. The Contractor is required to obtain any permits required for completion of the work. The fees for City of Newark permits, if applicable, will be waived.

4. COORDINATION

A. Contractor shall coordinate construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Contractor shall coordinate its operations with operations that depend on each other for proper installation, connection, and operation.
B. 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.
C. Coordinate removal of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
D. Coordinate with the City to detour pedestrian access to the project site.

5. SUBMITTALS

The Contractor shall submit an **electronic copy** of each submittal for review and approval by the Owner. Provide submittals in accordance with specifications. For scheduling purposes, the Contractor shall allow for a ten (10) business day review time by the Owner. Comments and Approvals will be returned in a digital format. The Contractor shall provide, at minimum, all submittals identified in the specifications. Each shop drawing shall contain only one work item and shall be consecutively numbered before submission. Additional submittals may be requested at the discretion of the Owner.

6. RESTORATION

The Contractor is responsible to restore all disturbed areas to original or better condition and remove all debris, residuals, trash, and excess materials from the sites.

7. SECURITY AND SITE ACCESS

The Contractor is responsible for security of his equipment and materials related to the work. The Contractor is responsible to maintain the work site in a safe and orderly manner.

Contractor is required to maintain a secure perimeter around the work area. Pedestrian walkways shall be always open except where indicated on the project plans.

A. Walkways and Entrances: Keep walkways and entrances outside of designated laydown and work area clear and accessible at all times. Do not use these areas for parking or storage of materials.
B. Schedule deliveries to minimize disruption to walkways and entrances not within the limits of disturbance shown on the project plans.
C. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

Prior to mobilization, the Contractor shall take a pre-construction video or photographs of any such areas to be used for access, staging, or work during the project and submit to the Owner. Video or photographs shall be used to document any existing damage or deteriorated conditions.

It shall be the responsibility of the contractor to obtain permission from any neighboring property owner if said contractor finds it necessary to enter upon or use in any manner the property of any neighbor for the expedition of the contractor's work.

8. WORK RESTRICTIONS

A. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
B. On-Site Work Hours: Limit work at the site to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated or approved by City of Newark.
C. Weekend Hours: Weekend hours must be approved by the City. Contractor must submit request to work on weekends at least 5 business days in advance of the projected work date.
D. 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 five days in advance of proposed utility interruptions.
    2. Obtain Owner's written permission before proceeding with utility interruptions.

E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption with Owner.

    1. Notify Owner not less than two days in advance of proposed disruptive operations.
    2. Obtain Owner's written permission before proceeding with disruptive operations.

F. Controlled Substances: Use of tobacco products and other controlled substances on Project sites is not permitted. See Office of Management and Budget – Drug Testing Requirements for further information regarding controlled substances.

G. Contractor shall have contaminant spill response equipment readily available on-site during construction activity.

9. SITE CONSTRUCTION AND EXISTING UTILITIES

A. The Contractor is responsible to account for and consider existing site conditions and existing utilities. Prior to starting any work, the Contractor shall contact Miss Utility of Delmarva at 1-800-282-8555 for a utility mark out. The Contractor is responsible for locating and

protecting existing utilities for the duration of the work.

B. The failure to show on the contract drawings any existing utilities shall not relieve the contractor of his responsibility in determining the locations of utilities.
C. Any damage done to existing utility lines, services, poles and structures shall be repaired or replaced by the Contractor at his own expense. The Contractor shall notify all possible owners of utilities in the areas where work is to be done and the schedule and extent of such work.

10. EXAMINATION OF SITE, DRAWINGS, ETC.

Before submitting proposals, bidders shall inform themselves fully of the nature of the work by a personal examination of the site and the drawings and by such other means as they may prefer or consider necessary, as to matters, conditions and considerations bearing on or in any way affecting the preparation of their proposals and the contract. They shall not, at any time after submission of the proposal, dispute the accuracy of such drawings or the specifications and the general conditions nor assert that there is any misunderstanding in regard to the location, extent or nature of the work to be performed.

Existing drawings and information provided in these contract documents and appendices form a part of the Bid Specification to the extent referenced and provide detailed information about the project. The documentation is provided for informational purposes only and for the sole use of the Contractor. The City makes no claims as to the correctness or accuracy of the data provided therein. The Contractor shall review and determine for themselves the correctness and accuracy of the information before incorporating and relying on the prior work as part of their work product to the City.

11. STARTING DATE, SEQUENCE OF CONSTRUCTION & COMPLETION DEADLINE

The starting date of this contract will be as specified by the City in a written "Notice to Proceed." Anticipated date for Notice to Proceed will be by issued January 1, 2026. A preconstruction meeting shall be scheduled to finalize the sequence of construction. The final decision as to sequence of construction shall be that of the Owner.

12. SUPERVISION OF WORK AND COORDINATION

The Contractor shall supervise the work and shall secure full cooperation of all subcontractors, if any, to complete the work with a minimum interference from the operating personnel of the Owner.

13. COORDINATION WITH THE OWNER

The Contractor shall coordinate all activities with the Owner. The Contractor shall provide the City with reasonable time to respond to requests for information and for coordination.

14. INSPECTION OF MATERIAL AND WORK

A. Workmanship shall be of good quality and all work and material shall be at all times subject to the inspection of the City of Newark or their duly authorized representatives. The contractor shall provide reasonable and necessary facilities for such inspection. If required by the City, the contractor shall take down or uncover portions of the finished work.
B. The contractor agrees that in the event that any of the material or work, or both, shall be rejected as defective or unsuitable by the City, the material shall be replaced and the work shall be done again immediately to the satisfaction and approval of the City at the cost and expense of the Contractor.
C. Any omission or failure on the part of the City of Newark or its inspectors to disapprove or reject any defective work or materials shall not be construed to be acceptance of any defective work or material.
D. Contractor and City Inspector must agree on additional work required outside of the contract documents. A daily time and material log for all additional work shall be supplied by the contractor and signed by the City Inspector.

15. PROTECTION TO PUBLIC AND PROPERTY

A. The contractor shall insure protective measures to the general public and to occupants of property along and adjacent to the work area.
B. The contractor is responsible for any and all damage or injury of any kind which directly or indirectly may be done to any property or sustained by any persons during the execution of the work.
C. If any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in the execution of the work, the contractor shall restore at his own expense such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

16. SAFETY PRECAUTIONS

A. The Contractor shall execute work under this contract with the utmost concern for the safety of the general public. All areas worked upon and subject to travel by the public shall be identified with the proper warning indicators and signs during the working period. Upon completion of the contract or when such areas are reopened to public travel, they shall be rendered in a safe condition using either temporary or permanent repair material as the case may be. No private driveway shall be blocked or closed without the property owner being notified and obtaining their agreement.
B. Streets, roads, and driveways used by the contractor for access to and from the work site shall be protected from damage in excess of that caused by the normal traffic of vehicles used for or in connection with construction work. Any such damage done shall be repaired immediately and left in good condition at the end of the construction period and shall be

repaired at the contractor's expense.

17. RIGHT-OF-WAY

All operations shall be confined to the assigned work area. The City will provide no right-of-way over other properties. The contractor shall take every precaution to minimize the inconvenience to the owners or tenants of adjacent property. Public roads shall not be obstructed in such a way as to cut off traffic. The contractor shall, at his own expense, repair any damage or injury to either public or private property during the progress of the work.

18. TRAFFIC CONTROL AND ROAD SIGNS

A. The contractor shall be responsible for traffic control for the duration of the project, as needed, and shall coordinate traffic control plans and obtain necessary permits from the Owner for work on city-owned roads. The contractor shall be responsible for removal and re-installation of all signs in the work area. Signs necessary for the safe movement of traffic shall be maintained in operation during construction. Any other signs shall be properly stored by the Contractor, who shall be responsible for them. All signage shall comply with the current Manual on Uniform Traffic Control Devices (MUTCD).
B. The Contractor shall provide notice to the City seven (7) calendar days in advance of any planned road or entrance closure. All closures shall be at the discretion of the City.

19. JOB SITE MAINTENANCE, RESTORATION AND CLEANUP

The contractor is responsible to restore all disturbed areas to original or better condition and remove all debris, residuals, trash, and excess materials from the site. The contractor is required to keep the work area clean during construction and remove trash as it accumulates. Roads shall be kept clean and free of mud, debris, and dirt. At the direction of the City Inspector, the contractor is responsible for the cost of street sweeping and maintenance required for upkeep of clean road surfaces.

20. DRAWINGS

Project Drawings are included as Attachment 1.

21. AVAILABLE BACKGROUND INFORMATION

Maps, photographs, closed circuit television (CCTV) inspection videos, and other documents provided herein form a part of this Bid Specification to the extent referenced and provide detailed information about the Project Location, and existing conditions of the site(s). The documentation is provided for informational purposes only and for the sole use of the Contractor. The City makes no claims as to the correctness or accuracy of the data provided therein. The Contractor shall review and determine for themselves the correctness and

accuracy of the information before incorporating and relying on the prior work as part of their work product to the City.

CITY OF NEWARK

Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

PROPOSAL

To: City of Newark Mayor and City Council

From: _____

We, the undersigned as a lawfully authorized agent for the bidder named herein has carefully examined the Bid Documents to be known as Invitation to Bid No. 25-01 and binds themself on award to the City of Newark by the Mayor and City Council of Newark, Delaware to execute in accordance with such award, a contract of which this Proposal and said General Provision, Specifications, and any Addenda shall be a part, and to furnish the goods as specified F.O.B. destination (Newark, Delaware) in a manner that is in complete accordance with said General Provisions and Specifications at the following named unit price on or before the delivery period stated below:

1. BID ITEMS

Bidders must provide prices on the Proposal form including all adjustment bid items. The Owner reserves the right to delete from the Contract one or more items listed and the right to add or subtract from the quantity of each item. The total price to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation or increase in unit prices in the Proposal if such additions and/or deletions are made to quantities. The Contractor must submit their schedule of values for each lump sum bid item.

2. BASIS OF PAYMENT

Payment for these items shall be included in the unit prices for each item as described in the Proposal. All other items, methods, and materials necessary to complete the work described in each pay item shall be incidental to the bid item the work is being completed under.

3. METHOD OF MEASUREMENT AND INCIDENTALS DETERMINATION

The measurement of payment shall be for the removal, disposal, and installation of the materials listed in the Proposal in accordance with the units indicated below. All work required to complete the work outlined in the proposal shall be incidental to the unit cost provided for the item the work is being conducted under.

A. Bid Item 1 – Base Bid: The lump sum cost for all work described in the scope of work as shown on the project plans, except the bid alternates described below. This bid item includes all costs for the scope of work items shown on the plans and any and all incidental costs required to complete the project per the contract documents.

B. Bid Item 2 – Alternate 1: The lump sum cost to remove and dispose of existing VCT flooring and vinyl wall base and prep floor to receive new finish, then provide and install new epoxy resin flooring w/ 4" integral cove base in classroom #004 and corridor #001, as shown on the project plans. This bid item includes all costs for the scope of work items shown on the plans and any and all incidental costs required to complete the project per the contract documents.

C. Bid Item 3 – Alternate 2: The lump sum cost to prep and paint all walls, prep and paint all metals handrails and railing, provide and install new rubber stair treads with integral risers, provide and install coordinating rubber flooring at landings in existing stair A and B (both levels) as shown on the project plans. This bid item includes all costs for the scope of work items shown on the plans and any and all incidental costs required to complete the project per the contract documents.

D. Bid Item 4 – Alternate 3: The lump sum cost to prep and paint the existing areas of stucco on the east and west exterior facades as shown on the project plans. This bid item includes all costs for the scope of work items shown on the plans and any and all incidental costs required to complete the project per the contract documents.

E. Bid Item 5 – Fire Alarm System Modification: The lump sum cost for fire alarm system modification services, including removal and replacement of two smoke detectors, two pull stations, two horn strobes, and one strobe as well as installation of two heat detectors. Work shall include all programing and electrical inspection shall be furnished by the Contractor through the City's approved vendor Marmic Fire and Safety.

Bid Item	Item Description	Units	Quantity	Unit Price	Total
1.	Base Bid	LS	1		
2.	Alternate 1	LS	1		
3.	Alternate 2	LS	1		
4.	Alternate 3	LS	1		
5.	Fire Alarm System Modifications	LS	1	$15,000	$15,000
TOTAL BID:					

Project to be Completed by _____

DATE: _____ BIDDER: _____

By: _____
Legally authorized representative

PRINT NAME: _____

TITLE: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

TELEPHONE: _____

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

PROPOSAL (CONT.)

We acknowledge that we **are/are not (circle one)** registered on www.sam.gov. We also acknowledge that there are no exceptions noted against us as outlined on www.sam.gov.

Our unique entity identifier (UEI), as outlined on www.sam.gov is (write N/A if none): _____

We acknowledge receipt of addendum(a) numbers: _____

Exceptions: _____

_____

Contact Information for Notice of Award/Rejection (If different from below): _____

_____

Project to be completed within 150 days from the Notice to Proceed.

BIDDER: _____ DATE: _____

SUBMITTED BY:

_____ _____
Legally Authorized Representative Signature Print Name

_____ _____
Title Address Line 1

_____ _____
Email Address Address Line 2

_____ _____
Telephone Number City, State, ZIP Code

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

BOND TO ACCOMPANY PROPOSAL

(Not Required if Certified or Cashier's Check is Used)

KNOW ALL MEN BY THESE PRESENTS, that _____ of _____ in the County of _____ and the State of _____ as principal, and _____ of _____ in the County of _____ and the State of _____ as surety, legally authorized to do business in the State of Delaware, are held and firmly bound unto the City of Newark in the sum of _____ to be paid to the said City of Newark for use and benefit of the Mayor and City Council of Newark, for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and separately, for and in the whole, firmly by these presents. Sealed with our seals, dated the _____ day of _____ in the year of our Lord, Two Thousand Twenty Five (2025).

NOW THE CONDITIONS OF THIS OBLIGATIONS ARE SUCH, that if the above noted bound principal _____ who has submitted to said City of Newark, a certain proposal to enter into a certain contract from Invitation to Bid No. 25-01, George Wilson Center Improvements shall faithfully well and truly enter into and execute said contract and furnish therewith such surety or performance bond or bonds as may be required by the terms of said Invitation to Bid and approved by said City of Newark, said notice of award thereof in accordance with the terms of said proposal, then this obligation to be void, otherwise shall remain in full force and virtue.

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

BOND TO ACCOMPANY PROPOSAL (CONT.)

SIGNED AND SEALED IN THE PRESENCE OF:

_____
Witness (Print)

_____
Witness (Signature)

SIGNED (#1): _____ (SEAL)
(Signature)

BY (#1): _____ (SEAL)
(Print)

SIGNED (#2): _____ (SEAL)
(Signature)

BY (#2): _____ (SEAL)
(Print)

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

NON-COLLUSION STATEMENT

Date: _____

City of Newark, Delaware

This is to certify that the undersigned bidder _____

Has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted to the City of Newark, Delaware on the _____ day of _____, 20____.

BY LEGALLY AUTHORIZED REPRESENTATIVE: _____
(Signature)

_____
(Print)

Sworn to and subscribed before me on this _____ day of _____, 20____.

NOTARY PUBLIC: _____
(Signature)

_____
(Print)

My Commission expires: _____

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

LISTING OF SUBCONTRACTORS

The submitting bidder shall fill in the following listing of all subcontractors they intend to use in the performance of the work outlined herein. No subcontractor shall be substituted for any listed below without the written consent of the City of Newark. The submitting bidder hereby certifies that they have notified all subcontractors that they are obligated to comply with the provisions of this Invitation to Bid, including liability insurance coverage requirements, and all other federal or state laws as they pertain to this project. The submitting bidder shall submit evidence of such compliance upon notice of request.

1. Subcontractor name: _____

   Address: _____

   Type of work: _____

2. Subcontractor name: _____

   Address: _____

   Type of work: _____

3. Subcontractor name: _____

   Address: _____

   Type of work: _____

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

LISTING OF SUBCONTRACTORS (CONT.)

4. Subcontractor name: _____

   Address: _____

   Type of work: _____

Date: _____ Bidder: _____

Address: _____

_____

Telephone #: _____

Email address: _____

Legally authorized representative: _____
(Signature)

_____
(Print)

CITY OF NEWARK
Delaware

INVITATION TO BID NO. 25-01

GEORGE WILSON CENTER IMPROVEMENTS

REFERENCES SHEET

Provide the following information for to 25-01 references who will attest to your company's ability to undertake and complete this type of work. Information denoted here must be clearly printed or typed.

1. Reference name: _____

   Address: _____

   Telephone #/email: _____

2. Reference name: _____

   Address: _____

   Telephone #/email: _____

3. Reference name: _____

   Address: _____

   Telephone #/email: _____

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.2 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 - PRODUCTS

2.1 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Use of products having any of the following characteristics is not permitted:

1. Made using or containing CFC's or HCFC's.
2. Made of wood from newly cut old growth timber.
3. Containing lead, cadmium, or asbestos.

2.2 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specifying a Basis of Design manufacturer/product or Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

PART 3 - EXECUTION

3.1 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.2 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 017419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

A. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

B. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

C. Methods of trash/waste disposal that are not acceptable are:

1. Burning on the project site.
2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.

D. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

A. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

1.3 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site for reuse at the project site and/or to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

A. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

C. Meetings: Discuss trash/waste management goals and issues at project meetings.

1. Prebid meeting.
2. Preconstruction meeting.
3. Regular job-site meetings.

D. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.

1. Provide containers as required.
2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

E. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

F. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

G. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

H. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 017700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Final Completion procedures.
2. List of incomplete items.
3. Submittal of Project warranties.
4. Final cleaning.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest-control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

1.6 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
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 will state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Submit Final Completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

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

1.7 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. 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. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. 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.

E. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Clean flooring, removing debris, dirt, and staining; clean in accordance with manufacturer's instructions.
i. Vacuum and mop concrete.
j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean in accordance with manufacturer's instructions if visible soil or stains remain.
k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
l. Remove labels that are not permanent.
m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
r. Clean strainers.
s. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 CORRECTION OF THE WORK

A. Complete repair and restoration operations required before requesting inspection for determination of Substantial Completion.

END OF SECTION

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. Salvage of existing items to be reused or recycled as noted on the plans or directed by the Engineer/Architect.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 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.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss the condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control, and for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Submit before Work begins.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

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

1.8 QUALITY ASSURANCE

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

1.9 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.

B. Notify warrantor on completion of selective demolition and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.11 COORDINATION

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

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 ANSI/ASSP 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. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged.
2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

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

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies. Coordinate with owner.

2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 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.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas. Coordinate with G-series drawings.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Provide temporary enclosures, dust control, heating, and cooling.

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.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least one hour after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."

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 or indicated on Drawings.
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.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."

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.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

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

END OF SECTION

SECTION 031000

CONCRETE FORMING 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. Form-facing materials.

1.3 DEFINITIONS

A. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction, movement, contraction, and isolation joints
c. Forms and form-removal limitations.
d. Anchor rod and anchorage device installation tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

1. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.

a. Location(s) of construction joints is subject to approval of Architect.

2. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.

1.6 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Minutes of preinstallation conference.

C. Qualification Statements: For testing and inspection agency.

1.7 QUALITY ASSURANCE

A. Testing and Inspection Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete, and as follows:

a. Plywood, metal, or other approved panel materials.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 RELATED MATERIALS

A. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners to be acceptable to form liner manufacturer.

B. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

C. Sealant: One-part moisture cure silicone sealant used with form liners.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-in-Place Concrete" for as-cast finishes.

C. Limit concrete surface irregularities as follows:

1. Surface Finish-1.0: ACI 117 Class D, 1 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.

J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

K. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.

    a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

L. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

M. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

N. Coat contact surfaces of forms with form-release agent, in accordance with manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF 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.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Clean embedded items immediately prior to concrete placement.

3.3 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, 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. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
2. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved its 28-day design compressive strength.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 INSTALLATION OF SHORING AND RESHORING

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until the measurement of slab tolerances is complete.

B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare test reports.

C. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.

D. Prepare test and inspection reports.

END OF SECTION

SECTION 032000

CONCRETE REINFORCING

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. Steel reinforcement bars.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction contraction and isolation joints.
c. Steel-reinforcement installation.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

B. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

D. Field quality-control reports.

E. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

2.2 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

    a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.

1. Finish: Plain.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. 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.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
2. Stagger splices in accordance with ACI 318.

3.3 JOINTS

A. 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.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. 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.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare test reports.

C. Inspections:

1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
3. Steel-reinforcement welding.

D. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION

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.

1.2 SUMMARY

A. Concrete standards.

B. Concrete materials.

C. Repair materials.

D. Concrete mixture materials.

E. Concrete mixture class types.

F. Concrete mixing.

G. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement or blended hydraulic cement alone or in combination with one or more of the following:

1. Fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cementitious Materials (w/cm) Ratio: The ratio by weight of mixing water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

    a. Contractor's superintendent.
    b. Independent testing agency responsible for inspections and acceptance testing of concrete at Project site.
    c. Ready-mix concrete manufacturer.
    d. Concrete Subcontractor.

2. Review the following:

    a. Special inspection and testing and inspecting agency procedures for field quality control.
    b. Construction joints, control joints, isolation joints, and joint-filler strips.
    c. Semirigid joint fillers.
    d. Anchor rod and anchorage device installation tolerances.
    e. Cold- and hot-weather concreting procedures.
    f. Concrete finishes and finishing.
    g. Curing procedures.
    h. Forms and form-removal limitations.
    i. Shoring and reshoring procedures.
    j. Concrete repair procedures.
    k. Concrete protection.
    l. Initial curing of standard-cured and field curing of field-cured test cylinders (ASTM C31/C31M.)
    m. Protection of field cured field test cylinders.
    n. Distribution of test reports.

1.5 ACTION SUBMITTALS

A. Product Data:

1. Portland cement.
2. Fly ash.
3. Natural or other pozzolans.
4. Aggregates.
5. Ground calcium carbonate and aggregate mineral fillers.
6. Admixtures:

    a. Include limitations of use. Admixtures that do not comply with reference ASTM International requirements must be submitted with test data for approval.

7. Floor and slab treatments.
8. Curing materials.
9. Joint fillers.
10. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Compressive strength at 28 days or other age as specified.
3. Compressive strength required at stages of construction.
4. Durability exposure classes for Exposure Categories F, S, W, and C.
5. Maximum w/cm ratio.
6. Slump or slump flow limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Submit adjustments to design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant changes.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

    a. Location of construction joints is subject to approval of the Architect.

D. Concrete Schedule: For each location of each class of concrete indicated in "Concrete Mixture Class Types" Article, including the following:

1. Concrete class designation.
2. Location within Project.
3. Exposure class designation.
4. Formed surface finish designation and final finish.
5. Final finish for floors.
6. Floor treatment, if any.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Testing Agency: Include documentation indicating compliance with ASTM E329 or ASTM C1077 and copies of applicable ACI certificates for testing technicians or ACI Concrete Construction Special Inspector - MH, ASCC.

B. Material Certificates: For each of the following:

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

C. Material Test Reports: For the following:

1. Portland cement.
2. Fly ash.
3. Natural or other pozzolans.
4. Aggregates.
5. Admixtures.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances in accordance with ACI 117 and in compliance with ASTM E1155.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC's Acceptance Criteria AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified Installer who employs Project personnel qualified as an ACI-certified Concrete Flatwork Associate and Concrete Flatwork Finisher and a supervisor who is a certified ACI Advanced Concrete Flatwork Finisher/Technician or an ACI Concrete Flatwork Finisher with experience installing and finishing concrete.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer's production facilities and delivery vehicles certified in accordance with NRMCA's certification requirements or equivalent approval by a State DOT.

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing that performs duties on behalf of the Architect/Engineer.

1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Level 1. Testing agency laboratory supervisor tests to be an ACI-certified Concrete Laboratory Testing Technician, Level 2.

D. Field Quality-Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests on plastic concrete properties are to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with policies from ACI CPP 610.1 or an equivalent certification program.

1.8 PRECONSTRUCTION TESTING

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

1. Include the following information in each test report:

a. Admixture dosage rates.
b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.10 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 as follows:

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When air temperature has fallen to, or is expected to fall below 40 deg F during the protection period, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE STANDARDS

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I orType II, gray.
2. Pozzolans: ASTM C618, Class C, F, or N.

C. Normal-Weight Aggregates:

1. Coarse Aggregate: ASTM C33/C33M, Class 3S
2. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
3. Fine Aggregate: ASTM C33/C33M.
4. Recycled Aggregate: Provide documentation of characteristics of recycled aggregate and mechanical properties and durability of proposed concrete, which incorporates recycled aggregate to conform to appliable requirements for the class of concrete.
5. Alkali-Silica Reaction: Comply with one of the following for each aggregate used:

a. Expansion Result of Aggregate: Not more than 0.04 percent at one year when tested in accordance with ASTM C1293.

2.3 ADMIXTURES

A. Air-Entraining Admixture: ASTM C260/C260M.

B. Chemical Admixtures: Do not use calcium chloride or admixtures containing calcium chloride in steel-reinforced concrete.

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.
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. Admixtures with special properties, with documentation of claimed performance

enhancement, ASTM C494/C494M, Type S.

C. Mixing Water for Concrete Mixtures and Water Used to Make Ice: ASTM C1602/C1602M. Include documentation of compliance with limits for alkalis, sulfates, chlorides, or solids content of mixing water from Table 2 in ASTM C1602/C1602M.

2.4 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 burlap-polyethylene sheet.

C. Water: Potable water that does not cause staining of the surface.

2.5 ACCESSORIES

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1752, cork or self-expanding cork.

B. Epoxy Bonding Adhesive: ASTM C881/C881M, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.6 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.7 CONCRETE MIXTURE MATERIALS

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, in accordance with ACI 301.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland or hydraulic cement in concrete assigned to Exposure Class F3 as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.

2.8 CONCRETE MIXTURE CLASS TYPES

A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.

1. Exposure Class: ACI 318 Class F3.
2. Minimum Compressive Strength: 5000 psi at 28 days.
3. Maximum w/cm Ratio: 0.40.
4. Slump Limit: 5 inches, plus or minus 1-1/2 inches for concrete <Insert limits>.
5. Air Content:

    a. Exposure Classes F2 and F3: 6.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.

6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cementitious materials.
7. Compressive strength or alternative methods of estimating in-place strength of concrete by maturity or other nondestructive testing with acceptable correlation between test results and concrete compressive strength <Insert strength and age for construction stages>.

B. Class C: Normal-weight concrete used for interior slabs-on-ground.

1. Exposure Class: ACI 318 Class F0, Class S0, Class W0, Class C0.Class F3.
2. Minimum Compressive Strength: [4000 psi 28 days.
3. Maximum w/cm Ratio : 0.40.
4. Slump Limit: 5 inches, plus or minus 1.5 inches for concrete <Insert limits>.
5. Air Content:

    a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish delivery ticket.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 TOLERANCES

A. Comply with ACI 117.

3.4 INSTALLATION OF 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.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install reglets to receive waterproofing and through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.5 INSTALLATION OF CAST-IN-PLACE CONCRETE

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

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Water addition in transit or at the Project site must be in accordance with ASTM C94/C94M and must not exceed the permitted amount indicated on the concrete delivery ticket.

D. 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.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.

    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. 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.

E. 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. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-

textured surface plane, before excess bleedwater appears on the surface.

8. Do not further disturb slab surfaces before starting finishing operations.

3.6 INSTALLATION OF JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.

    a. Continue reinforcement across construction joints unless otherwise indicated.

3. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints in Slabs-on-Ground: 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 on Drawings.
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.

D. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.7 APPLICATION OF FINISHING FLOORS AND SLABS

A. Scratch Finish:

1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
3. Apply scratch finish to surfaces to receive concrete floor toppings.

B. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

C. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface. Use of an approved finishing aid is acceptable.
5. Do not apply troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:

    a. Slabs on Ground:

        1) Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.

D. Trowel and Fine-Broom Finish: First apply a trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with a fiber-bristle broom perpendicular to main traffic route.

2. Coordinate required final finish with Architect before application.

3.8 APPLICATION OF FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 (ACI 301M) Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.

a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
b. Remove projections larger than 1 inch.
c. Tie holes do not require patching.
d. Surface Tolerance: ACI 117, Class D.
e. Apply to concrete surfaces for metal lap pan deck formed surfaces and those surfaces that are buried or covered with subsequent installed surfaces.

2. ACI 301 (ACI 301M) Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.

a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
b. Remove projections larger than 1/4 inch.
c. Patch tie holes.
d. Surface Tolerance: ACI 117, Class B.
e. Locations: Apply to concrete surfaces [exposed to public view,][to receive a rubbed finish,][or to be covered with a coating or covering material applied directly to concrete]<Insert locations>.

3. ACI 301 (ACI 301M) Surface Finish SF-3.0:

a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
b. Remove projections larger than 1/8 inch.
c. Patch tie holes.
d. Surface Tolerance: ACI 117 Class A.
e. Locations: Apply to concrete surfaces to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

3.9 APPLICATION OF CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305R, before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period as follows:

    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing after finishing concrete.
2. Interior Concrete Floors:

    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

        1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

            a) Lap edges and ends of absorptive cover not less than 12 inches.
            b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

        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.

            a) Immediately repair any holes or tears during curing

period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following not in cold weather:

a) Water.
b) Continuous water-fog spray.

b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches.
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

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.

a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

c. Floors to Receive Polished Finish: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches.
b) Maintain absorptive cover water saturated, and in place,

for duration of curing period, but not less than seven days.

2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

d. Floors To Receive Urethane Flooring:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.
3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

e. Floors To Receive Curing Compound:

1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Maintain continuity of coating, and repair damage during curing period.
4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

f. Floors To Receive Curing and Sealing Compound:

1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.10 INSTALLATION OF JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written

instructions.

1. Defer joint filling until concrete has aged at least one month(s).

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.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.11 INSTALLATION OF CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to meet specification requirements.

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 in excess of 0.01 inch spalls, air bubbles exceeding surface finish limits, honeycombs, rock pockets, fins and other projections on the surface exceeding surface finish limits, 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.

   a. Limit cut depth to 3/4 inch.
   b. Make edges of cuts perpendicular to concrete surface.
   c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
   d. Fill and compact with patching mortar before bonding agent has dried.
   e. 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.

   a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
   b. Compact mortar in place and match surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability

and structural performance, as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.

    a. Correct low and high areas.
    b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

2. Repair finished surfaces containing surface defects, including 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.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by adding patching mortar.

    a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.

    a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
    b. Feather edges to match adjacent floor elevations.

6. Correct other low areas scheduled to remain exposed with repair topping.

    a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
    b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.

    a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
    b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
    c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
    d. Place, compact, and finish to blend with adjacent finished concrete.
    e. Cure in same manner as adjacent concrete.

8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.

    a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
    b. Dampen cleaned concrete surfaces and apply bonding agent.
    c. Place patching mortar before bonding agent has dried.
    d. Compact patching mortar and finish to match adjacent concrete.
    e. 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.

3.12 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency to be responsible for providing curing facility for initial curing of strength test specimens on-site and verifying that test specimens are cured in accordance with standard curing requirements in ASTM C31/C31M.
2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

    a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

        1) Project name.
        2) Name of testing agency.
        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
        4) Name of concrete manufacturer.
        5) Date and time of inspection, sampling, and field testing.
        6) Date and time of concrete placement.
        7) Location in Work of concrete represented by samples.
        8) Date and time sample was obtained.
        9) Truck and batch ticket numbers.
        10) Design compressive strength at 28 days.
        11) Concrete mixture designation, proportions, and materials.

12) Field test results of fresh concrete, including slump or slump flow, air content, temperature and density.
13) Information on storage and curing of samples at the Project site, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

4. Provide a space and source of power or other resources for curing and access to test specimens by the testing agency.

C. Delivery Tickets: comply with ASTM C94/C94M.

D. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 150 cu. yd. or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing is to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

a. One test at point of delivery for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests as needed.

3. Slump Flow: ASTM C1611/C1611M:

a. One test at point of delivery for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests as needed.

4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; [ASTM C173/C173M volumetric method, for structural lightweight concrete].

    a. One test for each composite sample when strength test specimens are cast, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C1064/C1064M:

    a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample when strength test specimens are cast.

6. Concrete Density: ASTM C138/C138M:

    a. One test for each composite sample when strength test specimens are cast.

7. Unit Weight: ASTM C138/C138M density of fresh structural lightweight concrete.

    a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture. The fresh density should be consistent with that associated with the equilibrium density within a tolerance of plus or minus 4 lb/ft.3.

8. Compression Test Specimens: ASTM C31/C31M:

    a. Cast and standard cure two sets of four 6 inches by 12-inches or 4-inch by 8-inch cylindrical specimens for each composite sample.

9. Compressive-Strength Tests: ASTM C39/C39M.

    a. Test one set of two standard cured specimens at seven days and one set of two specimens at 28 [other age] days.
    b. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

10. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
11. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests of standard cured cylinders equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.

12. 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.
13. Additional Tests:

    a. Testing and inspecting agency to 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.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.7.6.3.

14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 24 hours of completion of floor finishing and promptly report test results to Architect.

3.13 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using floor slab protective covering.

END OF SECTION

SECTION 042000

UNIT MASONRY

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. Concrete masonry units.
2. Brick.
3. Mortar and grout materials.
4. Reinforcement.
5. Ties and anchors.
6. Embedded flashing.
7. Accessories.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 REFERENCE STANDARDS

A. TMS 402 – Building Code Requirements for Masonry Structures; The Masonry Society.

B. TMS 602 – Specification for Masonry Structures; The Masonry Society.

C. ASTM A 82/A 82M – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

D. ASTM A 153/A 153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E. ASTM A 615/A 615M – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

F. ASTM A 641/A 641M – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

G. ASTM C 67 – Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.

H. ASTM C 90 – Standard Specification for Loadbearing Concrete Masonry Units.

I. ASTM C 140 – Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.

J. ASTM C 144 – Standard Specification for Aggregate for Masonry Mortar.

K. ASTM C 150 – Standard Specification for Portland Cement.

L. ASTM C 207 – Standard Specification for Hydrated Lime for Masonry Purposes.

M. ASTM C 216 – Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).

N. ASTM C 270 – Standard Specification for Mortar for Unit Masonry.

O. ASTM C 404 – Standard Specification for Aggregates for Masonry Grout.

P. ASTM C 476 – Standard Specification for Grout for Masonry.

Q. ASTM C 780 – Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project Site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.Show elevations of reinforced walls.
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for verification:

1. Clay face brick, in the form of straps of five or more bricks.
2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
3. Accessories embedded in masonry.
4. Cavity drainage Material

5. Weep holes/cavity vents.

1.7 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Material Certificates: For each type of the following:

1. Masonry units.

a. Include material test reports substantiating compliance with requirements.
b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
c. For exposed brick, include test report for efflorescence according to ASTM C 67.
d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing in accordance with ASTM C67/C67M

C. 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 C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

E. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

F. Hold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with hot-weather requirements.

G. Qualification Data: For testing agency

H. Anchors, ties, and metal accessories.

I. Joint reinforcement.

J. Reinforcing bars.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Masonry Contractor Qualification::

1. Engage a contractor with at least 10 years experience in masonry construction of type and scope included in the construction documents.
2. Contractor must show his experience by submitting to the Owner a list of at least 10 masonry projects of similar size and scope.
3. Contractor must also submit resumes of all key personnel that will be assigned to the project. Contractor must dedicate assigned personnel to the project for the entire scope of work.

C. Comply with provisions of TMS 402 and TMS 602, except where exceeded by requirements of the contract documents.

1. Maintain one copy of each document on project site.

D. Fire-Resistance Ratings: Where indicated, provide materials identical to those assemblies with fire-resistance ratings conforming to the Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies, ACI 216.1-97/TMS-0216-07,National Concrete Masonry Association TEK 7-1A and ASTM E-119, and acceptable to authorities having jurisdiction.

1. Certification of concrete masonry units for fire ratings must be provided by the National Concrete Masonry Association.
2. Provide Letter of Certification for aggregates used in mix design assuring compliance with ASTM C 33 and ASTM C 331.
3. Provide mix design and determine equivalent thickness, for units incorporating recycled content materials.

E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup for typical exterior wall infill in sizes approximately 48 inches long by 48 inches high by full thickness, including face and backup wythes and accessories.

a. Include a sealant-filled joint at least 16 inches long in exterior wall mockup.

2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
4. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

    a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

    1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

B. Contractor to verify masonry subcontractor’s protection at end of each day; inadequate protection to be corrected or replaced by Contractor for proper protection; costs incurred by the Contractor is not the Owner’s responsibility, but may be recovered under Contractor’s agreement with subcontractor.

C. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

E. 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.

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.3 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 and will be within 20 feet vertically and horizontally of a walking surface.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 BRICK

A. General: 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 stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C216.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

a. Endicott Clay Products
b. Belden Brick Company
c. Taylor Clay Products

2. Grade: SW
3. Type: FBX or FBS.
4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.

5. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C67.
6. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."
7. Size: To Match Existing
8. Application: Use where brick is exposed unless otherwise indicated.
9. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.

2.5 BRICK

A. General: 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 stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

2.6 MORTAR AND GROUT 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.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

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. 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.

E. 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.

3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C 404.

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.

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

I. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.
5. Wire Size for Veneer Ties: 0.148-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet , with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type; ASTM A 82/A 82M steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than ½ inch of mortar coverage on each exposure. Retain one or more of three subparagraphs below and coordinate with requirements in Part 3. More than one type may be needed; "Composite Masonry" and "Cavity Walls" articles specify types required for various applications.

E. Masonry-Joint Reinforcement for Multiple-Wythe Masonry: Ladder type; fabricated with moisture drip; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than ½ inch of mortar coverage on each exposure.

2.8 TIES AND ANCHORS

A. General:

1. Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
2. Corrugated Metal Ties: Not Allowed.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.
2. Where wythes do not align, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
3. Wire: Fabricate from 3/16-inch diameter, stainless steel wire.

2.9 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
4. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
5. Solder metal items at corners.

B. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge.
4. Where flashing is fully concealed, use metal flashing.

C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.

B. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

C. Weep/Cavity Vent Products: Use one of the following unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

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 or Architect approved equal:

1) Advanced Building Products Inc.
2) Heckmann Building Products, Inc.
3) Hohmann & Barnard, Inc.

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Mortar Deflector: Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches that prevent clogging with mortar droppings.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following or Architect approved equal:

1) Heckmann Building Products, Inc.
2) Hohmann & Barnard, Inc.
3) Mortar Net Solutions.

2.11 MASONRY-CELL FILL

A. Foamed-In-Place masonry insulation for thermal, sound and fire resistance values.

1. Surface Burning Characteristics: Maximum flame spread, smoke developed and fuel contributed of 0, 5 and 0 respectively.
2. Combustion Characteristics: Must be noncombustible, Class A building material.
3. Thermal Values: "R" Value of 4.91/inch @ 32 degrees F mean; ASTM C-177.
4. Sound Abatement: Minimum Sound Transmission Class rating of 53 and a minimum Outdoor Indoor Transmission Class rating of 44 for 8" wall assembly ASTM E90-90.

5. Manufacturers: Tailored Chemical Products; Core Fill 500, or Architect approved equal.

2.12 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following or Architect approved equal:

a. Diedrich Technologies, Inc.; a Hohmann & Barnard company.
b. EaCo Chem, Inc.
c. Prosoco.

2.13 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.
3. For reinforced masonry, use portland cement-lime.
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, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type S or Type N.
4. For interior nonload-bearing partitions, Type O may be used instead of Type N.

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.

1. Pigments shall not exceed 10 percent of portland cement by weight.
2. Mix to match Architect's sample.
3. Application: Use pigmented mortar for exposed mortar joints with the following units:

a. Clay face brick.

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 3000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 7 Section “Fire-Resistive Joint Systems”.

G. 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 C67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch 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.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

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

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond pattern; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.

2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
3. At fire-rated partitions, treat joint between top of partition and underside of structure above.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Wet joint surfaces thoroughly before applying mortar.
3. Rake out mortar joints for pointing with sealant.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

E. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, or air barriers unless otherwise indicated.

3.6 MASONRY-CELL FILL

A. Foamed-In-Place Masonry Insulation: Fill all open cells and voids in hollow concrete masonry walls where shown on drawings. The foam insulation shall be pressure injected through a series of 5/8" to 7/8" holes drilled into every vertical column of block cells (every 8" on center) beginning at an approximate height of four (4) feet from finished floor level. Repeat this procedure at an approximate height of ten (10) feet above the first horizontal row of holes (or as needed) until the void is completely filled. Patch holes with mortar and score to resemble existing surface

3.7 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.

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.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 2 inches wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

A. General:

1. Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
2. Comply with NCMA TEK 10-2C or 10-3 standard for the placement of control joint in CMU masonry walls unless otherwise noted below or on Drawings.

B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.

3. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Vertical Control Joints

1. Ensure joints are free from mortar and horizontal reinforcing.
2. Utilize control joint filler to maintain width and depth of clear joint. Locate to permit proper placement of primary joint sealant and joint backer material.
3. Locations: Install where indicated in Contract Documents and in accordance with following:

    a. At control or expansion joints in structure.
    b. At 30 feet on center maximum horizontal run of uninterrupted wall and around corners.
    c. At 15 feet on center maximum horizontal run for parapets, balconies, and free-standing walls and at their junctions with walls of other building areas. Extend joints through masonry parapets and from top of parapet down to horizontal expansion joint.
    d. Within 10 feet of inside and outside corners on one wall. Provide next vertical control joint around corner on other wall with distance between joints within maximum spacing requirements above.
    e. At offsets and setbacks in wall.
    f. At changes in thickness, height, or direction of wall.
    g. At openings greater than 24 inches wide. Provide for independent movement of loose lintels at vertical control joints by means of slip plane formed of masonry flashing and joint sealant in accordance with recommendations in BIA Technical Note 18A.
    h. Where more than one of above conditions occur in area, combine above requirements to minimize number of joints while creating continuous expansion control and visual appearance.
    i. Joint Width: 5/8 inch unless otherwise shown on Drawings or required by referenced design standards.

D. Horizontal Expansion Joints: Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch.

1. Install joint filler in joint underneath shelf angles, beams, slabs, and decks and sealant tape as secondary seal behind primary joint sealant to establish weather barrier at face of assembly
2. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry
3. Do not continue horizontal joint reinforcement through control and expansion joints.
4. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.10 LINTELS

A. Install steel lintels where indicated.

B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.11 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through- wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape.
2. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under air barrier, lapping at least 4 inches.
3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
5. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.

C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/cavity vent products to form weep holes.
2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
3. Space weep holes formed from plastic tubing or wicking material 16 inches o.c.
4. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
5. Trim wicking material flush with outside face of wall after mortar has set.

D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.12 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

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

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.13 GROUTING

A. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

B. Placing and Grouting Vertical Reinforcing at Engineered Masonry: Comply with ACI 530.1 and NCMA TEK 3.2 – Grouting Concrete Masonry Walls.

1. Steel Reinforcing Bars (vertical): Space and size reinforcing steel to support loads imposed.
2. Secure each successive length of reinforcing steel to previous length with bar positioners. Overlap length of successive reinforcing steel sufficiently to support loads without deflection. Comply with installation tolerances established by ACI Specifications.
3. Fully grout CMU cores containing reinforcing steel. Consolidate grout.

3.14 PARGING

A. Dampen masonry walls prior to parging.

B. Scarify each parging coat to ensure full bond to subsequent coat.

C. Parge masonry walls in two uniform coats of mortar to a total thickness of 3/4 inch.

D. Steel trowel surface smooth and flat with a maximum surface variation of 1/8 inch per foot.

E. Strike top edge of parging at 45 degrees.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: 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. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

C. Mortar Test (Property Specification): Only required for load-bearing masonry walls. For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.

3.16 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
7. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION

SECTION 055213

PIPE AND TUBE RAILINGS

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. Stainless-steel pipe and tube railings.

1.3 COORDINATION

A. Coordinate installation of anchorages for railings. 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.

B. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

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

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
2. Fittings and brackets.
3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.

a. Show method of connecting and finishing members at intersections.

D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

E. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Stainless-Steel Pipe and Tube Railings:

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

a. Blum, Julius & Co., Inc.
b. Sterling Dula Architectural Products, Inc. / KaneSterling.
c. Tri Tech, Inc.
d. Tuttle Railing Systems.
e. Wagner, R & B, Inc.

B. Source Limitations: Obtain each type of railing from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer 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.

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

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

2.3 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.4 STAINLESS STEEL

A. Tubing: ASTM A 554, Grade MT 304.

B. Pipe: ASTM A 312/A 312M, Grade TP 304.

C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.

D. Plate and Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

E. Rods: Type 304.

2.5 FASTENERS

A. General: Provide the following:

1. Stainless-Steel Railings: Type 304 stainless-steel fasteners.
2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.

D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

1. 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.

2.6 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For stainless-steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

D. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.7 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. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. 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. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

J. Form Changes in Direction as Follows:

1. As detailed.
2. By bending or by inserting prefabricated elbow fittings.

K. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire

bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of railing members with prefabricated end fittings.

M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

P. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

Q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.8 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines, or blend into finish.

B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

C. Stainless Steel Tubing Finishes:

1. 180-Grit Polished Finish: Uniform, directionally textured finish.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. 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.

1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.3 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. 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, mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.

D. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post anchoring material flush with adjacent surface.

E. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For stainless-steel pipe railings, weld flanges to post and bolt to supporting surfaces.

3.4 ATTACHING RAILINGS

A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.

C. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

D. 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.
2. For hollow masonry anchorage, use toggle bolts.

3.5 ADJUSTING AND CLEANING

A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

3.6 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION

SECTION 061053

MISCELLANEOUS ROUGH CARPENTRY

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. Wood preservative treated materials.
2. Wood fire retardant treated materials.
3. Plywood backing panels.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.
5. Metal framing anchors.

1.5 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664, and design value adjustment factors shall be calculated according to ASTM D6841. For enclosed roof framing, framing in attic spaces, and where high-temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.

E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings, and the following:

1. Concealed blocking.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Cants.
4. Furring.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Western woods; WCLIB or WWPA.
7. Northern species; NLGA.
8. Eastern softwoods; NeLMA.

C. Utility Shelving: Lumber with 19 percent maximum moisture content of any of the following species and grades:

1. Mixed southern pine or southern pine No. 1 grade; SPIB.
2. Spruce-pine-fir (south) or spruce-pine-fir, Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:

1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
2. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F1667.

C. Screws for Fastening to Metal Framing: ASTM C1002 and ASTM C954, length as recommended by screw manufacturer for material being fastened.

D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.7 METAL FRAMING ANCHORS

A. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

B. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

C. Stainless-Steel Sheet: ASTM A666, Type 304.

1. Use for exterior locations and where indicated.

2.8 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

B. Adhesives for gluing furring and sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Adhesives shall have a Volatile Organic Compounds (VOC) content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring at 16 inches o.c.

3.4 PROTECTION

A. Protect products from moisture absorption and subsequent warping or deterioration until subsequent construction can proceed.

B. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

C. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 079200

JOINT SEALANTS

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

1.3 ACTION SUBMITTALS

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

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 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. Colors of Exposed Joint Sealants: As selected by Owner from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.

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 C920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following or approved equal:

a. Dow Corning Corporation.
b. Pecora Corporation.

c. Sika Corporation; Joint Sealants.

2.3 URETHANE JOINT SEALANTS

A. 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 C920, Type S, Grade P, Class 25, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following or approved equal:

a. BASF Corporation.
b. Pecora Corporation.
c. Polymeric Systems, Inc.
d. Schnee-Morehead, Inc., an ITW company.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

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

a. Dow Corning Corporation.
b. May National Associates, Inc.; a subsidiary of Sika Corporation.
c. Pecora Corporation.

2.5 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C1311.

1. Manufacturers: Subject to compliance with requirements, provide products by the following or approved equal:

a. Bostik, Inc.
b. Approved Equal

2.6 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

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

    a. May National Associates, Inc.; a subsidiary of Sika Corporation.
    b. Pecora Corporation.
    c. Sherwin-Williams Company (The).

2.7 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

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

    a. Adfast.
    b. Alcot Plastics Ltd.
    c. BASF Corporation.
    d. Approved Equal

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 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 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.

E. 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 C1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

a. Whether sealants filled joint cavities and are free of voids.
b. Whether sealant dimensions and configurations comply with specified requirements.
c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Joints between plant-precast architectural concrete units.
c. Control and expansion joints in unit masonry.
d. Joints in exterior insulation and finish systems.

e. Joints between metal panels.
f. Joints between different materials listed above.
g. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
h. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

B. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.
b. Control and expansion joints in tile flooring.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, P, 25, T, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

E. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:

   a. Aluminum thresholds.
   b. Sill plates.
   c. Other joints as indicated on Drawings.

2. Joint Sealant: Butyl-rubber based.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

END OF SECTION

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:

1. Standard interior hollow metal frames.

B. Related Sections:

1. Division 08 Section “Flush Wood Doors”.
2. Division 08 Section "Door Hardware".
3. Division 09 Sections "Interior Painting" for field painting hollow metal frames.

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

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. SDI-113 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies
10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.

11. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
12. ASTM E1423 - Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.
13. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
14. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
15. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
16. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
17. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
18. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
19. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts,

anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.

C. Product Schedule: For hollow 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.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, frames from a SDI Certified manufacturer:

1. CECO Door Products (CE).
2. Curries Company (CU).
3. Steelcraft (ST).

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 INTERIOR HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16” positive thermal break and integral vinyl weatherstripping.

C. ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Basis of Design:

a. Curries Company (CU) - M Series.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

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.

2.5 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

D. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.7 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION

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 other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core 5-ply flush wood doors with primed HDF
2. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 099123 "Interior Painting" for field finishing doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door frame construction.
5. Factory-machining criteria.
6. Factory-finishing specifications.

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

1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Dimensions and locations of cutouts

9. Doors to be factory finished and application requirements.
10. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
2. Polymer edging, in manufacturer's standard colors.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Special warranties.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

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

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of veneer.
b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Provide labels and certificates from AWI certification program indicating that doors comply with requirements of grades specified.
2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.3 SOLID-CORE THREE-PLY FLUSH WOOD DOORS

A. Interior Doors (F):

1. Manufacturers: Subject to compliance with requirements, provide Forte Door Company, or equal product by one of the following or approved equal:

    a. Eggers Industries.
    b. Lambton Doors.
    c. VT Doors.

2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
3. Faces: Hardboard (HDF)
4. Finish: Shop Primed White
5. Vertical Edges: finger-jointed softwood (1-1/4" before trim)
6. Core: ANSI A208.1, Grade LD-2 particleboard.

    a. Blocking: Provide wood blocking in particleboard core doors as needed to eliminate through-bolting hardware.

7. Construction: five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 LIGHT FRAMES AND LOUVERS

A. Metal Frames for Light Openings in Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated on Drawings.

B. Metal Louvers:

1. Blade Type: Vision-proof, inverted V.
2. Metal and Finish: Hot-dip galvanized steel, 0.040-inch-thick, with baked-enamel- or powder-coated finish.
3. Size: As indicated on drawings.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

C. Openings: Factory cut and trim openings through doors.

1. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Factory finish doors where indicated in schedules or on Drawings as factory finished.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware".

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
2. Anchor frames to anchors or blocking built in or directly attached to substrates.

a. Secure with countersunk, concealed fasteners and blind nailing.
b. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.

1) For factory-finished items, use filler matching finish of items being installed.

D. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.

a. Do not trim stiles and rails in excess of limits set by manufacturer.

2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
4. Clearances:

a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
c. Where threshold is shown or scheduled, provide1/4 inch from bottom of door to top of threshold unless otherwise indicated.

5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

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.

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

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

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.

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 as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 437- Key Locks.

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. 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.

D. 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.

1.4 CLOSEOUT SUBMITTALS

A. 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 Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 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. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. 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.

D. 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.

E. 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.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. 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.

H. 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

I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 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".

1.7 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 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 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.

1.8 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. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

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 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

   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. 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: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.

5. Manufacturers:

   a. McKinney Products (MK) - TA/T4A Series, 5-knuckle.

2.3 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

    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. 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: With the exception of electric through wire hinges, 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. Manufacturers:

    a. Hager Companies (HA).
    b. Lawrence Brothers (LA).
    c. McKinney Products (MK).

2.4 DOOR OPERATING TRIM

A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
3. Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push

plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

5. Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood Products (RO).
    c. 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.

1. Manufacturers:

    a. Corbin Russwin (RU).
    b. Sargent Manufacturing (SA).
    c. Yale Locks and Hardware (YA).

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. 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.
6. Keyway: Match Facility Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "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. New System: Key locks to a new key system as directed by the Owner.

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

1. Change Keys per Cylinder: Three (3) each.
2. Master Keys (per Master Key Level/Group): Five (5) each.
3. Construction Keys: Ten (10) each.

E. Construction Keying: Provide construction master keyed cylinders.

F. 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 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

2.7 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide locksets with functions and features as follows:

a. Heavy duty 12-gauge wrought steel case.
b. Stainless steel 3/4" one-piece anti-friction reversible latchbolt with a one-piece hardened stainless steel 1” projection deadbolt.
c. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
d. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
e. Meets UL Certification Directory ZHLL.R21744 for products used in windstorm rated assemblies.
f. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 16 million cycles or greater.
g. Status indicators inside, outside, or on both sides of doors as specified; available with wording for “locked/unlocked”, “vacant/occupied” or custom wording options. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status.
h. Ten-year limited warranty for mechanical functions.

2. Manufacturers:

a. Sargent Manufacturing (SA) - 8200 Series.
b. Corbin Russwin (RU) - ML2000 Series.
c. Yale Locks and Hardware (YA) – 8800RL Series.

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.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

2.9 SURFACE 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.
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. 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 Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. 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 (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed 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 or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:

a. Sargent Manufacturing (SA) - 351 Series.
b. Corbin Russwin (RU) - DC6000 Series.
c. Norton Door Controls (NO) - 7500 Series.

C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency 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 of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.

1. Manufacturers:

a. Sargent Manufacturing (SA) - 422 Series.
b. Corbin Russwin (RU) - DC5000 Series.
c. Norton Door Controls (NO) - 2800ST Series

2.10 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 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. Manufacturers:

a. Rockwood Products (RO).
b. Hiawatha, Inc. (HI).
c. Trimco (TC).

2.11 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 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. Manufacturers:

a. Rockwood Products (RO).
b. Hiawatha, Inc. (HI).
c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed 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. Manufacturers:

a. Sargent Manufacturing (SA).
b. Rixson (RF).
c. Rockwood Products (RO).

2.12 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 NFPA 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. Manufacturers:

1. Pemko Products (PE).
2. National Guard Products (NG).
3. Reese Enterprises, Inc. (RE).

2.13 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.

2.14 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 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. DHI TDH-007-20: Installation Guide for Doors and Hardware.
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. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. 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 (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

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.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

Set: 1– Utility Closets 116a, 003a

Doors: 006a, 003a

3	Hinge	TA2714 4-1/2" x 4-1/2" NRP	US26D	MK
1	Storeroom Lockset	21 8204 LNMB	US26D	SA
1	Mortise Cylinder	100200X x Z20 x MK	26	MC
1	Closer/Stop	351 CPS	EN	SA
1	Kickplate	K1050 8" x 2" LDW 4BE CSK	US32D	RO
3	Silencer	608-RKW		RO

Set: 2 – Existing Women's restroom 006, Existing Men's restroom 003

Doors: 003, 006

3	Hinge	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Push Plate	70C 4 x 16	US32D	RO
1	Pull Plate	110 x 70C 4 x 16	US32D	RO
1	Closer	422 CTB2	EN	SA
1	Kickplate	K1050 8" x 2" LDW 4BE CSK	US32D	RO
1	Mop Plate	K1050 4" x 1" LDW 4BE CSK	US32D	RO
1	Wall Stop	406	US32D	RO
3	Silencer	608-RKW		RO

Set: 3 – Restroom 107, 108

Doors: 107, 108

3	Hinge	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Lock w/ Indicator	ML2030 102X V20 AP CMK MK	US26D	RO
1	Closer	422 CTB2	EN	SA
3	Silencer	608-RKW		RO
1	Mop Plate	K1050 4" x 1" LDW 4BE CSK	US32D	RO

END OF SECTION

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 other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

1.3 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, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

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 Steel Framing Industry Association or the Steel Stud Manufacturers Association.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with AISI S220 for conditions indicated.

1. Steel Sheet Components: Comply with AISI S220 requirements for steel unless otherwise indicated.
2. Protective Coating: AISI S220, G40, hot-dip galvanized unless otherwise indicated.

B. Studs and Tracks: AISI S220.

1. Steel Studs and Tracks:

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following or approved equal:

1) ClarkDietrich.
2) MarinoWARE.
3) MRI Steel Framing, LLC.
4) Phillips Manufacturing Co.

b. Minimum Base-Steel Thickness: 0.0269 inch.
c. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement.

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 or approved equal:

1) ClarkDietrich.
2) MarinoWARE.

3) Super Stud Building Products Inc.

2. Single Long-Leg Track System: AISI S220 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
3. Double-Track System: AISI S220 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

    a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following or approved equal:

        1) ClarkDietrich.
        2) MarinoWARE.
        3) SCAFCO Steel Stud Company.

D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Steel Thickness: 0.0296 inch.

F. Hat-Shaped, Rigid Furring Channels: AISI S220.

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 or approved equal:

    a. ClarkDietrich.
    b. MarinoWARE.
    c. SCAFCO Steel Stud Company.

2. For Ceilings: Provide 150F125-27, 33ksi, at 12” O.C., fastened to cold form steel trusses with at least four (4) #10 hex head self-drilling screws at each connection point. Head of screw, or washer if provided, shall have a minimum diameter of 5/16”. A minimum penetration of three (3) exposed threads through the joined material shall be maintained.
3. Mechanical Fasteners: ASTM C1513, corrosion- resistant coated, self-drilling, self-tapping steel drill screws.

2.3 SUSPENSION SYSTEMS

A. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following or approved equal:

a. Armstrong World Industries, Inc.
b. Rockfon (Rockwool International).

2.4 AUXILIARY MATERIALS

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

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c unless otherwise indicated.
2. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

B. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

C. Do not attach hangers to steel roof deck.

D. Do not connect or suspend steel framing from ducts, pipes, or conduit.

END OF SECTION

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 other 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 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board and tile backing panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C1396/C1396M.

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

    a. CertainTeed Corporation.
    b. Georgia-Pacific Gypsum LLC.
    c. National Gypsum Company.

2. Thickness: As indicated on drawings.
3. Long Edges: Tapered.

B. Gypsum Board, Type X: ASTM C1396/C1396M.

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

    a. CertainTeed Corporation.
    b. Georgia-Pacific Gypsum LLC.
    c. National Gypsum Company.

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

C. Gypsum Ceiling Board: ASTM C1396/C1396M.

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

    a. CertainTeed Corporation.
    b. Georgia-Pacific Gypsum LLC.
    c. National Gypsum Company.

2. Thickness: 1/2 inch.

3. Long Edges: Tapered.

D. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.

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

a. CertainTeed Corporation.
b. Georgia-Pacific Gypsum LLC.
c. National Gypsum Company.

2. Core: As indicated on Drawings.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
5. Shall be used in all rooms with exposure to moisture and on lower level.

2.4 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.

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

a. CertainTeed Corporation.
b. Georgia-Pacific Gypsum LLC.
c. National Gypsum Company.

2. Core: 5/8-inch, Type X.
3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:

a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. L-Bead: L-shaped; exposed long flange receives joint compound.
d. U-Bead: J-shaped; exposed short flange does not receive joint compound.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

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

B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 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.

C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

D. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where indicated.
4. U-Bead: Use at exposed panel edges.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 3 is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical.
4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 093013

CERAMIC TILING

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. Porcelain tile.
2. Metal edge strips.
3. Ceramic tile.
4. Crack isolation membranes.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 "Gypsum Board" for glass-mat, water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Face Size: Actual tile size, excluding spacer lugs.

D. Module Size: Actual tile size plus joint width indicated.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 36 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Metal edge strips in 6-inch lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of floor tile installation.
2. Build mockup of wall tile installation.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Metal edge strips.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS

A. Ceramic Tile Type T-1: Porcelain floor tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Architessa; Strand or a comparable product by one of the following:

a. Approved Equal

2. Module Size: 12 inch by 24-inch nominal.
3. Face Size Variation: Calibrated
4. Thickness: 10mm
5. Edge: Rectified
6. Dynamic Coefficient of Friction: Not less than 0.42.
7. Tile Color and Pattern: As indicated on drawings.
8. Grout Color: As indicated on drawings.
9. Joint width: 1/8 inch

B. Ceramic Tile Type T-2: Ceramic wall tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Architessa; Hues or a comparable product by one of the following:

a. Approved Equal

2. Module Size: 4 inch by 10-inch nominal.
3. Face Size Variation: Rectified.
4. Thickness: 7mm – 8mm
5. Edge: Pressed
6. Tile Color and Pattern: As indicated on drawings.
7. Grout Color: As indicated on drawings.
8. Joint width: 1/8 inch

2.4 SETTING MATERIALS

A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.

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

a. Bonsal American, an Oldcastle company.
b. Custom Building Products.
c. H.B. Fuller Construction Products Inc. / TEC.
d. LATICRETE SUPERCAP, LLC.

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

2.5 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.

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

a. Mapei Corporation.
b. Bostik, Inc.
c. H.B. Fuller Construction Products Inc. / TEC.
d. LATICRETE SUPERCAP, LLC.

2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A666, 300 Series exposed-edge material.

1. Manufacturers: Subject to compliance with requirements, provide basis of design product indicated on drawings by Schluter, or comparable product by one of the following:

a. Blanke Corporation.
b. Ceramic Tool Company, Inc.
c. Approved equal.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

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

a. Bonsal American, an Oldcastle company.
b. Custom Building Products.
c. Jamo Inc.
d. Southern Grouts & Mortars, Inc.

2.7 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION OF CERAMIC TILE

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

a. Tile floors in wet areas.
b. Tile floors consisting of tiles 8 by 8 inches or larger.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Wall Tile: 1/8 inch.
2. Porcelain Tile: 1/8 inch.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

I. Metal Edge Strips: Install at locations indicated and the following:

1. Where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

J. Floor Sealer: Apply floor sealer to grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other

surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F113; thinset mortar.

a. Ceramic Tile Type: T-1.
b. Thinset Mortar: Improved modified dry-set mortar.
c. Grout: High-performance sanded grout.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.

a. Ceramic Tile Type: T-2
b. Thinset Mortar: Improved modified dry-set mortar.
c. Grout: High-performance sanded grout.

END OF SECTION

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 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Structural members to which suspension systems will be attached.
3. Method of attaching hangers to building structure.

    a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:

    a. Lighting fixtures.
    b. Diffusers.
    c. Grilles.
    d. Speakers

7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.

B. Evaluation Reports: For each acoustical panel ceiling suspension system from ICC-ES.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A according to ASTM E1264.
2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS <A-1>

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries; Ultima High NRC 1943 or comparable product by one of the following:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. Rockfon (Rockwool International).

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Classification: Provide panels as follows:

1. Type and Form: Type IV, mineral base with painted finish; Form 2, nodular.
2. Pattern: E (lightly textured).

D. Color: White.

E. Light Reflectance (LR): Not less than 0.87.

F. Ceiling Attenuation Class (CAC): Not less than 35.

G. Noise Reduction Coefficient (NRC): Not less than 0.80.

H. Articulation Class (AC): Not less than 170.

I. Edge/Joint Detail: Square Lay-In

J. Thickness: 7/8 inch.

K. Modular Size: 24 by 48 inches.

L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries; Prelude 15/16” or comparable product by one of the following:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. Rockfon (Rockwool International).

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.

C. 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.

1. Structural Classification: Heavy-duty system.
2. Face Design: Flat, flush.
3. Cap Finish: Painted white.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than #12-gauge diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Hold-Down Clips: Manufacturer's standard hold-down.

2.6 METAL EDGE MOLDINGS AND TRIM

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

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. Rockfon (Rockwool International).

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.

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

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
4. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

    a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.

5. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 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. Vinyl base.
2. Vinyl molding accessories.
3. Resilient stair 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, not less than 12 inches long.

C. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 VINYL BASE <VB-1/VB-2>

A. Manufacturers: Subject to compliance with requirements, provide basis of design product by Tarkett, or approved equal by one of the following:

1. Johnsonite; a Tarkett company
2. Armstrong World Industries, Inc.
3. Roppe Corporation, USA.

B. Product Standard: ASTM F1861, Type TV (vinyl, thermoplastic).

1. Group: I (solid, homogeneous).
2. Style: Style B, Cove.

C. Minimum Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed.

G. Inside Corners: Job formed.

H. Colors and Patterns: As indicated on drawings.

2.2 VINYL MOLDING ACCESSORY <WT-2>

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

1. Johnsonite; a Tarkett company

2. Armstrong World Industries, Inc.
3. Burke Mercer Flooring Products; a division of Burke Industries Inc.

B. Description: Vinyl transition for resilient floor to carpet tile and ceramic tile.

C. Profile and Dimensions: As indicated.

D. Locations: Provide vinyl molding accessories in areas indicated.

E. Colors and Patterns: As indicated by manufacturer's designations.

2.3 Angle Fit Rubber Stair Treads with Integrated Risers <RT-1>

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Basis-of-Design Product: Subject to compliance with requirements, Tarkett Raised Square Tread/Riser, or a comparable product by one of the following or Architect approved Equeal:

1. Nora by Interface
2. Flexco
3. Roppe Corporation, USA.

C. Stair Treads: ASTM F2169.

1. Type: TS.
2. Class: 2 embossed pattern.
3. Color and Pattern: Color to be selected from full range of colors. Pattern: Raised Square.
4. Integral Risers: Smooth, flat; in height that fully covers substrate.

D. Locations: Provide rubber stair accessories in areas indicated on drawings.

E. Stair Tread and Nosing Size: Lengths and depths to fit each stair tread in one piece or, for treads exceeding maximum lengths manufactured, in equal-length units.

F. Test data:

1. Hardness (ASTM D2240): ≥ 85 Shore A
2. Resistance to Chemicals (ASTM F925): Passes
3. Resistance to Heat (ASTM F 1514): $\Delta E \leq 8$
4. Static Coefficient of Friction (ASTM D 2047): ≥ 0.5 SCOF
5. Flamability (ASTM E648, Critical Radiant Flux): Class 1 (≥ 0.45 W/cm2)
6. Limited Commercial Warranty: 5 years

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based, or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

C. Metal Edge Strips: Extruded aluminum with mill finish, nominal 2 inches wide, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

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

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. 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.

3.4 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.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.

1. Apply two coat(s).

E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vinyl composition floor tile
2. Luxury vinyl tile flooring with backing.
3. Rubber floor tile

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of resilient floor tile.

1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
2. Show details of special patterns.

C. Samples: For each exposed product and for each color, texture, and pattern specified, in manufacturer's standard size, but not less than 6-by-9-inch sections.

D. Product Schedule: For floor tile: Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 10 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive floor tile during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 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 SOLID VINYL FLOOR TILE <VCT-1>

A. Basis-of-Design Product: Subject to compliance with requirements, provide vinyl composition tile by Tarkett or an Approved equal by one of the following:

1. Armstrong Flooring
2. AHF Products

B. Tile Standard: ASTM F1700.

1. Class II Surface-Decorated Vinyl Tile.
2. Type A, Smooth Surface.
3. Size: 12 by 12 inches
4. Thickness: 3.17mm
5. Finish: Polyurethane.

C. Colors and Patterns: As indicated on drawings, to match existing.

2.3 LUXURY VINYL TILE <LVT—1>

A. Basis-of-Design Product: Subject to compliance with requirements, provide Cobalt; Katanga LVT or an Approved equal by one of the following:

1. Mannington Commercial.
2. Moduleo

B. Tile Standard: ASTM F1700.

1. Type: Class III Printed Film Vinyl Tile with attached performance pad.
2. Thickness: 5mm
3. Waer layer: 20mil
4. Edges: square, non-bevel
5. Finish: Enhanced polyurethane

C. Accessories:

1. Leveling Compound: White, premixed, latex based.
2. Adhesive: Water based, waterproof, recommended by flooring manufacturer.
3. Grounding Tape: 1/2 inch wide copper tape.

D. Sheet Width: As standard with manufacturer.

E. Installation Method: Glue-down

F. Colors and Patterns: As indicated on drawings.

2.4 RUBBER FLOOR TILE <RL-1>

A. Basis-of-Design Product: Subject to compliance with requirements, provide vinyl composition tile by Johnsonite or an Approved equal by one of the following:

1. Johnsonite; a Tarkett company.
2. Roppe Corporation; Roppe Holding Company.

B. Product Standard: ASTM F1344.

1. Type: Class I-A, Homogeneous Rubber Tile, solid color
2. Thickness: 1/8 inch
3. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D2240.
4. Thickness: 1/8 inch
5. Size: 24 by 24 inches
6. Hardness: Not less than 85 Shore A.
7. Slip Resistance: ≥ 0.5 SCOF

C. Wearing Surface: Textured

D. Seamless-Installation Method: Chemically bonded.

E. Colors and Patterns: As indicated on drawings.

2.5 RESILIENT INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient tile flooring manufacturer for applications indicated.

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

C. Seamless-Installation Accessories:

1. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation.

3.2 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.

B. Material Inspection: In accordance with manufacturer's installation requirements, visually inspect materials prior to installation. Material with visual defects shall not be installed. Labor costs required to replace material installed with visual defects shall be the responsibility of the installation contractor.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Resilient:

1. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient products.
2. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
3. Do not install resilient floor tile until materials are the same temperature as space where they are to be installed.

a. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

4. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

B. Luxury Vinyl Tile:

1. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
2. Surface Preparation:

a. General: Prepare floor substrate in accordance with manufacturer's instructions.
b. Floor Substrate: Prepare floor substrate to be smooth, rigid, flat, permanently dry, clean and free of foreign materials such as dust, paint, grease, oils, solvent, curing and hardening compounds, sealers, asphalt and old adhesive residue.
c. Concrete Floor Substrate: Concrete floor substrate shall have a minimum compressive strength of 3500 psi. Refer to Division 3 Concrete sections

for patching and repairing crack materials, and leveling compounds with portland cement-based compounds.

1) Reference Standard: Comply with ASTM F 710 Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.

d. Concrete Moisture testing:

1) Conduct moisture tests on all concrete floors regardless of the age, grade level or the presence of existing flooring. Conduct calcium chloride tests in accordance with ASTM F 1869. Measure the internal relative humidity of the concrete slab in accordance with ASTM F 2170. One test of each type should be conducted for every 1,000 sq. ft. of flooring. For projects less than 3,000 sq. ft., a minimum of three tests of each type should be conducted. The tests should be conducted around the perimeter of the room, at columns, and where moisture may be evident. Concrete moisture vapor emissions must not exceed 5.0 lbs. per 1,000 sq. ft. in 24 hrs. Concrete internal relative humidity must not exceed 75%. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If any test result exceeds these limitations, the installation must not proceed until the problem has been corrected.

e. Concrete pH Test: Perform pH tests on concrete floors regardless of the age or grade level. If the pH is greater than 10, it must be neutralized prior to beginning the installation.

3.4 RESILIENT TILE FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient tile flooring.

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. Scribe and cut resilient floor tile to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

D. Extend resilient sheet floor tile into toe spaces, door reveals, closets, and similar openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient floor tile as marked on substrates. Use chalk or other nonpermanent marking device.

F. Install resilient floor tile on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

G. Adhere floor tile 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.

H. Seamless Installation:

1. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.5 LUXURY VINYL TILE INSTALLATION

A. Full Spread Adhesive Method Installation: Install tile flooring with full spread adhesive method from established area center marks, in order for tile at opposite edges of area to be of equal width. Avoid using cut tile widths at perimeter less than four inches of tile width. Install tiles square with room axis. Lay tile material into wet adhesive, as recommended by tile manufacturer.

1. Full Spread Adhesive Method, Seamless Flooring Installation: Rout out seams and heat weld together with complementary colored heat welding rod in accordance with flooring manufacturer's recommendations.
2. Adhesive Material Installation: Use trowel as recommended by flooring manufacturer for specific type of adhesive. Spread at a rate of approximately 150 sq. ft./gal. as recommended by flooring manufacturer.

B. Installation techniques:

1. Square with room axis.
2. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
3. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
4. Extend flooring into toe spaces, door reveals, closets, and similar openings.
5. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers.
6. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specifications sections for expansion joint covers.
7. Adhere resilient flooring to flooring substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed flooring installation.

a. Use adhesive applied to substrate in compliance with flooring manufacturer’s recommendations, including those for trowel notching, adhesive mixing, and adhesive open and working times.

8. Roll resilient flooring as required by flooring manufacturer.
9. Finish Flooring Pattern: Ashlar.

3.6 CLEANING AND PROTECTION

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

B. Comply with manufacturer's written instructions for cleaning and protecting resilient floor tile.

C. Perform the following operations immediately after completing resilient floor tile installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

D. Protect resilient floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

E. Cover resilient floor tile until Substantial Completion.

END OF SECTION

SECTION 096723

RESINOUS 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. Resinous flooring systems.
2. Integral cove base accessories.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review manufacturer's written instructions for substrate preparation and environmental conditions affecting resinous flooring installation.
2. Review details of integral cove bases.
3. Review manufacturer's written instructions for installing resinous flooring systems.
4. Review protection measures for adjacent construction and installed flooring, floor drainage requirements, curbs, base details, and so forth.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.

B. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Apply full-thickness mockups on 96-inch-square floor area selected by Architect.

a. Include 96-inch length of integral cove base with inside and outside corner.

2. Simulate finished lighting conditions for Architect's review of mockups.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.

C. Close spaces to traffic during resinous flooring installation and for 24 hours after installation unless manufacturer recommends a longer period.

1.9 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Flammability: Self-extinguishing according to ASTM D635.

2.2 MANUFACTURERS

A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.3 RESINOUS FLOORING (RMF-1)

A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Stonhard, Stoneshield HRI or comparable product by one of the following:

a. Sherwin Williams
b. Elite Crete Systems.
c. Architect approved equeal.

B. System Characteristics:

1. Color and Pattern: As indicated on drawings.
2. Wearing Surface: Textured for slip resistance.
3. Overall System Thickness: 3/16 inch nominal.

C. System Components:

1. Primer:

a. Resin: Epoxy
b. Formulation Description: two component, 100 percent solids.
c. Application Method: Squeegee and roller.
d. Number of Coats: one.

2. Mortar Base

a. Resin: Epoxy.
b. Formulation Description: three component, 100 percent solids.
c. Application Method: Metal Trowel.

1) Thickness of Coats: nominal 1/8 inch.

2) Number of Coats: One.

d. Aggregates: Pigmented Blended aggregate.

3. Undercoat

a. Resin: Epoxy
b. Formulation Description: two-component, 100% solids, UV Stable.
c. Type: Clear.
d. Finish: Gloss.
e. Number of Coats: one.

4. Broadcast Media:

a. Type: pigmented
b. Finish: standard.
c. Number of Coats: one.

5. Sealer:

a. Resin: Epoxy
b. Formulation Description: two-component, 100% solids, UV Stable.
c. Type: Clear.
d. Finish: Gloss.
e. Number of Coats: one.
f. Texture level: Standard or medium.

D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 10,000 psi after 7 days per ASTM C579
2. Tensile Strength: 2,000 psi per ASTM C307
3. Flexural Strength: 4,300 psi per ASTM C580
4. Flexural Modulus of Elasticity: 2.0 x 106 psi per ASTM C580
5. Hardness: 85 to 90 per ASTM D2240, Shore D
6. Impact Resistance: > 160 in./lbs. per ASTM D2794
7. Abrasion Resistance: 0.06 gm max. weight loss per ASTM D 4060, CS-17
8. Flammability: Class 1 per ASTM E-648.
9. Thermal Coefficient of Linear Expansion: 1.3 x 10-5 in./in. oF
10. Water Absorption: 0.1% per ASTM C 413
11. VOC Content per ASTM D2369:

a. Base – 40 g/l
b. Undercoat – 34 g/l
c. Sealer – 34 g/l

12. Cure Rate @ 77°F / 25°C: 12 hours foot traffic, 24 hours normal operations.

2.4 INTEGRAL COVE ACCESSORIES

A. Radius Cove: Cove molding with approximately 1-inch radius for adhesive installation at floor-to-wall joint as substrate to receive resinous flooring system to form an integral cove base.

1. Height: As indicated on drawings.

B. Installation Adhesive: As recommended in writing by accessory manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resinous flooring systems.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
b. Comply with ASTM C811 requirements unless manufacturer's written instructions are more stringent.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 6 lb of water/1000 sq. ft. of slab area in 24 hours.
b. Relative Humidity Test: Use in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Reinforcing Membrane: Apply reinforcing membrane to substrate cracks.

D. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

1. Integral Cove Base: As indicated on drawings.

E. Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness indicated for flooring system.

1. Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.

F. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.

G. Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.

3.3 FIELD QUALITY CONTROL

A. Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.

1. Contractor will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Owner.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

B. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.

3.4 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION

SECTION 097200

WALL COVERINGS

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: Wall Covering.

1.3 REFERENCE STANDARDS

A. ASTM D1308-02 Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes

B. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

C. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)

D. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials

E. ASTM E1428 Standard Test Method for Evaluating the Performance of Antimicrobials in or on Polymeric Solids Against Staining by Streptoverticillium Reticulum

F. ASTM G21-15 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

G. ASTM G22 Standard Practice for Determining Resistance of Plastics to Bacteria

H. California Specification 01350 - Standard Method for The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers.

I. NSF/ANSI 342 Sustainability Assessment for Wallcovering Product

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Convene pre-installation meeting before start of installation of wall coverings.
2. Review surface preparation, testing for and eliminating sources of moisture accumulation into walls, installation, cleaning, protection, and coordination with other work.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement seams and termination points.

C. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36 inches long in size.

1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied.

a. Show complete pattern repeat.
b. Mark top and face of fabric.

D. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed.

1.9 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.

1. Build mockups for each type of wall covering on each substrate required. Comply with requirements in ASTM F1141 for appearance shading characteristics.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Delivery and acceptance requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and handling requirements:

1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
3. Store materials in clean, dry area indoors, out of direct sunlight.
4. Keep wall coverings clean and dry.
5. Store materials at normal occupied building temperature and humidity for a minimum of 3 days before installation.

1.12 AMBIENT CONDITIONS

A. Rooms to receive wall coverings: Weather tight with HVAC settings, including temperature 65°F-80°F, and relative humidity 35-55%, the same as those of occupied building for 3 days before installation, throughout installation, and maintained after installation of wall coverings. Wall coverings to be stored under these same conditions for 3 days prior to installation.

1.13 WARRANTY

A. Warranty period: 5 years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates in accordance with test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 50 or less.

2. Fire-Growth Contribution: No flashover and heat and smoke release when tested in accordance with NFPA 286.

2.2 WALL COVERING <WC-1>:

A. Basis-Of-Design Product: Inpro Corporation Ricochet Flexible Wall Protection

1. Finished width: 48 inches.
2. Inks: HAPS free, Ethyl Acetate.
3. Low VOC emitting: a. Meets California 01350 Specification for low VOC emissions.
4. Packaging – 15 yard rolls

B. Physical Properties:

1. Finished total weight: Fed. Spec. CCC-T-191b 5041.

a. Thickness: .032” - .040” (varies by emboss and finish)
b. 34 to 38 oz. per linear yard (555g to 620 g/linear m). [varies by emboss and finish]

2. PVF protective cap film.
3. Backing Type: Poly/Cotton knit. (77%/23%)

C. Surface Properties

1. Impact Resistance – ASTM D-5420 – Gardener Drop Dart –24 to 60+ inch-lbs

2. Abrasion Resistance ASTM D-4060 Taber CS-10f wheel 500 gram load – 200 cycles, 0.02% weight loss.
3. Chemical Resistance – ASTM D-1308 – 10 cleaning agents, 10 staining agents, after 7 days, no change
4. Stain Resistance – ASTM D-1308 - 10 cleaning agents, 10 staining agents, after 7 days, no change
5. Streptoverticillium Reticulum Stain Resistance – ASTM E1428, No visible stain

D. Fire Ratings

1. Surface burning characteristics, ASTM E 84: Class A.

a. Flame Spread Index: 10
b. Smoke Developed Index: 120.

E. Environment and Health

1. CAL 01350 – Certified
2. Fungal Resistance – ASTM G-21 – No growth
3. Bacterial Resistance – ASTM G-22 – No growth
4. EPD - 3rd Party Certified
5. HPD – 3rd Part Certified
6. NSF/ANSI 342 Certified to Wallcovering Association Sustainability Standard

F. Design:

1. Pattern: Select from Ricochet pattern selection.

a. Color: Select from Ricochet color palette.

2.3 ACCESSORIES

A. Primer:

1. Roman PRO 935 Primer

a. Contain mold inhibitor.
b. Compatible with wall coverings.

B. Adhesive:

1. Roman PRO 555 Extreme Tack Wallcovering Adhesive.

a. Contain mold inhibitor.
b. Compatible with wall coverings.
c. Use undiluted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive wall coverings. Existing substrates must be sanded to remove prior adhesives and coatings that include oil-based, gloss or semi-gloss paints/primers. Moisture content of the drywall should not exceed 4%. Wall covering cannot be installed over non-porous substrates (such as laminates, impact resistant drywall, brick, metal or glass).

B. Notify architect of conditions that would adversely affect installation or subsequent use.

C. Do not begin surface preparation or installation until unacceptable conditions are corrected.

3.2 SURFACE PREPERATION

A. Surface finishes should be at a minimum of level 4 (per ASTM C840-04 Specifications) and in accordance with manufacturer's instructions. Never install over existing wallcovering, wall protection or other surface finishes.

B. Ensure walls are structurally sound, smooth, clean, and dry.

C. Remove mold, mildew, dirt, oil, grease, stains, and marks.

D. Repair wall irregularities.

E. NEVER apply primer over oil-based paint/primer.

F. Test for and eliminate sources of moisture accumulation into wall or wall cavity.

G. Remove existing wall coverings, including remaining adhesive.

H. Apply primer to wall surfaces to receive wall coverings 24-hours prior to installation to ensure complete drying.

3.3 INSTALLATION

A. Install wall coverings in accordance with manufacturer's instructions utilizing experienced Vinyl Wallcovering (VWC) installers.

B. Wall Preparation:

1. Install a minimum of 3 strips of wall coverings for test.
2. Inspect wall coverings and evaluate appearance for color uniformity and pattern match. All material must be installed in numerical roll sequence starting with the highest number
3. Notify Architect and manufacturer if appearance is unacceptable.
4. Do not begin main installation until unacceptable appearance is corrected.

C. Install wall coverings under adequate lighting conditions.

D. Install wall covering strips plumb.

E. Apply adhesive to back of wall coverings in accordance with manufacturer's instructions

F. Ensure wall coverings have made good contact to wall smoothing out all bubbles with a plastic smoother. Continue to inspect up to (2) two hours after installation.

G. Seams:

1. Install wall covering seams vertical, with tight fit.
2. Install wall covering seams free from air and paste bubbles.
3. Do not locate seams closer than 6 inches to corners.
4. Obtain uniform color match associated with patterns across seams.

H. Remove paste residue from wall coverings, ceilings, and baseboards.

I. Install wall coverings to obtain uniform color and pattern match across seams.

J. Install wall coverings with no objectionable variations in color and pattern match, as determined by Architect.

K. Remove and replace damaged wall coverings that cannot be successfully repaired, as determined by Architect.

3.4 CLEANING

A. Clean wall coverings promptly after installation, if necessary, in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials, steel wool abrasive cleaners, metal bristled brushes, or methods that could damage wall coverings. Solvents can be used in accordance with manufacturer's instructions.

3.5 PROTECTION

A. Protect both installed and uninstalled wall coverings from damage during construction.

END OF SECTION

SECTION 099113

EXTERIOR 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 exterior substrates:

1. Exterior Stucco

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

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.
2. Indicate VOC content.
3. Product characteristics.
4. Surface preparation instructions and recommendations.
5. Primer requirements and finish specifications.
6. Storage and handling requirements and recommendations.
7. Application methods.

8. Cautions for storage, handling and installation.

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

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra paint materials from the same production run as the materials applied and, in the quantities, described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to owner.

B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

C. Coating Maintenance Manual: Upon conclusion of project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams, "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

C. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors, and sheens available.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.

1. Product name and type (description).
2. Application and uses.
3. Surface Preparation.
4. VOC Content.
5. Environmental handling.
6. Batch date.
7. Color number.

B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing

D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

E. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

F. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior/Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. Paints and Coatings:

1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufactures product instructions for optimal color conformance.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use a primer categorized as "best" by the manufacturer.

C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

D. Color: Refer to Finish Schedule for paint colors, and as selected.

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

F. 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.

G. Colors: As indicated on drawings.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until the substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

D. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

G. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.

3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.
5. Gypsum Board: 12 percent.

3.2 PREPARATION

A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint, or other contamination to ensure good adhesion.

1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface, and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.

B. Stucco: Must be clean and free of any loose stucco. If recommended procedures for applying stucco are followed, and normal drying conditions prevail, the surface may be painted in 30 days. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments such as Loxon.

C. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.Apply coatings using methods recommended by manufacturer.

C. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

D. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.

E. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

F. 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.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Stucco Substrates (P-5):

1. Acrylic, Textured Coating System: MPI 42.

a. Prime coat: As recommended in writing by topcoat manufacturer.
b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
c. Topcoat: Textured latex coating, flat, MPI #42. Texture: Medium

1) Sherwin Williams; ConFlex XL Texture High Build Acrylic Coating, A05W00810/CF12W0810,
2) PPG; Perma-Crete Textured Coating, 4-50/4-60
3) Benjamin Moore; Ultra Spec Masonry Elastomeric Waterproof Coating, 055.

END OF SECTION

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. Steel and iron.
2. Galvanized metal.
3. Gypsum board.
4. Flush Wood Doors
5. Metal Frames
6. CMU

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

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.
2. Indicate VOC content.
3. Include preparation requirements and application instructions.

B. Samples: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. 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 and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each paint product from single source from single manufacturer.

2.2 MANUFACTURERS

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

1. Sherwin Williams Company (The).
2. PPG Paints.
3. Benjamin Moore & Co.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior Painting Schedule for the paint category indicated.

2.3 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. Colors: As indicated on drawings.

2.4 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Masonry (Clay and CMUs): 12 percent.
2. Gypsum Board: 12 percent. Verify that finishing compound is dry and sanded smooth.
3. Concrete: 12 percent.
4. Wood: 15 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.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

    a. Uninsulated metal piping.

2. Paint the following work where exposed in occupied spaces:

    a. Uninsulated metal piping.
    b. Other items as directed by Architect.
    c. Equipment, including panelboards.
    d. Uninsulated plastic piping.
    e. Pipe hangers and supports.
    f. Metal conduit.
    g. Plastic conduit.
    h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    i. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Steel Substrates <P-4>:

1. High-Performance Architectural Latex System MPI INT 5.1RR:

a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.

1) Benjamin Moore: D.T.M. Alkyd Low Lustre
2) PPG: Multiprime 4160
3) Sherwin Williams: Steel Spec Universal Metal Primer

b. Prime Coat: Shop primer specified in Section where substrate is specified.
c. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
d. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.

1) Benjamin Moore: Ultra Spec Waterborne Interior Eggshell
2) PPG: Diamond Interior Eggshell Paint + Primer
3) Sherwin Williams: Interior Acrylic Eg-Shel

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

1) Benjamin Moore: Ultra Spec Waterborne Interior Semi-Gloss
2) PPG: Diamond Interior Semi- Gloss Paint + Primer
3) Sherwin Williams: Interior Acrylic Semi-Gloss

B. Galvanized-Metal Substrates:

1. High-Performance Architectural Latex System MPI INT 5.3M:

a. Prime Coat: Primer, galvanized, water based, MPI #134.

1) Benjamin Moore: Ultra Spec Acrylic Metal Primer

2) PPG: Corrostop Ultra Metal Primer for Rust-Free Galvanized Metal
3) Sherwin Williams: Pro Industrial DTM Acrylic Primer/Finish

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

c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.

1) Benjamin Moore: Ultra Spec Waterborne Interior Eggshell
2) PPG: Diamond Interior Eggshell Paint + Primer
3) Sherwin Williams: Interior Acrylic Eg-Shel

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

1) Benjamin Moore: Ultra Spec Waterborne Interior Semi-Gloss
2) PPG: Diamond Interior Semi- Gloss Paint + Primer
3) Sherwin Williams: Interior Acrylic Semi-Gloss

C. Gypsum Board Substrates <P-1, P-3, P-7>:

1. Institutional Low-Odor/VOC Latex System MPI INT 9.2M:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.

1) Benjamin Moore: UltraSpec 500 Interior Primer.
2) PPG Architectural: Speedhide Zero Latex Sealer.
3) Sherwin Williams: ProMar 200 Zero Interior Primer.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

c. Topcoat: Latex, interior, institutional low odor/VOC, flat (MPI Gloss Level 1), MPI #143.

1) Benjamin Moore: UltraSpec 500 Interior Flat.
2) PPG Architectural: Speedhide Zero Latex Flat.
3) Sherwin Williams: ProMar 200 Zero Interior Latex Flat.

d. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.

1) Benjamin Moore: UltraSpec 500 Interior Low Sheen.
2) PPG Architectural: Speedhide Zero Latex Eggshell.
3) Sherwin Williams: ProMar 200 Zero Interior Low Gloss Eg-shel.

e. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

1) Benjamin Moore: UltraSpec 500 Interior Semi-gloss.
2) PPG Architectural: Speedhide Zero Latex Semi-gloss.
3) Sherwin Williams: ProMar 200 Zero interior Latex Semi-gloss.

D. CMU Substrates (P-6)

1. Water-Based Light Industrial Coating System MPI INT 4.2K:

a. Block Filler: Latex, interior/exterior, MPI #4

1) Sherwin Williams; Pro Industrial Heavy Duty Block Filler.
2) Benjamin Moore; Ultra Spec Hi Build Masonry Block Filler
3) PPG; Speedhide Int./Ext. Masonry Hi Fill Latex Block Filler.

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

c. Topcoat: Latex, interior, high-performance architectural, eggshell (MPI Gloss Level 3), MPI #139

1) Sherwin Williams; Pro Industrial Pre-Cat Epoxy Eg-Shel
2) PPG; Pitt-Glaze WB1 Int. Eggshell Pre-Catalyzed WB Acrylic Epoxy
3) Benjamin Moore; D.T.M. Acrylic Low Lustre Enamel

END OF SECTION

SECTION 102113.17

PHENOLIC-CORE TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Overhead braced Phenolic-core toilet compartments.
2. Urinal Screens: Wall hung with brackets.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for blocking and support of floor and wall anchored compartments.
2. Section 092216 "Non-Structural Metal Framing" for blocking.
3. Section 102800 "Toilet, Bath, and Laundry Accessories" for accessories mounted on toilet compartments.

1.2 COORDINATION

A. Coordinate requirements for blocking, reinforcing, and other supports concealed within wall to ensure that toilet compartments can be supported and installed as indicated.

1.3 ACTION SUBMITTALS

A. Product Data.

1. Manufacturer's data sheets for each type of product indicated. Include fabrication details, description of materials and finishes.

a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments and urinal screens.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of centerlines of toilet fixtures.
4. Show locations of floor drains.
5. Show overhead support and bracing locations.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of toilet compartment.

1. Include Samples of hardware and accessories involving material and color selection.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for toilet compartments and urinal screens, prepared on 6 by 6 inch square samples of same thickness and material indicated for Work.
2. Each type of hardware and accessory.

E. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

F. Delegated Design Submittals: For grab bars mounted on toilet compartment panels, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum five years' experience in the manufacturing of toilet compartments.

B. Installers Qualifications: Experienced Installer regularly engaged in installation of toilet compartments for minimum three years.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver toilet compartments to site until building is enclosed and HVAC systems are in operation.

1. Deliver toilet compartments in manufacturer's original packaging.
2. Store in an upright condition.

1.6 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship during the following period after substantial completion:

1. Phenolic LT Toilet Partitions: Against delamination: 5 years.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For toilet compartments and urinal screens.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Door Hinges: Two hinge(s) with associated fasteners.
2. Latch and Keeper: Two latch(es) and keeper(s) with associated fasteners.
3. Door Bumper: Two door bumper(s) with associated fasteners.
4. Door Pull: Two door pull(s) with associated fasteners.
5. Fasteners: Ten fasteners of each size and type.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain phenolic-core toilet compartments from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 26-75.
2. Smoke-Developed Index: 450 or less.

B. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:

1. Panels are able to withstand a concentrated load on grab bar of at least 250 lbf applied at any direction and at any point, without deformation of panel.

C. Regulatory Requirements: Comply with applicable provisions in the USDOJ's 2010 ADA Standards for Accessible Design" and ICC A117.1 for toilet compartments designated as accessible.

2.3 PHENOLIC-CORE TOILET COMPARTMENTS

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 or Architect approved equal:

1. Bradley Corporation.
2. Global Partitions Corp., an ASI Group Company.
3. Accurate Partitions Corp., an ASI Group Company.
4. General Partitions Mfg. Corp.

B. Toilet-Enclosure Style: Floor anchored/ overhead braced.

C. Urinal-Screen Style: Wall hung flat panel.

D. Door Height Above Floor: 6 inches at standard compartments, 9 inches at accessible compartments.

E. Pilaster Height: As indicated on drawings.

F. Door, Panel, and Pilaster Construction: Solid phenolic-core material with melamine facing on both sides fused to substrate during manufacture (not separately laminated), and with eased and polished edges. Provide minimum 3/4-inch thick doors and pilasters and minimum 1/2-inch thick panels.

1. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand applied downward load on grab bar of at least 250 lbf, when tested according to ASTM F446, without deformation of panel.
2. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.

G. Flat-Panel Urinal-Screen Construction: Matching panel construction.

H. Pilaster Shoes: Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

I. Pilaster Sleeves (Caps): Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

J. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets, stainless steel.
2. Full-Height (Continuous) Type: Manufacturer's standard design, stainless steel.

K. Phenolic Compartment Finish: One color in each room.

1. Through-Color Phenolic: Manufacturer's standard solid through-color.

a. Color: As selected by Architect from manufacturer's full range.

2.4 HARDWARE AND ACCESSORIES

A. Door Hardware and Accessories, Heavy Duty: Manufacturer's heavy-duty institutional operating hardware and accessories.

1. Hinges: Manufacturer's minimum 0.062-inch thick, stainless steel self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door. Mount with through-bolts.
2. Latch and Keeper: Manufacturer's heavy-duty, surface-mounted, cast stainless steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible. Mount with through bolts.
3. Coat Hook: Manufacturer's heavy-duty, combination cast stainless steel hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories. Mount with through bolts.
4. Door Bumper: Manufacturer's heavy-duty, rubber-tipped, cast stainless steel bumper at outswinging doors. Mount with through bolts.
5. Door Pull: Manufacturer's heavy-duty, cast stainless steel pull at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible. Mount with through bolts.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

A. Aluminum Castings: ASTM B26/B26M.

B. Aluminum Extrusions: ASTM B221

C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.

D. Stainless Steel Castings: ASTM A743/A743M.

2.6 FABRICATION

A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Urinal-Screen Posts: Manufacturer's standard corrosion-resistant anchoring assemblies at posts and walls, with leveling adjustment nuts at tops and bottoms of posts. Provide shoes and sleeves (caps) at posts to conceal anchorage.

D. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments designated as accessible

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels or Screens: 1/2 inch.
b. Panels or Screens and Walls: 1 inch.

2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height brackets.

a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 102800

TOILET, BATH, AND LAUNDRY 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. Public-use washroom accessories.
2. Underlavatory guards.
3. Baby changing stations.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Samples: Full size, for each exposed product and for each finish specified.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TOILET ROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Grab Bar <D>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-6806 x 42 or a comparable product by one of the following:

a. American Specialties, Inc.
b. Bradley Corporation.
c. Bobrick Washroom Equipment, Inc

2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.

a. Finish: Smooth, No. 4 finish (satin).

4. Outside Diameter: 1-1/2 inches.
5. Configuration and Length: Straight, 42 inches long.

C. Grab Bar <C>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-6806 x 36 or a comparable product by one of the following:

a. American Specialties, Inc.

b. Bradley Corporation.
c. Bobrick Washroom Equipment, Inc

2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.

a. Finish: Smooth, No. 4 finish (satin).

4. Outside Diameter: 1-1/2 inches.
5. Configuration and Length: Straight, 36 inches long.

D. Vertical Grab Bar <E>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-6806 x 18 or a comparable product by one of the following:

a. American Specialties, Inc.
b. Bradley Corporation.
c. Bobrick Washroom Equipment, Inc

2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.

a. Finish: Smooth, No. 4 finish (satin).

4. Outside Diameter: 1-1/2 inches.
5. Configuration and Length: Straight, 18 inches long.

E. Toilet Tissue (Roll) Dispenser <F>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-4288 or a comparable product by one of the following:

a. American Specialties, Inc.
b. Bradley Corporation.
c. Bobrick Washroom Equipment, Inc

2. Description: Double-roll dispenser.
3. Mounting: Surface mounted.
4. Operation: Noncontrol delivery with theft-resistant spindle.
5. Capacity: Designed for 6-inch diameter tissue rolls.
6. Material and Finish: Satin-finish aluminum bracket with plastic spindle.

F. Sanitary-Napkin Disposal Unit <G>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-270 or a comparable product by one of the following:

    a. American Specialties, Inc.
    b. Bradley Corporation.
    c. Bobrick Washroom Equipment, Inc

2. Mounting: Surface mounted.
3. Door or Cover: Self-closing, disposal-opening cover.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

G. Combination Towel (Roll) Dispenser/Waste Receptacle <H>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-3979 or a comparable product by one of the following:

    a. American Specialties, Inc.
    b. Bradley Corporation.
    c. Bobrick Washroom Equipment, Inc.

2. Description: Combination unit for dispensing preset length of roll paper towels, with removable waste receptacle.
3. Towel Mechanism: Automatic, battery-operated sensor.
4. Mounting: Surface
5. Minimum Towel-Dispenser Capacity: 8-inch-wide, 800-foot-long roll.
6. Minimum Waste-Receptacle Capacity: 18-gallon.
7. Material and Finish: Stainless steel, No. 4 finish (satin).
8. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle

H. Liquid-Soap Dispenser, Surface Mounted <B>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-4112 or a comparable product by one of the following:

    a. American Specialties, Inc.
    b. Bradley Corporation.
    c. Bobrick Washroom Equipment, Inc

2. Description: Designed for dispensing antibacterial soap in liquid form.
3. Mounting: Surface mounted.
4. Operation: Automatic
5. Capacity: 34 oz.
6. Materials: Stainless steel, No. 4 finish (satin).

I. Combination Towel (Roll) Dispenser/Waste Receptacle <K>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-3942 or a comparable product by one of the following:

    a. American Specialties, Inc.
    b. Bradley Corporation.
    c. Bobrick Washroom Equipment, Inc.

2. Description: Combination unit for dispensing C-fold or multifold paper towels, with removable waste receptacle.
3. Towel Mechanism: Manual.
4. Mounting: Semi-Recessed.
5. Minimum Towel-Dispenser Capacity: 8-inch-wide, 800-foot-long roll.
6. Minimum Waste-Receptacle Capacity: 12-gallon.
7. Material and Finish: Stainless steel, No. 4 finish (satin).
8. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle

J. Mirror Unit <A>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-165 or a comparable product by one of the following:

    a. American Specialties, Inc.
    b. Bradley Corporation.
    c. Bobrick Washroom Equipment, Inc

2. Frame: Stainless steel angle, 0.05 inch.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

    a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

4. Size: As indicated on Drawings.

K. Seat-Cover Dispenser <J>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-221 or a comparable product by one of the following:

    a. American Specialties, Inc.
    b. Bradley Corporation.
    c. Bobrick Washroom Equipment, Inc

2. Mounting: Surface Mounting.
3. Minimum Capacity: 250 seat covers
4. Exposed material and finish: Stainless steel, No. 4 finish (satin)

5. Lockset: Tumbler Type

L. Fixed Height Baby Changing Station <L>:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Koala Kare Model KB300 or a comparable product by one of the following:

   a. American Specialties, Inc.
   b. Bradley Corporation.
   c. Bobrick Washroom Equipment, Inc

2. Mounting: Surface Mounted with unit projecting not more than 4 inches (102 mm) from wall when closed.
3. Operation: Concealed pneumatic cylinder providing controlled opening and closing of the changing station bed.
4. Exposed material and finish: Bed Surface: injection molded polypropylene with Microban® antimicrobial additive, and ISO 22196 tested for efficacy. Surface is contoured, concave and smooth. Bed surface shall be minimum 535 sq. in.
5. Safety Straps: Replaceable, restraining straps.

2.2 UNDERLAVATORY GUARDS

A. Underlavatory Guard:

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. Buckaroos, Inc.
   b. Plumberex Specialty Products, Inc.
   c. Truebro by IPS Corporation.

2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.3 MATERIALS

A. Stainless Steel: ASTM A666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.

C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

D. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).

E. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

SECTION 220523

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Angle valves.

B. Ball valves.

1.2 RELATED REQUIREMENTS

A. Section 220553 - Identification for Plumbing Piping and Equipment.

B. Section 220716 - Plumbing Equipment Insulation.

C. Section 221005 - Plumbing Piping.

1.3 ABBREVIATIONS AND ACRONYMS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Non-rising stem.

E. OS&Y: Outside screw and yoke.

F. PTFE: Polytetrafluoroethylene.

G. RS: Rising stem.

H. TFE: Tetrafluoroethylene.

I. WOG: Water, oil, and gas.

J. WSP: Working steam pressure.

1.4 REFERENCE STANDARDS

A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).

B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

C. ASME B16.34 - Valves — Flanged, Threaded, and Welding End; 2020.

D. ASME B31.9 - Building Services Piping; 2020.

E. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023, with Errata (2024).

F. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings; 2017.

G. AWWA C606 - Grooved and Shouldered Joints; 2022.

H. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service; 2010a.

I. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves; 2019.

J. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata.

K. MSS SP-125 - Check Valves: Gray Iron and Ductile Iron, In-Line, Spring-Loaded, Center-Guided; 2018.

L. NSF 61 - Drinking Water System Components - Health Effects; 2024.

M. NSF 372 - Drinking Water System Components - Lead Content; 2024.

1.5 SUBMITTALS

A. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

1.6 QUALITY ASSURANCE

A. Manufacturer:

1. Obtain valves for each valve type from single manufacturer.
2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

B. Welding Materials and Procedures: Comply with ASME BPVC-IX.

PART 2 - PRODUCTS

2.1 APPLICATIONS

A. See drawings for specific valve locations.

B. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).

C. Provide the following valves for the applications if not indicated on drawings:

1. Shutoff: Ball, butterfly.

D. Required Valve End Connections for Non-Wafer Types:

1. Copper Tube:

a. 2 inch and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

E. Domestic, Hot and Cold Water Valves:

1. 2 inch and Smaller:

a. Bronze and Brass: Provide with solder-joint ends.
b. Bronze Angle: Class 125, bronze disc.
c. Ball: One-piece, full port, brass with brass trim.

2.2 GENERAL REQUIREMENTS

A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.

B. Valve Sizes: Match upstream piping unless otherwise indicated.

C. Valve Actuator Types:

1. Hand Lever: Quarter-turn valves 6 inch and smaller.

D. Insulated Piping Valves: With 2-inch stem extensions and the following features:

1. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

E. Valve-End Connections:

1. Threaded End Valves: ASME B1.20.1.
2. Solder Joint Connections: ASME B16.18.

F. General ASME Compliance:

1. Solder-joint Connections: ASME B16.18.
2. Building Services Piping Valves: ASME B31.9.

G. Potable Water Use:

1. Certified: Approved for use in compliance with NSF 61 and NSF 372.
2. Lead-Free Certified: Wetted surface material includes less than 0.25 percent lead content.

2.3 BRONZE, ANGLE VALVES

A. Class 125; CWP Rating: 200 psi:

1. Comply with MSS SP-80, Type 1.
2. Body: Bronze; ASTM B62, with integral seat and screw in bonnet.
3. End Connections: Pipe thread.

4. Stem: Bronze.
5. Disc: Bronze.
6. Packing: Asbestos free.
7. Handwheel: Bronze or aluminum.

2.4 BRASS, BALL VALVES

A. One Piece, Full Port with Brass Trim and Push-to-fit or Threaded Connections:

1. Comply with MSS SP-110.
2. CWP Rating: 200 psi.
3. Body: Forged brass.
4. Seats: PTFE.
5. Stem: Brass.
6. Ball: Chrome-plated brass.
7. Operator: Handle.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

END OF SECTION

SECTION 220529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Beam clamps.

B. Pipe hangers.

C. Pipe supports, guides, shields, and saddles.

D. Anchors and fasteners.

1.2 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

D. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

F. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

1.3 QUALITY ASSURANCE

A. Comply with applicable building code.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide required hardware to hang or support piping, equipment, or fixtures with related accessories as necessary to complete installation of plumbing work.

B. Provide hardware products listed, classified, and labeled as suitable for intended purpose.

C. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.

D. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

E. Materials for Metal Fabricated Supports:

1. Zinc-Plated Steel: Electroplated in accordance with ASTM B633 unless stated otherwise.
2. Galvanized Steel: Hot dip galvanized in accordance with ASTM A123/A123M or ASTM A153/A153M unless stated otherwise.

F. Corrosion Resistance: Use corrosion-resistant metal-based materials fully compatible with exposed piping materials and suitable for the environment where installed.

1. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

C. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

D. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

F. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.

2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

G. Secure fasteners according to manufacturer's recommended torque settings.

H. Remove temporary supports.

END OF SECTION

SECTION 220553

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe markers.

1.2 RELATED REQUIREMENTS

A. Section 099123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.

PART 2 - PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

A. Pipe Markers: 3/4-inch diameter and higher.

2.2 NAMEPLATES

A. Description: Laminated piece with up to three lines of text.

1. Letter Color: White.
2. Letter Height: 1/4 inch.

2.3 PIPE MARKERS

A. Comply with ASME A13.1.

B. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

C. Identification Scheme, ASME A13.1:

1. Primary: External Pipe Diameter, Uninsulated or Insulated.
2. Secondary: Color scheme per fluid service.

a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive identification products.

3.2 INSTALLATION

A. Install tags in clear view and align with axis of piping

B. Install plastic tape pipe marker around pipe in accordance with manufacturer's instructions.

END OF SECTION

SECTION 220719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Glass fiber insulation.

1.2 RELATED REQUIREMENTS

A. Section 221005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.3 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).

B. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.

C. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

E. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified in this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER INSULATION

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. CertainTeed Corporation.
2. Johns Manville Corporation.
3. Knauf Insulation.
4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ.
5. Approved Equal.

B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.

1. K Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Exposed Piping: Locate insulation and cover seams in least visible locations.

C. Glass fiber insulated pipes conveying fluids below ambient temperature:

1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

D. Glass fiber insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

E. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

F. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with canvas jacket sized for finish painting.

3.3 SCHEDULES

A. Plumbing Systems:

1. Domestic Hot Water Supply:

a. Glass Fiber Insulation:

1) Thickness: 1 inch.

2. Domestic Cold Water:

END OF SECTION

SECTION 221005

PLUMBING PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sanitary waste piping, buried within 5 feet of building.

B. Sanitary waste piping, above grade.

C. Domestic water piping, above grade.

D. Pipe flanges, unions, and couplings.

E. Pipe hangers and supports.

F. Pressure relief valves.

G. Strainers.

1.2 RELATED REQUIREMENTS

A. Section 220516 - Expansion Fittings and Loops for Plumbing Piping.

B. Section 220529 - Hangers and Supports for Plumbing Piping and Equipment.

C. Section 220553 - Identification for Plumbing Piping and Equipment.

D. Section 220719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems; 2015 (Reaffirmed 2020).

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

E. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings: DWV; 2021.

F. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2024.

G. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings—DWV; 2022.

H. ASME B16.51 - Copper and Copper Alloy Press-Connect Pressure Fittings; 2021.

I. ASME B31.9 - Building Services Piping; 2020.

J. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2021.

K. ASTM B32 - Standard Specification for Solder Metal; 2020.

L. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2019.

M. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2020.

N. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

O. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

P. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.

Q. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2023.

R. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.

S. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.

T. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.

U. ASTM D2846/D2846M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems; 2019a.

V. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.

W. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2023.

X. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

Y. ASTM F437 - Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80; 2021.

Z. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40; 2023.

AA. ASTM F439 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80; 2019.

BB. ASTM F441/F441M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80; 2023.

CC. ASTM F442/F442M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR); 2023.

DD. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings; 2022.

EE. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.

FF. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2020.

GG. IAPMO (UPC) - Uniform Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

HH. IAPMO/ANSI/CAN Z1117 - Standard for Press Connections; 2022.

II. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

JJ. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

KK. NSF 61 - Drinking Water System Components - Health Effects; 2024.

LL. NSF 372 - Drinking Water System Components - Lead Content; 2024.

MM. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Valves: Manufacturer’s name and pressure rating marked on valve body.

C. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: CISPI 301, hubless.

1. Fittings: Cast iron.
2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies.

B. PVC Pipe: ASTM D2665 or ASTM D3034.

1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY WASTE PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. Fittings: Cast iron.
2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D2665.

1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Pipe: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: ASTM B32, alloy Sn95 solder.
3. Mechanical Press Sealed Fittings: ASME B16.51 or IAPMO/ANSI/CAN Z1117, ICC (IPC), and IAPMO (UPC) approved, NSF 61 and NSF 372 certified, with EPDM seals.

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) Anvil International.
2) Apollo Valves.
3) FNW; Copper Press.

4) NIBCO INC; Press System.
5) Approved Equal:
a) Substitutions: See Section 016000 - Product Requirements.

B. CPVC Pipe: ASTM D2846/D2846M, ASTM F441/F441M, or ASTM F442/F442M.

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. IPEX USA, LLC; Xirtec CPVC Schedule 40.
b. Approved Equal.

2. Fittings: CPVC; ASTM D2846/D2846M, ASTM F437, ASTM F438, or ASTM F439.
3. Joints: ASTM D2846/D2846M, solvent weld with ASTM F493 solvent cement.

2.5 PIPE FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 inch and Under:

1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.

2.6 PIPE HANGERS AND SUPPORTS

A. See Section 220529 for additional requirements.

B. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.

2.7 PRESSURE RELIEF VALVES

A. ANSI Z21.22, AGA certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

2.8 STRAINERS

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on, inside, and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. See Section 220516.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

1. See Section 220719.

H. Provide access where valves and fittings are not exposed.

1. Coordinate size and location of access doors with Section 083100.

I. Install bell and spigot pipe with bell end upstream.

J. Install valves with stems upright or horizontal, not inverted. See Section 220523.

K. Install water piping to ASME B31.9.

L. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

M. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

N. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.
2. Support horizontal piping as indicated.
3. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
6. Provide copper plated hangers and supports for copper piping.
7. Support cast iron drainage piping at every joint.

3.4 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

3.5 FIELD TESTS AND INSPECTIONS

A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.

B. Domestic Water Systems:

1. Perform hydrostatic testing for leakage prior to system disinfection.
2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
3. General:

    a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.

C. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed, and clean.

B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

END OF SECTION

SECTION 221119

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

A. NSF 61 - Drinking Water System Components - Health Effects; 2024.

B. NSF 372 - Drinking Water System Components - Lead Content; 2024.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products complying with NSF 61 and NSF 372.

B. Source Limitations: Furnish domestic water piping specialties of same kind by same manufacturer.

C. Provide brass-bodied domestic water piping specialties in DZR brass.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Discard packing materials and verify product interiors are free from debris, damage, and corrosion.

B. Verify end connections, flanges, threads, and grooves are completely clean without signs of damage or degradation that could result in leakage.

C. For products containing isolation or shutoff valves, verify isolation and shutoff valves operate smoothly from fully closed to fully open.

3.2 INSTALLATION

A. Prior to installation of domestic water piping specialties, flush domestic water piping of foreign material.

B. Install products in accordance with manufacturer's instructions.

C. Install products level and plumb.

D. Install products with clearance for access and maintenance.

E. Support products NPS 2-1/2 and larger independently of surrounding pipe.

F. Support products with flanged or grooved ends independently of surrounding pipe.

G. For products containing isolation or shutoff valves, locate valves in horizontal piping with stems at or above center of piping, maintaining unimpeded stem movement.

H. Backflow Preventers:

1. Install backflow preventers in accordance with requirements of local authorities having jurisdiction, including requirements of local water utility.

END OF SECTION

SECTION 223000

PLUMBING EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Diaphragm-type compression tanks.

1.2 REFERENCE STANDARDS

A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023, with Errata (2024).

1.3 SUBMITTALS

A. Product Data:

1.4 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

PART 2 - PRODUCTS

2.1 DIAPHRAGM-TYPE COMPRESSION TANKS

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. Amtrol Inc.
2. Bell & Gossett, a brand of Xylem, Inc.
3. Taco, Inc.
4. Approved Equal:
   a. Substitutions: See Section 016000 - Product Requirements.

B. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.

C. Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 12 psig.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions required for applicable certifications.

B. Coordinate system, equipment, and piping work with applicable electrical, fuel, gas, vent, drain, and waste support interconnections as included or provided by other trades.

END OF SECTION

SECTION 224000

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flush valve water closets.

B. Wall hung urinals.

C. Lavatories.

1.2 RELATED REQUIREMENTS

A. Section 221005 - Plumbing Piping.

1.3 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).

C. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2024.

D. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.

E. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.

F. NSF 61 - Drinking Water System Components - Health Effects; 2024.

G. NSF 372 - Drinking Water System Components - Lead Content; 2024.

1.4 SUBMITTALS

A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on-site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 REGULATORY REQUIREMENTS

A. Comply with applicable codes for installation of plumbing systems.

B. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation.

2.3 FLUSH VALVE WATER CLOSETS

A. Water Closets:

1. Vitreous china, ASME A112.19.2, floor mounted or wall hung as indicated on project drawings, siphon jet flush action, china bolt caps.
2. Bowl: ASME A112.19.2; 16.5 inches high with elongated rim.
3. Flush Valve: Exposed (top spud).
4. Flush Operation: Sensor operated.
5. Handle Height: 44 inches or less.
6. Inlet Size: 1-1/2 inches.
7. Trapway Outlet: 4 inch.
8. Color: White.
9. 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. Gerber Plumbing Fixtures LLC.
    b. Kohler Company.
    c. Approved Equal.

B. Flush Valves:

1. Valve Supply Size: 1 inch.
2. Valve Outlet Size: 1-1/2 inches.
3. 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. Sloan Valve Company.
    b. Zurn Industries, LLC; ZEMS Series.
    c. Approved Equal:
        1) Substitutions: See Section 016000 - Product Requirements.

4. Sensor-Operated:

    a. Type: ASME A112.19.5; chloramine-resistant clog-resistant dual-seat diaphragm valve complete with vacuum breaker, stops and accessories.

b. Mechanism: Solenoid-operated piston or electronic motor-actuated operator with 10 yearbattery powered infrared sensor, and mechanical override or override push button.
c. Supplied Volume Capacity: 1.6 gal per flush.

5. Exposed Type: Chrome-plated, escutcheon, integral screwdriver stop.

C. Water Closet Carriers:

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. Watts
b. Zurn Industries, LLC; Z1201-N.
c. Approved Equal.

2. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.4 WALL HUNG URINALS

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. Gerber Plumbing Fixtures LLC.
2. Kohler Company.
3. Approved Equal:
a. Substitutions: See Section 016000 - Product Requirements.

B. Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.

1. Consumption Volume: 1.0 gal per flush, maximum.
2. Flush Style: Washout.
3. Flush Valve: Exposed (top spud).
4. Flush Operation: Sensor operated.
5. Trapway Outlet: Integral.
6. Removable stainless-steel strainer.
7. Supply Size: 3/4 inch.
8. Outlet Size and Location: 2 inches, bottom.

C. Flush Valves:

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. Sloan Valve Company.
b. Zurn Industries, LLC; ZEMS Series.
c. Approved Equal:
1) Substitutions: See Section 016000 - Product Requirements.

2. Sensor-Operated:

a. Type: ASME A112.19.5; chloramine-resistant, clog-resistant dual-seat diaphragm valve with vacuum breaker, stops and accessories.
b. Mechanism: Solenoid-operated piston or electronic motor-actuated operator with low-voltage powered infrared sensor, and mechanical override or override push button.
c. Supplied Volume Capacity: 1gallon per flush.

2.5 LAVATORIES

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. Gerber Plumbing Fixtures LLC.
2. Kohler Company..
3. Approved Equal:
   a. Substitutions: See Section 016000 - Product Requirements.

B. Wall-Hung Basin:

1. Vitreous China, Grade A: ASME A112.19.2; white, rectangular commercial-grade sink with predrilled holes, rear-center drain, front overflow, and hanger. Size as indicated on drawings with 4-inch centerset spacing.
2. Carrier:

a. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.
b. Manufacturers:

1) Zurn Industries, LLC; Z1231.
2) Watts.
3) Substitutions: See Section 016000 - Product Requirements.

C. Sensor Operated Faucet:

1. Cast brass, chrome plated, deck mounted with sensor located on neck of spout.
2. Spout Style: Standard.
3. Power Supply:

a. Wired: 6 VDC, field-wired into dedicated or common power supply.
b. Wireless:

1) Battery: Replaceable alkaline or lithium type with 200,000 cycles, minimum.
2) Light Cell: Photovoltaic or infra-red cell that transforms both sunlight and artificial light into electrical energy for use and battery charging.

3) Low Battery Warning: Provide red or yellow colored indicator to light periodically at 30 days of remaining capacity and continuously 2 weeks prior to get fully discharged.

4. Mixing Valve: None, single line for tempered water.
5. Water Supply: 3/8-inch compression connections.
6. Aerator: Vandal resistant, 0.5 gpm, laminar flow device.
7. Automatic Shut-off: 30 seconds.
8. Sensor Range: Factory set at 3 inch adjustable up to 24 inch.
9. Finish: Polished chrome.
10. 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. Gerber Plumbing Fixtures LLC.
    b. Moen Incorporated.
    c. Kohler.
    d. Approved Equal:
        1) Substitutions: See Section 016000 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

3.2 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome-plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall supports and bolts.

E. Solidly attach water closets to floor with lag screws. Lead flashing is not intended to hold fixture in place.

3.3 CLEANING

A. Clean plumbing fixtures and equipment.

B. See Section 017419 - Construction Waste Management and Disposal for additional requirements.

3.4 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.

B. Do not permit use of fixtures by construction personnel.

C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 230513

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General construction and requirements.

B. Applications.

C. Single phase electric motors.

1.2 REFERENCE STANDARDS

A. NEMA MG 00001 - Motors and Generators; 2024.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

PART 2 - PRODUCTS

2.1 GENERAL CONSTRUCTION AND REQUIREMENTS

A. Construction:

1. Open drip-proof type except where specifically noted otherwise.
2. Design for continuous operation in 104 degrees F environment.
3. Design for temperature rise in accordance with NEMA MG 00001 limits for insulation class, service factor, and motor enclosure type.

B. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.

C. Wiring Terminations:

1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.

2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.2 APPLICATIONS

A. Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not comply with these specifications.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

SECTION 230529

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Support and attachment components.

1.2 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.4 QUALITY ASSURANCE

A. Comply with applicable building code.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.

    a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    b. Galvanized Steel: Hot dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Prefabricated Trapeze-Framed Metal Strut Systems:

1. Strut Channel or Bracket Material:
2. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.

C. Hanger Rods:

1. Threaded zinc-plated steel unless otherwise indicated.
2. Minimum Size, Unless Otherwise Indicated or Required:
    a. Equipment Supports: 1/2-inch diameter.

D. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

C. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

D. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

F. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

G. Secure fasteners according to manufacturer's recommended torque settings.

H. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

A. Inspect support and attachment components for damage and defects.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 230593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Measurement of final operating condition of HVAC systems.

1.2 REFERENCE STANDARDS

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.

B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2024.

1.3 SUBMITTALS

A. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.

1. Include at least the following in the plan:

a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
d. Final test report forms to be used.
e. Procedures for formal deficiency reports, including scope, frequency and distribution.

B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

1. Revise TAB plan to reflect actual procedures and submit as part of final report.
2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.
3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
5. Units of Measure: Report data in I-P (inch-pound) units only.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:

1. AABC (NSTSB), AABC National Standards for Total System Balance.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Duct systems are clean of debris.
5. Fans are rotating correctly.
6. Duct system leakage is minimized.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 10 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

3.5 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

3.6 MINIMUM DATA TO BE REPORTED

A. Electric Motors:

1. Manufacturer.
2. Model/Frame.
3. HP/BHP.
4. Phase, voltage, amperage; nameplate, actual, no load.
5. RPM.
6. Service factor.
7. Sheave Make/Size/Bore.

B. Exhaust Fans:

1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Sheave Make/Size/Bore.
10. Fan RPM.

C. Duct Traverses:

1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

END OF SECTION

SECTION 233100

HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Metal ducts.

1.2 RELATED REQUIREMENTS

A. Section 230130.51 - HVAC Air-Distribution System Cleaning: Post install duct cleaning.

B. Section 233319 - Duct Silencers.

1.3 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

C. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.

D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.

B. Provide metal duct unless otherwise indicated. Fibrous glass duct can be substituted at the Contractor's option.

C. Acoustical Treatment: Provide sound-absorbing liners and sectional silencers for metal-based ducts in compliance with Section 233319.

D. Duct Shape and Material in accordance with Allowed Static Pressure Range:

1. Round: Plus, or minus 2 in-wc of galvanized steel.

E. Duct Sealing and Leakage in accordance with Static Pressure Class:

1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:

a. Supply Air: 1/2 in-wc pressure class, galvanized steel.
b. Return and Relief Air: 1/2 in-wc pressure class, galvanized steel.
c. General Exhaust Air: 1/2 in-wc pressure class, galvanized steel.

F. Duct Fabrication Requirements:

1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
3. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
6. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 METAL DUCTS

A. Material Requirements:

1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. Comply with safety standards NFPA 90A and NFPA 90B.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

D. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.

E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

3.2 CLEANING

A. Clean thoroughly each duct system. See Section 230130.51.

END OF SECTION

SECTION 233300

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flexible duct connectors.

1.2 RELATED REQUIREMENTS

A. Section 233100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

PART 2 - PRODUCTS

2.1 FLEXIBLE DUCT CONNECTORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd.
2. Metal: 3 inches wide, 24 gauge, 0.0239 inch thick galvanized steel.

C. Maximum Installed Length: 14 inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 for duct construction and pressure class.

B. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

END OF SECTION

SECTION 233423

HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Ceiling-mounted ventilators.

B. Centrifugal ventilators - sidewall

1.2 RELATED REQUIREMENTS

A. Section 230513 – Common Motor Requirements for HVAC Equipment.

B. Section 230529 – Hangers and Supports for HVAC Piping and Equipment.

C. Section 230593 – Testing, Adjusting, and Balancing for HVAC.

D. Section 233100 – HVAC Ducts and Casings.

E. Section 233300 – Air Duct Accessories

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for fans.
2. Rated capacities, operating characteristics, and furnished specialties and accessories.
3. Certified fan performance curves with system operating conditions indicated.
4. Certified fan sound-power ratings.
5. Motor ratings and electrical characteristics, plus motor and electrical accessories.
6. Material thickness and finishes, including color charts.
7. Dampers, including housings, linkages, and operators.

1.4 QUALITY ASSURANCE

A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store power ventilators in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 CEILING-MOUNTED VENTILATORS

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. Greenheck Fan Corporation.
2. Broan.
3. PennBarry.
4. Approved equal.

B. Housing: Steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel removable for service.

D. Back-draft damper: Integral.

E. Grille: Plastic, louvered grille with flange on intake and thumbscrew or spring retainer attachment to fan housing.

F. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

2.2 CENTRIFUGAL VENTILATORS - SIDEWALL

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. Greenheck Fan Corporation.
2. Loren Cook
3. PennBarry
4. Approved equal

B. Configuration: Centrifugal sidewall ventilator.

C. Housing: Removable spun-aluminum dome top and outlet baffle; square, one-piece aluminum base with venturi inlet cone.

D. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

E. Accessories:

1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
2. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
4. Wall Mount Adapter: Attach wall-mounted fan to wall.

2.3 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.4 SOURCE QUALITY CONTROL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

B. AMCA Certification: Fans shall comply with AMCA 11 and bear the AMCA-Certified Ratings Seal.

C. Fan Sound Ratings: Comply with AMCA 311, and label fans with the AMCA-Certified Ratings Seal. Sound ratings shall comply with AMCA 301. The fans shall be tested according to AMCA 300.

D. Fan Performance Ratings: Comply with AMCA 211 and label fans with AMCA-Certified Rating Seal. The fans shall be tested for air performance - flow rate, fan pressure, power, fan efficiency, air density, speed of rotation, and fan efficiency - according to AMCA 210/ASHRAE 51.

E. Operating Limits: Classify according to AMCA 99.

F. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

PART 3 - EXECUTION

3.1 INSTALLATION OF HVAC POWER VENTILATORS

A. Install power ventilators level and plumb.

B. Equipment Mounting:

C. Ceiling Units: Suspend units from structure; use steel wire or metal straps.

D. Support suspended units from structure using threaded steel rods and spring hangers having a static deflection of 1 inch.

E. Install units with clearances for service and maintenance.

F. Label units according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 DUCTWORK CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

3.3 ELECTRICAL CONNECTIONS

A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Verify that shipping, blocking, and bracing are removed.

2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.

3. Verify that there is adequate maintenance and access space.

4. Verify that cleaning and adjusting are complete.

5. Adjust damper linkages for proper damper operation.

6. Verify lubrication for bearings and other moving parts.

C. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.5 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.

D. Lubricate bearings.

END OF SECTION

SECTION 238239

PROPELLAR UNIT HEATERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Propeller unit heaters.

1.2 RELATED REQUIREMENTS

A. Section 230513 – Common Motor Requirements for HVAC Equipment.

B. Section 230529 – Hangers and Supports for HVAC Piping and Equipment.

C. Section 230593 – Testing, Adjusting, and Balancing for HVAC.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Rated capacities, operating characteristics, furnished specialties and accessories.
3. Material thickness and finishes, including color charts.

1.4 QUALITY ASSURANCE

A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store propeller unit heaters in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PROPELLER UNIT HEATERS

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. Reznor.
2. Marley/Qmark.
3. Indeeco.

4. Approved equal.

B. Assembly including casing, coil, fan, and motor in vertical discharge configuration with adjustable discharge louvers.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with UL 2021.

E. Housings:

1. Finish: Manufacturer's standard baked enamel applied to factory-assembled and -tested propeller unit heaters before shipping.

2. Discharge Louver: Adjustable fin diffuser for horizontal units and conical diffuser for vertical units.

F. Coils:

1. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550 deg F at any point during normal operation.

a. Circuit Protection: One-time fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters.

b. Wiring Terminations: Stainless-steel or corrosion-resistant material.

G. Fan and motor:

1. Fan: Propeller type with aluminum wheel directly mounted on motor shaft in the fan venturi.

2. Motor: Permanently lubricated. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

H. Controls

1. Unit mounted thermostat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive propeller unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical connections to verify actual locations before unit-heater installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install propeller unit heaters to comply with NFPA 90A.

B. Install propeller unit heaters level and plumb.

C. Suspend propeller unit heaters from structure with all-thread hanger rods and spring hangers. Hanger rods and attachments to structure are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

3.3 CONNECTIONS

A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

B. Units will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.5 ADJUSTING

A. Adjust initial temperature set points.

END OF SECTION

SECTION 260010

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following:

1. Electrical equipment coordination and installation.
2. Common electrical installation requirements.

1.2 RELATED REQUIREMENTS

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

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

B. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems; Latest Edition.

1.4 DEFINITIONS

A. ATS: Acceptance Testing Specifications.

1.5 QUALITY ASSURANCE

A. Test Equipment Suitability and Calibration: Comply with NETA ATS, "Suitability of Test Equipment" and "Test Instrument Calibration."

1.6 FIELD CONDITIONS

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices.

C. Coordinate electrical testing of electrical, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.

D. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than five days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Owner's written permission.

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. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Incidentals: The CONTRACTOR shall provide materials and incidentals require for a complete and operable system, even if not required explicitly by the Contract Documents. Typical incidents are terminal lugs not furnished with vendor-supplied equipment, compression connectors for cables, splices, junction and terminal boxes, and control wiring required by vendor-furnished equipment to connect with other equipment indicated in the Contract Documents.

B. Field Control of Location and Arrangement: The Drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items, exact locations shall be determined by the CONTRACTOR in the field based on the physical size and arrangement of equipment, finished elevations, and other obstructions. Locations on the Drawings, however, shall be followed as closely as possible.

C. Where conduit development drawings or “home runs” are indicated, the CONTRACTOR shall route the conduits in accordance with those requirements. Routings shall be exposed or encased as indicated, except that conduit in finished areas shall be concealed unless specifically indicated otherwise. Conduits encased in a slab shall be sized for conduit OD to not exceed one-third of the slab thickness and be laid out and spaced to not impede concrete flow.

D. Conduit and equipment shall be installed in such a manner as to avoid obstructions, to preserve headroom, and keep openings and passageways clear. Lighting fixtures, switches, convenience outlets, and similar items shall be located within finished rooms as indicated. Where the Drawings do not indicate exact locations, such locations will be determined by the ENGINEER. If equipment is installed without instruction and must be moved, it shall be adjusted slightly to avoid obstructions and to minimize shadows.

E. Wherever conduits and wiring for lighting and receptacles are not indicated, it shall be the CONTRACTORS'S responsibility to provide lighting and receptacle-related conduits and wiring as required, based on the actual installed fixture layout and the circuit designations as indicated. Wring shall be #12 AWG minimum (encased). Where circuits are combined in the same raceway, the CONTRACTOR SHALL derate conductor ampacities in accordance with NEC requirements.

F. Workmanship: Materials and equipment shall be installed in strict accordance with printed recommendations of the manufacturer. Installation shall be accomplished by workers skilled in the WORK. Installation shall be coordinated in the field with other trades to avoid interferences.

G. Protections of Equipment and Materials: The CONTRACTOR shall fully protect materials and equipment against damage from any cause. Materials and equipment, both in storage and during construction, shall be covered in such a manner that no finished surfaces will be damaged, marred, or spattered with water, foam, plaster, or paint. Moving parts shall be kept clean and dry. The CONTRACTOR shall replace or refinish damaged materials or equipment, including faceplates of panels and switchboard sections as part of the WORK.

H. Comply with NECA 1.

I. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

J. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

K. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

L. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.

B. Examine roughing-in for other trades to verify actual locations of equipment connections before equipment installation.

C. Examine walls and floors for suitable conditions where equipment will be installed.

D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions until equipment is ready to be energized and placed into service.

B. Replace equipment whose interiors have been exposed to a buildup of dust or debris, water or other liquids prior to Substantial Completion.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 ADJUSTING

A. Adjust hardware to function smoothly and lubricate as recommended by manufacturer.

B. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

END OF SECTION

SECTION 260505

SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electrical demolition.

1.2 RELATED REQUIREMENTS

A. Section 017700 - Closeout Procedures: Additional requirements for alterations work.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify field measurements and circuiting arrangements are as indicated.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition drawings are based on casual field observation and existing record documents.

D. Report discrepancies to Engineer before disturbing existing installation.

E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls, floors, and patch surfaces.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

E. Repair adjacent construction and finishes damaged during demolition and extension work.

F. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.4 CLEANING AND REPAIR

A. Maintain site clear of debris during and after demolition activities.

B. See Section 017419 - Construction Waste Management for additional requirements.

3.5 PROTECTION

A. Protect all existing equipment not scheduled to be demolished.

B. Remove and replace equipment that are physically damaged, wet or moisture damaged, or mold damaged as a result of demolition activity under this contract.

END OF SECTION

SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Single conductor building wire.

B. Wiring connectors.

C. Electrical tape.

D. Heat shrink tubing.

E. Oxide inhibiting compound.

F. Wire pulling lubricant.

G. Cable ties.

1.2 RELATED REQUIREMENTS

A. Section 260505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.

B. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Latest Edition).

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; (Latest Edition).

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; with Editorial Revision (Latest Edition).

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; (Latest Edition).

E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; (Latest Edition).

F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; (Latest Edition).

G. FS A-A-59544 - Cable and Wire, Electrical (Power, Fixed Installation); (Latest Edition).

H. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; (Latest Edition).

J. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems; (Latest Edition).

K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

M. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

N. UL 267 - Outline of Investigation for Wire-Pulling Compounds; Current Edition, Including All Revisions.

O. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

P. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

Q. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

R. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate the installation of direct burial cable with other trades to avoid conflicts with piping or other potential conflicts.
3. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

B. Sustainable Design Documentation: Submit manufacturer's product data on conductor and cable showing compliance with specified lead content requirements.

C. Manufactured Wiring System Shop Drawings: Provide plan views indicating proposed system layout with components identified; indicate branch circuit connections.

D. Wire Pulling Lubricant: Certification of compatibility with conductors/cables.

E. Field Quality Control Test Reports.

F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

G. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.8 FIELD CONDITIONS

A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 ºF, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Engineer and obtain direction before proceeding with work.

PART 2 - PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Service entrance cable is not permitted.

F. Manufactured wiring systems are not permitted.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide new conductors and cables manufactured not more than one year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Comply with FS A-A-59544 where applicable.

G. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

H. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

I. Conductors for Grounding and Bonding: Also comply with Section 260526.

J. Conductors and Cables Installed Where Exposed to Direct Rays of Sun: Listed and labeled as sunlight resistant.

K. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.

L. Conductor Material:

1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
3. Tinned Copper Conductors: Comply with ASTM B33.

M. Minimum Conductor Size:

1. Branch Circuits: 12 AWG.

a. Exceptions:

1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.

2. Control Circuits: 14 AWG.

N. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

O. Conductor Color Coding:

1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.

a. Conductors size 4 AWG and larger, may have black insulation color coded using vinyl color coding electrical tape.

3. Color Code:

a. 208Y/120 V, 3 Phase, 4 Wire System:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
4) Neutral/Grounded: White.

b. Equipment Ground, All Systems: Green.
c. Isolated Ground, All Systems: Green with yellow stripe.
d. Travelers for 3-Way and 4-Way Switching: Pink.
e. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
f. For control circuits, comply with manufacturer's recommended color code.

2.3 SINGLE CONDUCTOR BUILDING 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. Copper Building Wire:

a. General Cable Technologies Corporation.
b. Service Wire Co.
c. Southwire Company.
d. Approved Equal.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:
   a. Size 10 AWG and Smaller: Solid.
   b. Size 8 AWG and Larger: Stranded.

2. Control Circuits: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

1. Copper Building Wire: Type THHN/THWN-2 or XHHW-2, except as indicated below.

   a. Size 4 AWG and Larger: Type XHHW-2.
   b. Installed Underground: Type XHHW-2.

2.4 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 260526.

C. Wiring Connectors for Splices and Taps:

1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

D. Wiring Connectors for Terminations:

1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
7. Conductors for Control Circuits: Use crimped terminals for all connections.

E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 105 ºC for standard applications and 105 ºC for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. 3M.
b. Ideal Industries, Inc.
c. NSI Industries LLC.
d. Approved Equal.

H. Mechanical Connectors: Provide bolted type or set-screw type.

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. Burndy LLC.
b. nVent ILSCO.
c. Thomas & Betts Corporation.
d. Approved Equal.

I. Compression Connectors: Provide circumferential type or hex type crimp configuration.

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. Burndy LLC.
b. nVent ILSCO.
c. Thomas & Betts Corporation.
d. Approved Equal.

J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

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. Burndy LLC.
b. Ilsco.
c. Thomas & Betts Corporation.
d. Approved Equal.

2.5 ACCESSORIES

A. Electrical Tape:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. 3M.
    b. Plymouth Rubber Europa.
    c. Approved Equal.

2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 105 ºC.
3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 ºF and suitable for continuous temperature environment up to 105 ºC.
4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 90 ºC and short-term 130 ºC overload service.
5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. 3M.
    b. Burndy LLC.
    c. Thomas & Betts Corporation.
    d. Approved Equal.

C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burndy LLC.
b. Ideal Industries, Inc.
c. Ilsco.
d. Approved Equal.

D. Wire Pulling Lubricant:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. 3M.
b. American Polywater Corporation.
c. Ideal Industries, Inc.
d. Approved Equal.

2. Listed and labeled as complying with UL 267.
3. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
4. Suitable for use at installation temperature.
5. Products:

a. American Polywater Corporation; Polywater J Cable Pulling Lubricant.
b. American Polywater Corporation; Polywater LZ Cable Pulling Lubricant.
c. Approved Equal.

E. Cable Ties: Material and tensile strength rating suitable for application.

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. Burndy LLC.
b. Ideal Industries, Inc.
c. Approved Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

A. Circuiting Requirements:

1. Unless dimensioned, circuit routing indicated is diagrammatic.
2. When circuit destination is indicated without specific routing, determine exact routing required.
3. Arrange circuiting to minimize splices.
4. Include circuit lengths required to install connected devices within 10 feet of location indicated.
5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
7. Circuiting Adjustments: Unless otherwise indicated or required by code, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:

    a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
    b. Increase size of conductors as required to account for ampacity derating.
    c. Size raceways, boxes, etc. to accommodate conductors.

8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Installation in Raceway:

1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
2. Pull all conductors and cables together into raceway at same time.
3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.

4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.

G. Terminate cables using suitable fittings.

H. Install conductors with a minimum of 12 inches of slack at each outlet.

I. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.

J. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

K. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

L. Make wiring connections using specified wiring connectors.

1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
3. Do not remove conductor strands to facilitate insertion into connector.
4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
7. Split-bolt compression splices are not permitted.

M. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.

2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

3. Wet Locations: Use heat shrink tubing.

N. Insulate ends of spare conductors using vinyl insulating electrical tape.

O. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

P. Identify conductors and cables in accordance with Section 260553.

Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.3.2.

C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 260523

CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (Latest Edition).

D. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

E. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

F. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

G. UL 1277 - Electrical Power and Control Tray Cables with Optional Optical-Fiber Members; Current Edition, Including All Revisions.

H. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

I. UL 1581 - Reference Standard for Electrical Wires, Cables, and Flexible Cords; Current Edition, Including All Revisions.

J. UL 1685 - Standard for Safety Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables; Current Edition, Including All Revisions.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. Section Includes:

1. Low-voltage control cabling.
2. Identification products.

1.4 DEFINITIONS

A. EMI: Electromagnetic interference.

B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.6 INFORMATIONAL SUBMITTALS

A. Source quality-control reports.

B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.

1. Flame Travel Distance: 60 inches or less.
2. Peak Optical Smoke Density: 0.5 or less.
3. Average Optical Smoke Density: 0.15 or less.

C. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.

D. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.

E. RoHS compliant.

2.2 CONTROL-CIRCUIT CONDUCTORS

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. General Cable; Prysmian Group North America.
2. Service Wire Co.
3. Southwire Company.
4. Approved Equal.

B. Class 1 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

C. Class 2 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

D. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

E. Class 2 Control Circuits and Class 3 Remote-Control and Signal Circuits That Supply Critical Circuits: Circuit Integrity (CI) cable.

1. Smoke control signaling and control circuits.

2.3 SOURCE QUALITY CONTROL

A. Factory test twisted pair cables according to TIA-568-C.2.

B. Cable will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Test cables on receipt at Project site.

1. Test each pair of twisted pair cable for open and short circuits.
2. Reject failed cables.

B. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.

1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
2. Outlet boxes for cables shall be no smaller than 4 inches square by 1-1/2 inches deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.

C. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.

D. Install manufactured conduit sweeps and long-radius elbows if possible.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Terminate all conductors; no cable shall contain unterminated elements.
2. Cables may not be spliced and shall be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
3. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
4. Furnish a separate raceway system for shielded signal cable. Do not run in the same conduit with power cable.

5. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Install exposed cables parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
9. Support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals. Do not allow cables to lie on removable ceiling tiles.
10. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
11. Provide strain relief.
12. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
13. Ground wire shall be copper, and grounding methods shall comply with IEEE C2. Demonstrate ground resistance.

C. Installation of Control-Circuit Conductors:

1. Install wiring in raceways.
2. Use insulated spade lugs for wire and cable connection to screw terminals.
3. Comply with requirements specified in Section 260533"Raceways and Boxes for Electrical Systems."
4. Control wiring may be pulled in the power conduits and wireways providing the highest voltage of the adjacent wires is not more than 120 volts.
5. All terminators required to interface the new cables to the various devices shall be furnished, installed, connected and tested as part of this contract.

D. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 30 inches apart.
3. Cable shall not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

E. Power Control Systems

1. The wiring of this category (single conductor, or multiple conductor) is to be installed in accordance with the NEC.

F. Telemetry and Instrumentation Signal Systems

1. Separate conduit and wireway runs are required for this category. All wiring is to be isolated from all power systems.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches.
    b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inches.
    c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
    b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inches.
    c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inches.

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

    a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inches.
    c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inches.

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.3 REMOVAL OF CONDUCTORS AND CABLES

A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified with a tag for future use.

3.4 CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits; No 14 AWG.
2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

3.5 GROUNDING

A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.

1. Ground cable shield at termination of instrumentation cabinet only. Ground connection should be visible.

B. For low-voltage control wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.6 IDENTIFICATION

A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.

C. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire shall have a unique tag.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. General Tests and Inspections:

1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

1.2 RELATED REQUIREMENTS

A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

1. Includes oxide inhibiting compound.

B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

B. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems; (Latest Edition).

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Field quality control test reports.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Bonding and Equipment Grounding:

1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor where indicated or required, including but not limited to:

    a. In each nonmetallic feeder and branch circuit raceway.
    b. In each flexible conduit.

3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
8.
    a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
    b. Metal gas piping.
    c. Metal process piping.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:

1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:

1. Use insulated copper conductors unless otherwise indicated.

    a. Exceptions:

        1) Use bare copper conductors where installed underground in direct contact with earth.
        2) Use bare copper conductors where directly encased in concrete (not in raceway).

2. Install solid conductor for 12 AWG and smaller, and stranded conductors for 10 AWG and larger unless otherwise indicated.
3. Factory Pre-fabricated Bonding Jumpers: Furnished with factory-installed ferrules; size braided cables to provide equivalent gauge of specified conductors.

C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.

    a. Exceptions:

        1) Use mechanical connectors for connections to electrodes at ground access wells.

3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

    a. Exceptions:

        1) Use exothermic welded connections for connections to metal building frame.

4. 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. Burndy LLC.
    b. nVent ERICO.
    c. Thomas & Betts Corporation.
    d. Approved Equal.

D. Oxide Inhibiting Compound: Comply with Section 260519.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.

1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.

3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.

E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements. Notify the Engineer promptly and include recommendations to reduce ground resistance.

F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 RELATED REQUIREMENTS

A. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.

B. Section 260533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

C. Section 265100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

1.3 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; (Latest Edition).

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; (Latest Edition).

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

D. MFMA-4 - Metal Framing Standards Publication; (Latest Edition).

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
2. Coordinate work to provide additional framing and materials required for installation.

3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
5. Notify Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachments to concrete surfaces until concrete has cured.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel/strut framing systems, nonpenetrating rooftop supports, and post-installed concrete/masonry anchors.

B. Installer's qualification statement.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Maintain at project site one copy of each referenced document that prescribes execution requirements.

B. Installer Qualifications for Powder-Actuated Fasteners: Certified by fastener system manufacturer with current operator's license.

C. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Comply with the following. Where requirements differ, comply with most stringent.

a. NFPA 70.
b. Requirements of authorities having jurisdiction.

2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported with minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.
5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
6. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
7. Steel Components: Use corrosion-resistant materials suitable for environment where installed.

    a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
    c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    d. Galvanized Steel: Hot dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2.
    a. ABB.
    b. Eaton Corporation.
    c. Emerson Electric Co; O-Z/Gedney.
    d. Approved Equal.

3. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
4. Conduit Clamps: Bolted type unless otherwise indicated.

C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.

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. ABB.
    b. Emerson Electric Co; O-Z/Gedney.
    c. HoldRite, a brand of Reliance Worldwide Corporation.
    d. Approved Equal.

D. Metal Channel/Strut Framing Systems:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Atkore International Inc; Unistrut.
    b. Eaton Corporation.
    c. Approved Equal.

2. Source Limitations: Furnish channel/strut and associated fittings, accessories, and hardware produced by single manufacturer.
3. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
4. Comply with MFMA-4.
5. Channel/Strut Used as Raceway, Where Indicated: Listed and labeled as complying with UL 5B.
6. Channel Material: Steel.

E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.

1. Minimum Size, Unless Otherwise Indicated or Required:

    a. Equipment Supports: 1/2-inch diameter.
    b. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch diameter.
    c. Single Conduit Larger than 1-inch (27 mm) Trade Size: 3/8-inch diameter.
    d. Trapeze Support for Multiple Conduits: 3/8-inch diameter.
    e. Luminaires: 1/4-inch diameter.

F. Anchors and Fasteners:

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. Dewalt.
    b. Hilti, Inc.
    c. Inninois Tool Works, Inc.
    d. Approved Equal.

2. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
3. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
4. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
5. Hollow Masonry: Use toggle bolts.
6. Hollow Stud Walls: Use toggle bolts.
7. Steel: Use beam clamps, machine bolts, or welded threaded studs.
8. Sheet Metal: Use sheet metal screws.
9. Plastic and lead anchors are not permitted.

10. Powder-actuated fasteners are permitted only as follows:

    a. Where approved by Engineer.

11. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.

    a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
    b. Comply with MFMA-4.
    c. Channel Material: Use galvanized steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install hangers and supports in accordance with NECA 1.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

D. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Equipment Support and Attachment:

1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Unless otherwise indicated, mount floor-mounted equipment on properly sized concrete pad 3 inches in height.
5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

H. Conduit Support and Attachment: See Section 260533.13 for additional requirements.

I. Box Support and Attachment: See Section 260533.16 for additional requirements.

J. Interior Luminaire Support and Attachment: See Section 265100 for additional requirements.

K. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

L. Secure fasteners in accordance with manufacturer's recommended torque settings.

M. Remove temporary supports.

3.3 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

3.4 FIELD QUALITY CONTROL

A. Inspect support and attachment components for damage and defects.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 260533.13

CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aluminum rigid metal conduit (RMC).

B. Flexible metal conduit (FMC).

C. Liquidtight flexible metal conduit (LFMC).

D. Galvanized steel electrical metallic tubing (EMT).

E. Rigid polyvinyl chloride (PVC) conduit.

1.2 RELATED REQUIREMENTS

A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Cable assemblies consisting of conductors protected by integral metal armor.

B. Section 260526 - Grounding and Bonding for Electrical Systems.

1. Includes additional requirements for fittings for grounding and bonding.

C. Section 260529 - Hangers and Supports for Electrical Systems.

D. Section 260533.16 - Boxes for Electrical Systems.

E. Section 260533.23 - Surface Raceways for Electrical Systems.

F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); (Latest Edition).

B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); (Latest Edition).

C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit -- Aluminum (ERMC-A); (Latest Edition).

D. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); (Latest Edition).

F. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; (Latest Edition).

G. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); (Latest Edition).

H. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; (Latest Edition).

I. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit; (Latest Edition).

J. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; (Latest Edition).

K. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; (Latest Edition).

L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

M. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

N. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

O. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel; Current Edition, Including All Revisions.

P. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.

Q. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

R. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

S. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.

T. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

U. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
5. Notify Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

1.6 QUALITY ASSURANCE

A. Documents at Project Site: Maintain at project site one copy of manufacturer's instructions and shop drawings.

B. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:

1. Under Slab on Grade: Use PVC-coated galvanized steel rigid metal conduit (RMC) or rigid PVC conduit.
2. Exterior, Direct-Buried: Use PVC-coated galvanized steel rigid metal conduit.
3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
4. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to PVC-coated galvanized steel rigid metal conduit (RMC) where emerging from underground.
5. Where rigid polyvinyl (PVC) conduit larger than 2-inch trade size is provided, use PVC-coated galvanized steel rigid metal conduit (RMC) elbows for bends.

D. Embedded Within Concrete:

1. Within Slab on Grade: Use rigid PVC conduit. Embed within structural slabs only where approved by Structural Engineer.
2. Within Slab Above Ground: Use rigid PVC conduit. Embed within structural slabs only where approved by Structural Engineer.

E. Concealed Within Masonry Walls: Use galvanized steel electrical metallic tubing (EMT).

F. Concealed Within Hollow Stud Walls: Use galvanized steel electrical metallic tubing (EMT).

G. Concealed Above Accessible Ceilings: Use galvanized steel electrical metallic tubing (EMT).

H. Interior, Damp or Wet Locations: Use ARC.

I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC), galvanized steel electrical metallic tubing (EMT), or rigid PVC conduit.

J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC) or aluminum rigid metal conduit (RMC).

K. Exposed, Exterior: Use galvanized steel rigid metal conduit (RMC) or aluminum rigid metal conduit (RMC).

2.2 CONDUIT - GENERAL REQUIREMENTS

A. Comply with NFPA 70.

B. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling mandrel through them.

C. Fittings for Grounding and Bonding: See Section 260526 for additional requirements.

D. Provide conduit, fittings, supports, and accessories required for complete raceway system.

E. Provide products listed, classified, and labeled as suitable for purpose intended.

F. Minimum Conduit Size, Unless Otherwise Indicated:

1. Branch Circuits: 3/4-inch trade size.
2. Underground, Exterior: 1 inch trade size.
3. Concrete encased, duct bank: 2-inch trade size.
4. PVC-Coated Steel Conduit stub-ups shall be minimum 12-inches long with 6-inches above grade and 6-inches below grade.

G. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

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. Allied Tube & Conduit, a division of Atkore International.
2. Nucor Tubular Products.
3. Wheatland Tube, a division of Zekelman Industries.
4. Approved Equal.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:

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. ABB; T&B.
b. Bridgeport Fittings Inc.
c. Emerson Electric Co; O-Z/Gedney.
d. Approved Equal.

2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
3. Hazardous/Classified Locations: Use fittings listed and labeled as complying with UL 1203 for classification of installed location.
4. Material: Use steel or malleable iron.
5. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.4 ALUMINUM RIGID METAL CONDUIT (RMC)

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. Patriot Industries, Patriot Aluminum Products.
2. Allied Tube & Conduit, a division of Atkore International.
3. Nucor Tubular Products.
4. Wheatland Tube, a division of Zekelman Industries.
5. Approved Equal.

B. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.

C. Fittings:

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. Patriot Industries, Patriot Aluminum Products.
b. ABB; T&B.
c. Allied Tube & Conduit, a division of Atkore International.
d. Emerson Electric Co; O-Z/Gedney.
e. Approved Equal.

2. Material: Use aluminum.
3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.5 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

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. ABB; Ocal.
2. Calbond, a division of Atkore International.
3. Robroy Industries.
4. Approved Equal.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.

C. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil, 0.040 inch.

D. Interior Coating: Urethane, minimum thickness of 2 mil, 0.002 inch.

E. PVC-Coated Boxes and Fittings:

1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
2. Use boxes and fittings listed and labeled as complying with UL 514A, UL 514B, or UL 6.
3. Material: Use steel or malleable iron.
4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil, 0.040 inch.
5. Interior Coating: Urethane, minimum thickness of 2 mil, 0.002 inch.

F. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil, 0.015 inch.

2.6 FLEXIBLE METAL CONDUIT (FMC)

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. AFC Cable Systems, a division of Atkore International.
2. Electri-Flex Company.
3. International Metal Hose.
4. Approved Equal.

B. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1 and listed for use in classified firestop systems.

C. Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2.
   a. ABB; T&B.
   b. Bridgeport Fittings, LLC.
   c. Emerson Electric Co; O-Z/Gedney.
   d. Approved Equal.
3. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
4. Material: Use steel or malleable iron.

2.7 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

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. AFC Cable Systems, a division of Atkore International.
2. Electri-Flex Company.
3. International Metal Hose.
4. Approved Equal.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:

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. ABB; T&B.
   b. Bridgeport Fittings, LLC.
   c. Emerson Electric Co; O-Z/Gedney.
   d. Approved Equal.

2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.

2.8 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

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. Allied Tube & Conduit, a division of Atkore International.
2. Nucor Tubular Products.
3. Wheatland Tube, a division of Zekelman Industries.
4. Approved Equal.

B. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:

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. Allied Tube & Conduit, a division of Atkore International.
b. Bridgeport Fittings, LLC.
c. Emerson Electric Co; O-Z/Gedney.
d. Approved Equal.

2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.
4. Connectors and Couplings: Use compression/gland or set-screw type.
   a. Do not use indenter type connectors and couplings.

2.9 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

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. ABB; Carlon.
2. Cantex Inc.
3. JM Eagle.
4. Approved Equal.

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

C. Fittings:

1. Manufacturer: Same as manufacturer of conduit to be connected.
2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.10 ACCESSORIES

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.

B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

C. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.

D. Duct Sealant:

1. Permanently soft, non-toxic compound, non-corrosive.
2. Adhere to clean dry surfaces.
3. Will nor harden or form a skin.

E. Foam Conduit Sealant:

1. Removable, two-part, closed-cell foam, specifically designed for sealing conduit openings against water, moisture, gases, and dust.
2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
3. Rated to hold minimum of 10 ft water head pressure.
4. Products:

a. American Polywater Corporation; Polywater AFT Foam Duct Sealant.
b. American Polywater Corporation; Polywater FST Foam Duct Sealant.

F. Conduit Mechanical Seals:

1. Listed as complying with UL 514B.
2. Specifically designed for sealing conduit openings against water, moisture, gases, and dust.
3. Suitable for sealing around conductors/cables to be installed.
4. Products:

a. American Polywater Corporation; PHRD SG Mechanical Seals.

G. Sealing Compound for Hazardous/Classified Location Sealing Fittings: Listed for use with particular fittings to be installed.

H. Sealing Systems for Concrete Penetrations:

1. Sleeves: Provide water stop ring or cement coating that bonds to concrete to prevent water infiltration.
2. Rate for minimum of 40 psig; suitable for sealing around conduits to be installed.

3. Products:

a. American Polywater Corporation; PZVR Cement-Coated Concrete Wall Sleeves.
b. American Polywater Corporation; PHSD Mechanical Seals.
c. American Polywater Corporation; PHSI 150 Varia Double Wall Inserts.
d. American Polywater Corporation; PGKD Modular Seals.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in accordance with NECA 1.

C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.

D. Aluminum Rigid Metal Conduit (RMC): Install in accordance with NECA 102.

E. PVC-Coated Galvanized Steel Rigid Metal Conduit (RMC): Install using only tools approved by manufacturer.

F. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 111.

G. Conduit Routing:

1. Unless dimensioned, conduit routing indicated is diagrammatic.
2. When conduit destination is indicated without specific routing, determine exact routing required.
3. Conceal conduits unless specifically indicated to be exposed.
4. Conduits in the following areas may be exposed, unless otherwise indicated:

a. Electrical rooms.
b. Mechanical equipment rooms.

5. Unless otherwise approved, do not route exposed conduits:

a. Across floors.
b. Across roofs.
c. Across top of parapet walls.
d. Across building exterior surfaces.

6. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
7. Arrange conduit to maintain adequate headroom, clearances, and access.
8. Arrange conduit to provide no more than equivalent of three 90-degree bends between pull points.
9. Arrange conduit to provide no more than 150 feet between pull points.
10. Route conduits above water and drain piping where possible.
11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:

    a. Heaters.
    b. Hot water piping.

14. Group parallel conduits in same area on common rack.

H. Conduit Support:

1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 260529.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.

    a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.

5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use of spring steel conduit clips for support of conduits is not permitted.
9. Use of wire for support of conduits is not permitted.
10. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with most stringent requirements.

I. Connections and Terminations:

1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.

3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquid tight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Where spare conduits stub up through concrete floors and are not terminated in box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
7. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
8. Secure joints and connections to provide mechanical strength and electrical continuity.

J. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Provide suitable sealing system where conduits penetrate exterior wall below grade.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.

K. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide minimum concrete cover of 3 inches on all sides unless otherwise indicated.

L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
3. Where conduits are subject to earth movement by settlement or frost.

M. Conduit Sealing:

1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:

   a. Where conduits enter building from outside.
   b. Where service conduits enter building from underground distribution system.
   c. Where conduits enter building from underground.
   d. Where conduits may transport moisture to contact live parts.

2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:

   a. Where conduits pass from outdoors into conditioned interior spaces.
   b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

N. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 24 inches at each end.

O. Provide grounding and bonding; see Section 260526.

P. Identify conduits; see Section 260553.

3.3 FIELD QUALITY CONTROL

A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

B. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.

C. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

B. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 260533.16

BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260529 - Hangers and Supports for Electrical Systems.

C. Section 260533.13 - Conduit for Electrical Systems:

1. Conduit bodies and other fittings.
2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.

D. Section 260533.23 - Surface Raceways for Electrical Systems:

E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

F. Section 262726 - Wiring Devices:

1. Wall plates.
2. Additional requirements for locating boxes for wiring devices.

G. See Section 013300 - Submittal Procedures, for submittal procedures.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; (Latest Edition).

C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); (Latest Edition).

D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; (Latest Edition).

E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; (Latest Edition).

F. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; (Latest Edition).

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

J. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

K. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures and underground boxes/enclosures.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 BOXES

A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled as suitable for the purpose intended.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use cast aluminum boxes where aluminum rigid metal conduit is used.
4. Use nonmetallic boxes where exposed rigid PVC conduit is used.
5. Use suitable concrete type boxes where flush-mounted in concrete.
6. Use suitable masonry type boxes where flush-mounted in masonry walls.
7. Use raised covers suitable for the type of wall construction and device configuration where required.
8. Use shallow boxes where required by the type of wall construction.
9. Do not use "through-wall" boxes designed for access from both sides of wall.
10. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
11. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
12. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.

13. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
14. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
15. Minimum Box Size, Unless Otherwise Indicated:

    a. Wiring Devices: 4-inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
    b. Communications Systems Outlets: 4-inch square by 2-1/8 inch (100 by 54 mm) trade size.
    c. Ceiling Outlets: 4 inches octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.

16. Wall Plates: Comply with Section 262726.
17. 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. Cooper Crouse-Hinds, a division of Eaton Corporation.
    b. Hubbell Incorporated; RACO Products.
    c. Thomas & Betts Corporation.
    d. Approved Equal.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:

1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:

    a. Indoor Clean, Dry Locations: Type 12, painted steel.
    b. Outdoor Locations: Type 3R, painted steel.

3. Junction and Pull Boxes Larger Than 100 cubic inches:

    a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

4. Finish for Painted Steel Enclosures: Manufacturer’s standard grey unless otherwise indicated.
5. 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. Cooper B-Line, a division of Eaton Corporation.
    b. Hoffman, a brand of Pentair Technical Products.
    c. Hubbell Incorporated; Wiegmann Products.
    d. Approved Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

H. Box Locations:

1. Unless dimensioned, box locations indicated are approximate.
2. Locate boxes as required for devices installed under other sections or by others.

    a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.

3. Locate boxes so that wall plates do not span different building finishes.
4. Locate boxes so that wall plates do not cross masonry joints.
5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
7. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.

I. Box Supports:

1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.

2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

J. Install boxes plumb and level.

K. Flush-Mounted Boxes:

1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

L. Install boxes as required to preserve insulation integrity.

M. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

N. Close unused box openings.

O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

P. Provide grounding and bonding in accordance with Section 260526.

Q. Identify boxes in accordance with Section 260553.

3.3 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.4 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 260533.23

SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Surface raceway systems.

B. Wireways.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260529 - Hangers and Supports for Electrical Systems.

C. Section 260533.13 - Conduit for Electrical Systems.

D. Section 260533.16 - Boxes for Electrical Systems.

E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

F. Section 262726 - Wiring Devices: Receptacles.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

D. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.

E. UL 5A - Nonmetallic Surface Raceways and Fittings; Current Edition, Including All Revisions.

F. UL 111 - Outline of Investigation for Multioutlet Assemblies; Current Edition, Including All Revisions.

G. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate rough-in locations of outlet boxes provided under Section 260533.16 and conduit provided under Section 260533.13 as required for installation of raceways provided under this section.
3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install raceways until final surface finishes and painting are complete.
2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.

1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 RACEWAY REQUIREMENTS

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

A. Manufacturers:

1. Hubbell Incorporated.
2. Legrand North America, Inc.
3. MonoSystems, Inc.
4. Approved Equal.

B. Surface Metal Raceways: Listed and labeled as complying with UL 5.

C. Surface Nonmetallic Raceways: Listed and labeled as complying with UL 5A.

D. Multioutlet Assemblies: Listed and labeled as complying with UL 111.

2.3 WIREWAYS

A. Manufacturers:

1. Eaton Corporation.
2. Enduro Composites.
3. nVent HOFFMAN.
4. Schneider Electric.
5. Approved Equal.

B. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.

C. Wireway Type, Unless Otherwise Indicated:

1. Indoor Clean, Dry Locations: NEMA EN 10250, Type 1, painted steel with screw-cover.

D. Finish for Painted Steel Wireways: Manufacturer’s standard grey unless otherwise indicated.

E. Minimum Wireway Size: 4 by 4 inches unless otherwise indicated.

F. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.4 SOURCE QUALITY CONTROL

A. Factory test each production unit for pre-wired surface raceway systems to verify proper wiring.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.

C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install raceways plumb and level.

D. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.

E. Secure and support raceways in accordance with Section 260529 at intervals complying with NFPA 70 and manufacturer's requirements.

F. Close unused raceway openings.

G. Provide grounding and bonding in accordance with Section 260526.

H. Identify raceways in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect raceways for damage and defects.

B. Surface Raceway Systems with Integrated Devices: Test each wiring device to verify operation and proper polarity.

C. Correct wiring deficiencies and replace damaged or defective raceways.

3.4 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.5 PROTECTION

A. Protect installed raceways from subsequent construction operations.

END OF SECTION

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Voltage markers.

E. Warning signs and labels.

1.2 RELATED REQUIREMENTS

A. Section 099113 - Exterior Painting.

B. Section 099123 - Interior Painting.

C. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

D. Section 262726 - Wiring Devices - Lutron

1.3 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. NFPA 70E - Standard for Electrical Safety in the Workplace; (Latest Edition).

C. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

B. Sequencing:

1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
2. Do not install identification products until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.7 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 - PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.

B. Identification for Equipment:

1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.

a. Panelboards:

1) Identify ampere rating.
2) Identify voltage and phase.
3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
5) Use typewritten circuit directory to identify load(s) served for panelboards with a door.
6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device.

b. Enclosed switches, circuit breakers, and motor controllers:

1) Identify power source and circuit number. Include location when not within sight of equipment.

2. Service Equipment:

    a. Use identification nameplate to identify each service disconnecting means.
    b. For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.

3. Use field-painted floor markings to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.

    a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches wide, painted in accordance with Section 099123 and 099113.

4. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
5.
    a. Service equipment.
    b. Industrial control panels.
    c. Motor control centers.
    d. Elevator control panels.
    e. Industrial machinery.

6. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.

    a. Minimum Size: 3.5 by 5 inches.
    b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
    c. Service Equipment: Include the following information in accordance with NFPA 70.

        1) Nominal system voltage.
        2) Available fault current.
        3) Clearing time of service overcurrent protective device(s).
        4) Date label applied.

7. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.

C. Identification for Conductors and Cables:

1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:

    a. At each source and load connection.
    b. Within boxes when more than one circuit is present.

D. Identification for Raceways:

1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet.
2. Use underground warning tape to identify underground raceways.

E. Identification for Boxes:

1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.

    a. For exposed boxes in public areas, use only identification labels.

F. Identification for Devices:

1. Wiring Device and Wall plate Finishes: Comply with Section 262726.
2. Use identification label or engraved wall plate to identify serving branch circuit for all receptacles.
3. Use identification labels to identify receptacles protected by upstream GFI protection, where permitted.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Brimar Industries, Inc.
    b. Kolbi Pipe Marker Co.
    c. Seton Identification Products.
    d. Approved Equal.

2. Materials:

    a. Indoor Clean, Dry Locations: Use plastic nameplates.
    b. Outdoor Locations: Use aluminum nameplates suitable for exterior use.

3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.

    a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.

4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Brady Corporation: www.bradyid.com/#sle.
    b. Brother International Corporation.
    c. Panduit Corp.
    d. Approved Equal.

2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:

1. Minimum Size: 1 inch by 2.5 inches.
2. Legend:

    a. Equipment designation or other approved description.

3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:

    a. Equipment Designation: 1/2 inch.

5. Color:

    a. Normal Power System: White text on black background.

D. Format for General Information and Operating Instructions:

1. Minimum Size: 1 inch by 2.5 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/4 inch.
5. Color: Black text on white background unless otherwise indicated.

E. Format for Caution and Warning Messages:

1. Minimum Size: 2 inches by 4 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch.
5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Receptacle Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Power source and circuit number or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

G. Format for Control Device Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Load controlled or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

2.3 WIRE AND CABLE MARKERS

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. Brady Corporation.
2. HellermannTyton.
3. Panduit Corp.
4. Approved Equal.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height:1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

2.4 VOLTAGE MARKERS

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. Brady Corporation.
2. Brimar Industries, Inc.
3. Seton Identification Products.
4. Approved Equal.

B. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

C. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

D. Minimum Size:

1. Markers for Equipment:1-1/2 by 4-1/2 inches.
2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.

E. Legend:

1. Markers for Voltage Identification: Highest voltage present.

F. Color: Black text on orange background unless otherwise indicated.

2.5 WARNING SIGNS AND LABELS

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. Brimar Industries, Inc.
2. Clarion Safety Systems, LLC.
3. Insite Solutions, LLC.
4. Approved Equal.

B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

C. Warning Signs:

1. Materials:

a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.

2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
3. Minimum Size: 7 by 10 inches unless otherwise indicated.

D. Warning Labels:

1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.

a. Do not use labels designed to be completed using handwritten text.

2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

1. Surface-Mounted Equipment: Enclosure front.
2. Flush-Mounted Equipment: Inside of equipment door.
3. Branch Devices: Adjacent to device.
4. Interior Components: Legible from the point of access.
5. Conduits: Legible from the floor.
6. Boxes: Outside face of cover.
7. Conductors and Cables: Legible from the point of access.
8. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Secure rigid signs using stainless steel screws.

G. Mark all handwritten text, where permitted, to be neat and legible.

3.3 FIELD QUALITY CONTROL

A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

SECTION 262416

PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Overcurrent protective devices for panelboards.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; (Latest Edition).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

C. NECA 407 - Standard for Installing and Maintaining Panelboards; (Latest Edition).

D. NEMA PB 1 - Panelboards; (Latest Edition).

E. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems; (Latest Edition).

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

1. Include characteristic trip curves for each type and rating of overcurrent protective device.

B. Source Quality Control Test Reports: Include reports for tests designated in NEMA PB 1 as routine tests.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

E. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.8 FIELD CONDITIONS

A. Maintain ambient temperature within the following limits during and after installation of panelboards:

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

B. Panelboard Warranty Period: Panelboards shall be under warranty for 18 months from the date of shipment or 12 months from the date of installation, whichever occurs first.

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. Schneider Electric.

B. Source Limitations: Provide panelboards and associated components produced by same manufacturer as other electrical distribution equipment used for project and obtained from a single supplier.

2.2 OVERCURRENT PROTECTIVE DEVICES

A. Single Source: Obtain overcurrent protective devices from the existing panelboard manufacturer.

B. Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489 and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:

a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:

1) 10,000 rms symmetrical amperes at 208 VAC.

b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

3. Conductor Terminations:

a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Do not use tandem circuit breakers.
7. Provide the following features and accessories where indicated or where required to complete installation:

a. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.
b. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.3 SOURCE QUALITY CONTROL

A. Factory test panelboards according to NEMA PB 1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Provide grounding and bonding in accordance with Section 260526.

D. Install all field-installed branch devices, components, and accessories.

E. Provide filler plates to cover unused spaces in panelboards.

F. Identify panelboards in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all circuit breakers. Tests listed as optional are not required.

C. Correct deficiencies and replace damaged associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

3.5 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Wall plates and covers.

D. Occupancy Sensors.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260533.16 - Boxes for Electrical Systems.

C. Section 260533.23 - Surface Raceways for Electrical Systems: Surface raceway systems, including multioutlet assemblies.

D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; (Latest Edition).

B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification); (Latest Edition).

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; (Latest Edition).

E. NEMA WD 1 - General Color Requirements for Wiring Devices; (Latest Edition).

F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; (Latest Edition).

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.

I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
4. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

B. Operation and Maintenance Data:

1. GFCI Receptacles: Include information on status indicators.

C. Project Record Documents: Record actual installed locations of wiring devices.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 - PRODUCTS

2.1 WIRING DEVICES - GENERAL REQUIREMENTS

A. Provide wiring devices suitable for intended use with ratings adequate for load served.

B. Except where explicitly permitted, substitution of combination switch-and-receptacle devices for separate switches and receptacles is not permitted.

C. Wiring Device Applications:

1. Provide GFCI protection for:

a. Receptacles installed within 6 feet of sinks.
b. Receptacles installed in kitchens, kitchenettes, and break rooms.
c. All other areas required by NFPA 70.

D. Wiring Device Finishes:

1. Provide wiring device finishes as described below, unless otherwise indicated.
2. Wiring Devices, Unless Otherwise Indicated: Ivory with white nylon wall plate.
3. Wiring Devices Installed in Finished Spaces: Ivory with ivory nylon wall plate.

E. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 WALL SWITCHES

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. Hubbell Incorporated.
2. Leviton Manufacturing Company, Inc.
3. Pass & Seymour, a brand of Legrand North America, Inc.
4. Approved Equal.

B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

C. Standard Wall Switches: Commercial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

D. Heavy Duty Wall Switches: Commercial specification grade, 30A, 120/277 V, double-pole, with standard toggle type switch actuator and maintained contacts. Provide locking handle guard suitable for pad lock when serving equipment.

2.3 OCCUPANCY SENSORS

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. Leviton Manufacturing Company, Inc.
2. Lutron Electronics Company, Inc.
3. Pass & Seymour, a brand of Legrand North America, Inc.
4. Approved Equal.

B. Description: Switchbox-mounted, combination lighting-control sensor and conventional switch lighting-control unit using dual (ultrasonic and passive infrared) technology.

C. Standards: Comply with UL 20.

D. Rated 960 W at 120 V ac for tungsten lighting, 10 A at 120 V ac or 10 A at 277 V ac for fluorescent or LED lighting, and 1/4 hp at 120 V ac.

E. Adjustable time delay of five minutes.

F. Able to be locked to Automatic-On mode.

2.4 POWER PACK

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. Current Lighting.

2. Approved Equal.

B. Description: Self-contained transformer and mechanical latching relay for low voltage occupancy sensors.

1. Ceiling mount capability.

2. 24 VDC rating.

3. 250 mA nominal output.

4. Plenum rated.

2.5 RECEPTACLES

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. Hubbell Incorporated.
2. Leviton Manufacturing Company, Inc.
3. Pass & Seymour, a brand of Legrand North America, Inc.
4. Approved Equal.

B. Receptacles - General Requirements: Heavy-duty, self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

C. Convenience Receptacles:

1. Tamper Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; single or duplex as indicated on the drawings.

D. GFCI Receptacles:

1. Tamper Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.

2.6 WALL PLATES AND COVERS

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. Hubbell Incorporated.
2. Leviton Manufacturing Company, Inc.
3. Pass & Seymour, a brand of Legrand North America, Inc.
4. Approved Equal.
5. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Wall Plates: Comply with UL 514D.

1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
2. Size: Standard.
3. Screws: Metal with slotted heads finished to match wall plate finish.

C. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.

D. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.

1. Mounting Heights: Unless otherwise indicated, as follows:

a. Receptacles: 16" to bottom of outlet box.
b. Wall switches: 48" to bottom of outlet box.

2. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
3. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Engineer to obtain direction prior to proceeding with work.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.

E. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

F. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

G. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

H. Where split-wired duplex receptacles are indicated, remove tabs connecting top and bottom receptacles.

I. Install wiring devices plumb and level with mounting yoke held rigidly in place.

J. Wall switches with lettering shall be installed with lettering in the proper orientation.

K. Install vertically mounted receptacles with grounding pole on bottom and horizontally mounted receptacles with grounding pole on right.

L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

N. Identify wiring devices in accordance with Section 260553.

3.4 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

C. Test each receptacle to verify operation and proper polarity.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 262816.16

ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Enclosed safety switches.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260529 - Hangers and Supports for Electrical Systems.

C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; (Latest Edition).

B. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); (Latest Edition).

C. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); (Latest Edition).

D. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; (Latest Edition).

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

I. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

B. Project Record Documents: Record actual locations of enclosed switches.

C. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

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. Eaton Corporation.
2. Schneider Electric.
3. Siemens Industry, Inc.
4. Approved Equal.

2.2 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet.
2. Ambient Temperature: Between -22 degrees F and 104 degrees F.

D. Horsepower Rating: Suitable for connected load.

E. Voltage Rating: Suitable for circuit voltage.

F. Short Circuit Current Rating:

1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
2. Minimum Ratings:

a. Heavy Duty Single Throw Switches Protected by Class R, Class J, Class L, or Class T Fuses: 200,000 rms symmetrical amperes.

G. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

H. Provide with switch blade contact position that is visible when the cover is open.

I. Conductor Terminations: Suitable for use with the conductors to be installed.

J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

K. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:

a. Indoor Clean, Dry Locations: Type 1.
b. Outdoor Locations: Type 3R.

L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

M. Heavy Duty Switches:

1. Comply with NEMA BS 31047.
2. Conductor Terminations:

a. Provide mechanical lugs unless otherwise indicated.
b. Provide compression lugs where indicated.
c. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required support and attachment in accordance with Section 260529.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 260526.

H. Identify enclosed switches in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires.

1.2 RELATED REQUIREMENTS

A. Section 260529 - Hangers and Supports for Electrical Systems.

B. Section 260533.16 - Boxes for Electrical Systems.

C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; (Latest Edition).

B. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; (Latest Edition).

C. NECA/IESNA 500 - Standard for Installing Indoor Lighting Systems; (Latest Edition).

D. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; (Latest Edition).

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

A. Shop Drawings:

1. Provide photometric calculations where luminaires are proposed for substitution.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:

a. Include estimated useful life, calculated based on IES LM-80 test data.
b. Include IES LM-79 test report upon request.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

A. See Section 017700 - Closeout Procedure, for additional warranty requirements.

B. Provide 1-year manufacturer warranty for LED luminaires, including drivers.

PART 2 - PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

B. Substitutions: See Section 016000 - Product Requirements.

2.2 LUMINAIRES

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 products scheduled on the drawings.

B. Manufacturers:

1. Refer to luminaire schedule on contract drawings.

C. Provide products that comply with requirements of NFPA 70.

D. Provide products that are listed and labeled as complying with UL 1598, where applicable.

E. Provide products listed, classified, and labeled as suitable for the purpose intended.

F. Provide products complying with Federal Energy Management Program (FEMP) requirements.

G. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

H. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

I. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

D. Provide required support and attachment in accordance with Section 260529.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Suspended Ceiling Mounted Luminaires:

1. Provide support wires secured to structure to provide independent luminaire support. Wire shall have a minimum gauge and type used to support ceiling support system.
2. Do not use ceiling tiles to bear weight of luminaires.
3. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
4. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

I. Install lamps in each luminaire.

3.3 FIELD QUALITY CONTROL

A. Inspect each product for damage and defects.

B. Operate each luminaire after installation and connection to verify proper operation.

C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Engineer.

3.4 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Engineer. Secure locking fittings in place.

3.5 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.6 CLOSEOUT ACTIVITIES

A. See Section 017700 - Closeout Procedures, for closeout submittals.

B. See Section 018200 - Demonstration and Training, for additional requirements.

3.7 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

SECTION 321313

CONCRETE PAVING

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 Concrete Paving. Including the Following:

1. Pavements.
2. Joints.
3. Curbs.
4. Walks and ramps.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Curing compounds.

4. Joint fillers.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. Testing Agency Qualifications: Qualified according to ASTM C1077 and ASTM E329 for testing indicated.

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.

1.7 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Unless otherwise permitted in writing, discontinue concreting operations when the descending air temperature, away from artificial heat, falls to 40F. Do not resume operations until the air temperature, away from artificial heat, rises above 40F. Do not let water with a temperature above 90F to come in direct contact with the cement, until the cement has been mixed with the aggregates. Place concrete when the concrete temperature is between 50F and 90F. Do not use materials containing frost, lumps, or crusts of hardened materials. Do not place concrete on frozen base, subbase, or subgrade.

C. Hot-Weather Concrete Placement: When the air temperature in the immediate vicinity of concrete operations rises to 85F, take thermometer readings of the plastic concrete, at 1/2-hour intervals and at the conclusion of the mixing cycles. Discontinue concrete operations if the plastic concrete temperature exceeds 90F after mixing. When the plastic concrete temperature rises to 90F, cool the mixing water or aggregates to maintain a plastic concrete temperature within 50F to 90F at the time of placing.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. All reinforcement shall be in accordance with DelDOT's Standard Specifications for Road and Bridge Construction, Sections 611 and 1037.

2.4 CONCRETE MATERIALS

A. All aggregate, water, and admixtures shall be in accordance with DelDOT's Standard Specifications for Road and Bridge Construction, Sections 501, 1003, 1004, 1020, 1021, and 1022.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation retarder in first paragraph below temporarily reduces moisture loss from concrete surfaces awaiting finishing in hot, dry, and windy conditions. Evaporation retarders are not curing compounds or chemical surface retarders used to delay concrete setting.

E. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

F. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products. See Division 1 Section "Product Requirements."

G. Retain first paragraph below if a dissipating-type, waterborne, membrane-forming curing compound is required. Although the EPA permits VOC emissions of up to 350 g/L for this product category, verify that product meets curing compound VOC emission limits of authorities having jurisdiction. If appearance of paving is important before breakdown and disappearance of curing membrane, verify rate of dissipation with manufacturers.

H. Curing and Sealing Compound shall be a VOC-compliant and/or water-based, clear, sprayable, non-residual liquid silane or siloxane sealing compound: ASTM C-309, ASTM C-672 (Zero Sealing at 100 cycles) and NCHRP 244 Series II.

I. Sealing Compound to be a waterborne silane or siloxane sealing compound: ASTM E-514, ASTM C-672 (Zero Scaling at 100 cycles) and NCHRP 244 Series II.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D1751, asphalt-saturated cellulosic fiber preformed strips.

B. Dowels: #6 smooth, round steel bars.

C. Joint Sealant: Two-part, chemically-curing, cold applied elastomeric, traffic grade, Polyurethane sealant in accordance with DelDOT Standard Specifications for Road and Bridge Construction section 1042.

2.7 CONCRETE MIXTURES

A. For pavement: DelDOT Class A, B, and B/SF, in accordance with DelDOT's Standard Specifications for Road and Bridge Construction, Section 1022.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Furnish batch certificates for each batch discharged and used in the Work.

1. Furnish batch certificates for each batch discharged and used in the Work.
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 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

A. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

B. Place reinforcement at depth shown on the Drawings.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 20 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness. Joints shall be straight and continuous, not staggered and as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

    a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.

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 will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

    a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.

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

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

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

1. When air temperature has fallen to or is expected to fall below 40 deg F uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.

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

M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: In vehicular pavement, drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: In walkways draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 DETECTABLE WARNING INSTALLATION

A. Blockouts: Form blockouts in concrete for installation of detectable paving units.

1. Tolerance for Opening Size: Plus 1/4 inch, no minus.

B. Cast-in-Place Detectable Warning Tiles: Form blockouts in concrete for installation of tiles. Screed surface of concrete where tiles are to be installed to elevation, so that edges of installed tiles will be flush with surrounding concrete paving. Embed tiles in fresh concrete immediately after screeding concrete surface.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by any one or a combination of these as follows:

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, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
3. Curing and Sealing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial applications. Maintain continuity of coating, and repair damage during curing period. Curing and Sealing compound to be applied in accordance with manufacturer recommendations.

E. Sealing Method: When an acceptable combined curing and sealing compound is not used, concrete pavement and sidewalk is to cure for 28 days and then power-washed and allowed to dry prior to apply sealing compound. Unless otherwise permitted, apply in weather suitable for drying when the air temperature and concrete surface temperature are between (50° F and 95° F). Do not apply when surface and air temperatures are not expected to remain above 50° F for a minimum of 8 hours after application, unless otherwise indicated by manufacturer's written instructions. Do not apply under windy conditions which may result in uncontrolled and excessive water repellent drift. Do not apply earlier than 24 hours after rain or if rain is predicted for a period of 8 hours after application, unless otherwise indicated by manufacturer's written instructions.

F. Protect concrete from rain before its initial set. If rain is imminent, stop paving and cover the concrete surface with protective material in accordance with DelDOT approved methods.

3.10 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/2 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.

3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/2 inch.
4. Lateral Alignment and Spacing of Dowels: 1 inch
5. Vertical Alignment of Dowels: 1/4 inch.
6. Joint Spacing: 3 inches.
7. Contraction Joint Depth: Plus 1/4 inch, no minus.
8. Joint Width: Plus 1/8 inch, no minus.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: The Contractor will engage a qualified independent testing agency to perform concrete tests. Tests shall be performed while a representative of the owner is present.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day. Provide a minimum of 4 samples.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four (4) standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days. Hold one in reserve.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if 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 by more than 500 psi.

D. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 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.

E. 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 Engineer.

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

G. Submit test and inspection reports to the Engineer within 24 hours of each test.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.

B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

3.13 SITE RESTORATION

A. If necessary and as indicated, repair adjacent bituminous pavement for smooth transition to the new concrete pavement and repair areas of bituminous pavement damaged during construction. Full depth bituminous repairs to be provided 2 feet wide by the length of repair required.

END OF SECTION

SECTION 329200

TURF AND GRASSES

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. Seeding.
2. Erosion-control materials.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer.

B. Submit seed mix for review by Landscape Architect. Do not apply any seed until receipt of approval.

C. Certifications: Submit certificate with names of materials and manufacturer.

1. Ground limestone: Include guaranteed analysis, and weight for packaged material.
2. Commercial fertilizers: Include guaranteed analysis.
3. Seed: include origin of seed.

D. Instructions: Submit planting and maintenance schedule.

1. Submit in writing the proposed seed installation schedule including season, delivery of materials to the site and installation of seed at the site.
2. The schedule must be approved by the Owner's Representative and Landscape Architect prior to the beginning of work.

E. Product data: Submit product literature or tear sheets with name of product, and manufacturer for each type of product specified herein.

1. Commercial fertilizer, including type and application rate.

F. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass. Include identification of source and name and telephone number of supplier.

G. Product Certificates: For fertilizers, from manufacturer.

H. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required maintenance periods.

1.6 QUALITY ASSURANCE

A. Contractor's superintendent shall consult with the Landscape Architect regarding final lines and grades.

B. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf and meadow establishment.

1. Professional Membership: Installer shall be a member in good standing of either the National Association of Landscape Professionals or AmericanHort.
2. Experience: Three years' experience in turf and meadow installation and have had experience at least three (3) other projects of similar scope and complexity and shall perform work with personnel totally familiar with lawn and meadow

installation and general construction techniques under the supervision of an experience landscape foreperson.

3. Seed producer: manufacturer specializing in grass seed production with a minimum of 5 years' experience.
4. Seed must comply with seed certifications in the state in which they are purchased.
5. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
6. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the National Association of Landscape Professionals:

    a. Landscape Industry Certified Technician - Exterior.
    b. Landscape Industry Certified Lawn Care Manager.
    c. Landscape Industry Certified Lawn Care Technician.

7. Pesticide Applicator: State licensed, commercial.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable. Protect materials from deterioration during delivery and during storage.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.
4. Deliver fertilizer and limestone in waterproof bags.
5. All seed shall be labeled to show compliance with requirements of governmental agencies having jurisdiction. All bag tags of seed used shall be retained and submitted to
6. Landscape Architect. Seed shall be kept in dry storage away from contaminants, insects and rodents.

1.8 FIELD CONDITIONS

A. Planting Restrictions: Plant during one of the following periods unless otherwise permitted by Landscape Architect.

1. Spring Planting: March 15 to May 30, unless approved by Engineer. No seeding shall be done on frozen ground, when the air temperature is less than 32-degrees Fahrenheit, or when the soil temperature is less than 50-degrees Fahrenheit regardless of the date of seeding.

2. Fall Planting: August 30 to October 30, unless approved by Engineer. No seeding shall be done on frozen ground, when the air temperature is less than 32-degrees Fahrenheit, or when the soil temperature is less than 50-degrees Fahrenheit regardless of the date of seeding.
3. Optimal: The optimal seeding season is in the fall, from August 30 to October 15. More rapid germination will occur for most seed varieties when the soil temperature is between sixty and seventy degrees Fahrenheit.
4. Where seeding or sodding is required outside of the Spring or Fall planting seasons, perform additional maintenance, provide additional mulch, frost protection blanket, compost, increased seeding rate, over-seeding, and other Work as required to improve germination conditions.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

C. Do not seed during adverse weather, windy conditions or on wet or frozen ground.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species:

1. Quality: State-certified seed of grass species as listed below for solar exposure.
2. Quality: Seed shall be a minimum of 80-percent endophyte enhanced, consist of a minimum of 98 percent pure seed with 0 percent weed seed and have a minimum 90 percent germination rate.
3. Seed Mixture: 100% Turf Type Tall Fescue Tall Fescue (Festuca arundinacea), a minimum of three cultivars.

C. Proportioned by weight per acrea as follows:

1. 34 percent Hemi, by Burlingham Seeds.
2. 33 percent Turbo, by Burlingham Seeds.
3. 33 percent Bullseye, by Burlingham Seeds.

D. Temporary Seed Mixture: Provide in accordance with Table D, DE Standard Specifications for Road and Bridge Construction Publication, August 2016 or latest edition for temporary seeding.

2.2 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition:

a. 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
b. Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition:

a. 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
b. Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.3 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

C. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

D. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

E. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

F. Asphalt Emulsion: ASTM D977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.4 PESTICIDES

A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.5 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

C. Erosion-Control Mats: Cellular, nonbiodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 3-inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil.

B. Placing Planting Soil: Place topsoil and spread over the prepared subgrade to obtain the required depth and grade elevation. Cultivate and conditioned to a depth of six inches with lime added at the rate determined by soil testing. Final compacted thickness of topsoil not less than six (6") inches. Exercise extreme care to prevent damage to items of construction. All work shall be done by hand immediately adjacent to these installations.

1. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Do not place topsoil when the subgrade is frozen, excessively wet, or extremely dry, do not handle topsoil when frozen or excessively wet.

D. Immediately after cultivating, uniformly spread the basic fertilizer and work in deeply (four to six inches), at the rate determined by soil testing. The areas shall then be carefully dragged and brought to an even, smooth grade, ready for seeding.

E. Remove stones one-inch (1") or larger in any dimension, vegetation, or debris brought to the surface during these operations from the site. The final grade shall be even, smooth and free of lumps or water-collecting pockets.

F. Apply starter fertilizer immediately before seeding by broadcasting and raking into a depth of one-inch (1") at the rate determined by soil testing.

G. Provide smooth finish grades with uniform flow without depressions or arises, with gradual and uniform transition at slopes and embankments. Maximum allowable tolerance in finish grades shall be not more than one inch (1") in ten feet (10') or three inches (3") in one hundred feet (100') when measured.

H. Place topsoil adjacent to all paved surfaces to meet finish grade of pavement and provide a smooth transition to surrounding finish grade.

I. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

J. Before planting, obtain Landscape Architects acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 11 lbs/1000 sq. ft..

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with erosion-control mats where indicated on Drawings; install and anchor according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 100 lbs. per 1,000 square feet to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft. Take precautions to prevent damage or staining of structures or

other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

G. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.6 HYDROSEEDING

A. Hydroseeding: Mix specified seed, commercial fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Spray-apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Spray-apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre.

3.7 TURF RENOVATION

A. Renovate existing turf where indicated.

B. Renovate turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
2. Install new planting soil as required.

C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

D. Remove topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

E. Mow, dethatch, core aerate, and rake existing turf.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

I. Apply soil amendments and initial fertilizer required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.

J. Apply seed and protect with straw mulch as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

3.8 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow turf-type tall fescue to a height of 2 to 3 inches.

D. Turf Postfertilization: Apply slow-release fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that provides actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.9 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches Insert coverage.
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.10 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.11 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

3.12 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:

1. Seeded Turf: 60 days from date of Substantial Completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

2. Sodded Turf: 45 days from date of Substantial Completion.

END OF SECTION

CITY OF NEWARK
DELAWARE

ATTACHMENT 1
Project Drawings, Sheets 1-33

DRAWING SET FOR:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

100% SUBMISSION 10/10/2025
ISSUED FOR BIDDING

OWNER:

CITY OF NEWARK

220 S MAIN ST, NEWARK, DE 19711
302-366-7000
WWW.NEWARKDE.GOV @CityofNewarkDE

DRAWING INDEX

GENERAL

G-000	COVER SHEET AND DRAWING INDEX

CIVIL

L-101	DEMOLITION PLAN
L-102	SITE LAYOUT PLAN
L-103	MATERIALS PLAN
L-104	GRADING PLAN
L-501	DETAILS

ARCHITECTURAL

A-001	ARCHITECTURAL SYMBOLS AND GENERAL NOTES
A-002	CODE COMPLIANCE AND LIFE SAFETY PLAN
AD-101	DEMOLITION FLOOR PLANS
AD-401	ENLARGED FLOOR PLANS - DEMOLITION
AD-402	ENLARGED REFLECTED CEILING PLANS - DEMOLITION
A-101	FLOOR PLANS - NEW WORK
A-201	EXTERIOR ELEVATIONS
A-401	ENLARGED PLANS
A-402	ENLARGED REFLECTED CEILING PLANS - NEW WORK
A-403	ELEVATIONS AND DETAILS
A-601	DOOR SCHEDULE, PARTITION TYPES, AND DETAILS
A-701	FINISH SCHEDULE AND FINISH FLOOR PLAN

STRUCTURAL

S-510	TYPICAL DETAILS

MECHANICAL

H-001	LEGEND - MECHANICAL
HD-101	FLOOR PLANS - DEMOLITION PLUMBING
H-101	FLOOR PLAN - HEATING AND VENTILATION - MECHANICAL
H-601	SCHEDULES AND DETAILS - MECHANICAL

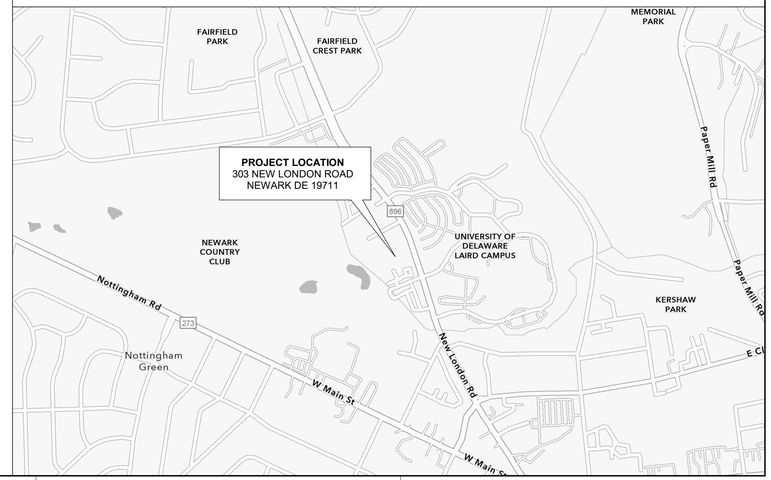
PLUMBING

P-001	LEGEND - PLUMBING
PD-101	FLOOR PLANS – DEMOLITION – PLUMBING
P-101	FLOOR PLANS - PLUMBING
P-601	RISERS - PLUMBING

ELECTRICAL

E-001	LEGEND - ELECTRICAL
ED101	ENLARGED ELECTRICAL FLOOR PLANS - DEMOLITION
E-101	FLOOR PLANS POWER - ELECTRICAL NEW WORK
E-102	FLOOR PLANS LIGHTING - ELECTRICAL NEW WORK
E-601	SCHEDULES - ELECTRICAL NEW WORK
E-602	SCHEDULES - ELECTRICAL NEW WORK

VICINITY MAP



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LICENSE NUM: EXP DATE:

PROJECT:
GEORGE WILSON CENTER IMPROVEMENTS
FACILITY RENOVATIONS CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
WWW.NEWARKDE.GOV
@CityofNewarkDE

MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	10/10/2025
SCALE:	AS INDICATED
DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:
COVER SHEET

SHEET NUMBER:
G-000

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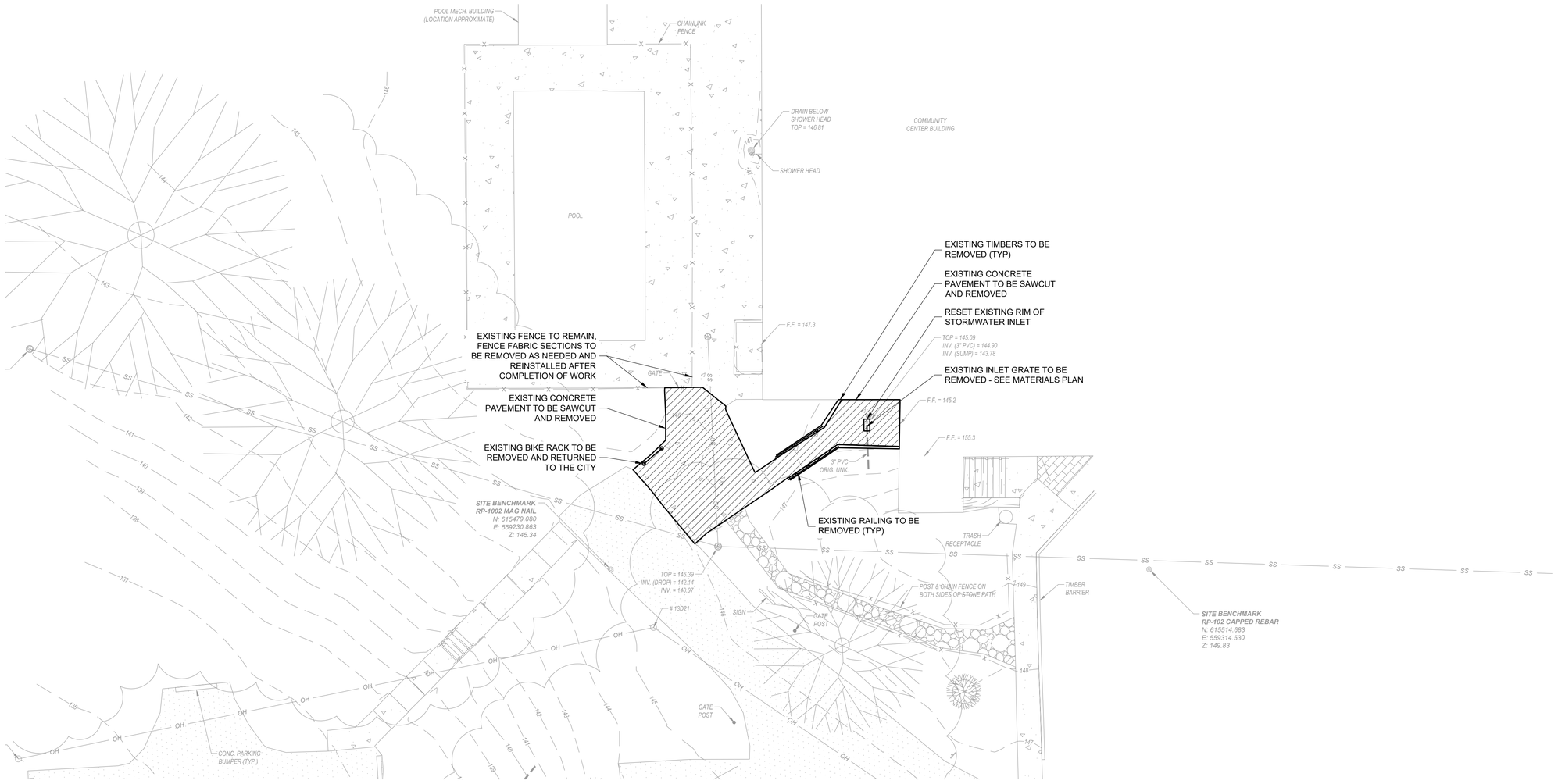

DEMOLITION NOTES

1. CONTRACTOR SHALL NOTIFY MISS UTILITY OF DELMARVA PRIOR TO ANY DEMOLITION ACTIVITIES.
2. INSTALL INLET PROTECTION MEASURES PRIOR TO SITE CLEARING OR DEMOLITION ACTIVITIES.
3. PRESERVE AND PROTECT ALL EXISTING FEATURES TO REMAIN: STRUCTURES, LIGHTING, SURFACE MATERIALS, ABOVE AND BELOW GRADE UTILITIES, FOOTING AND VEGETATION WITHIN AND ADJACENT TO CONSTRUCTION AREA DURING ALL PHASES OF DEMOLITION AND CONSTRUCTION.
4. MEET ALL EXISTING GRADES AT ALL EDGES OF PROJECT. ADJUST EXISTING INLETS, DRAINS, VENTS, VALVE, AND ANY OTHER APPLICABLE UTILITIES TO MEET FINISH GRADES.
5. DO NOT DRIVE OR PARK, STORE MATERIAL OR DEBRIS ON THE SITE EXCEPT IN AREAS APPROVED BY OWNER. STAGING AREAS SHALL BE APPROVED BY OWNER. DO NOT STAGE MATERIALS IN AREAS OTHER THAN THOSE THAT ARE PREVIOUSLY DESIGNATED BY THE OWNER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT TO ANY EXISTING ANY FEATURES DISTURBED OR DAMAGED BY THE CONSTRUCTION OR DEMOLITION ACTIVITIES PROPOSED HEREIN.
7. CUTTING AND PATCHING OF EXISTING PAVEMENTS TO REMAIN SHALL BE COMPLETED WITH CARE. PATCH WITH MATERIALS IDENTICAL TO EXISTING MATERIALS.
8. REMOVE EXISTING PAVEMENT TO FULL DEPTH WITHIN THE AREAS NOTED FOR DEMOLITION.
9. DEMOLITION WORK SHALL BE SCHEDULED AND IMPLEMENTED WITH MINIMAL DISRUPTION TO ADJACENT OCCUPIED AREAS.
10. ALL EXISTING UNDERGROUND UTILITIES, UTILITY POLES, GUY WIRES, MANHOLES, AND HYDRANTS UNLESS OTHERWISE NOTED SHALL NOT BE DISTURBED BY THE CONTRACTORS DEMOLITION EFFORTS UNLESS NOTED FOR REMOVAL.
11. ALL ITEMS NOTED FOR REMOVAL SHALL BE REMOVED IN THEIR ENTIRETY, INCLUDING ALL ASSOCIATED APPURTENANCES UNLESS OTHERWISE NOTED.
12. THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER AND/OR ENGINEER FOR ANY AND ALL INJURIES AND/OR DAMAGES TO PERSONNEL, EQUIPMENT AND/OR EXISTING FACILITIES IN THE DEMOLITION AND CONSTRUCTION DESCRIBED IN THE PLANS AND SPECIFICATIONS.
13. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXAMINE THE SITE AND BE FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING ON THE DEMOLITION WORK FOR THIS PROJECT. IF THE CONDITIONS ENCOUNTERED DURING EXAMINATION ARE SIGNIFICANTLY DIFFERENT THAN THOSE SHOWN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.
14. ALL DEMOLITION WASTE AND CONSTRUCTION DEBRIS SHALL BE REMOVED BY THE CONTRACTOR AND DISPOSED OF IN A STATE APPROVED WASTE SITE AND IN ACCORDANCE WITH ALL LOCAL AND STATE CODES AND PERMIT REQUIREMENTS.
15. CONTRACTOR SHALL NOTIFY OWNER IMMEDIATELY IF HAZARDOUS MATERIALS ARE ENCOUNTERED.
16. CONTRACTOR SHALL PROTECT ALL CORNER PINS, MONUMENTS, PROPERTY CORNERS, AND BENCHMARKS DURING DEMOLITION ACTIVITIES. IF DISTURBED, CONTRACTOR SHALL HAVE DISTURBED ITEMS RESET BY A LICENSED SURVEYOR AT NO ADDITIONAL COST TO THE OWNER.
17. CONTRACTOR SHALL PROTECT AT ALL TIMES ADJACENT EXISTING STRUCTURES AND ITEMS FROM DAMAGE DUE TO DEMOLITION / CONSTRUCTION ACTIVITIES.
18. CONTRACTOR SHALL REFER TO OTHER PLANS WITHIN THIS CONSTRUCTION SET FOR OTHER PERTINENT INFORMATION.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK ZONE SAFETY AS MANDATED BY OSHA, THE MUNICIPALITY, OR THE OWNER'S AUTHORIZED REPRESENTATIVE.
20. CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND OWNER PRIOR TO REMOVING ANY ITEMS OTHER THAN WHAT IS SHOWN ON THESE PLANS.
21. ALL EQUIPMENT TO BE RETURNED TO OWNER SHALL BE DELIVERED TO CITY OF NEWARK FIELD OPERATIONS COMPLEX 406 PHILLIPS AVE, NEWARK, DELAWARE. CONTACT PARKS AND RECREATION TO COORDINATE DELIVERY OF EQUIPMENT.

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LEGEND:

PAVEMENT TO BE REMOVED

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SEAL:

CHRISTOPHER R. BRENNAN LICENSE No. 18168 DELAWARE PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: 18168, EXP DATE: 06/30/2026.

PROJECT:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS
CONTRACT NO. 25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
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@CityofNewarkDE

MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	09-26-2025
SCALE:	AS INDICATED
DESIGNED BY:	JT
DRAWN BY:	JT
CHECKED BY:	MG

DRAWING TITLE:
DEMOLITION PLAN

SHEET NUMBER:
L-101

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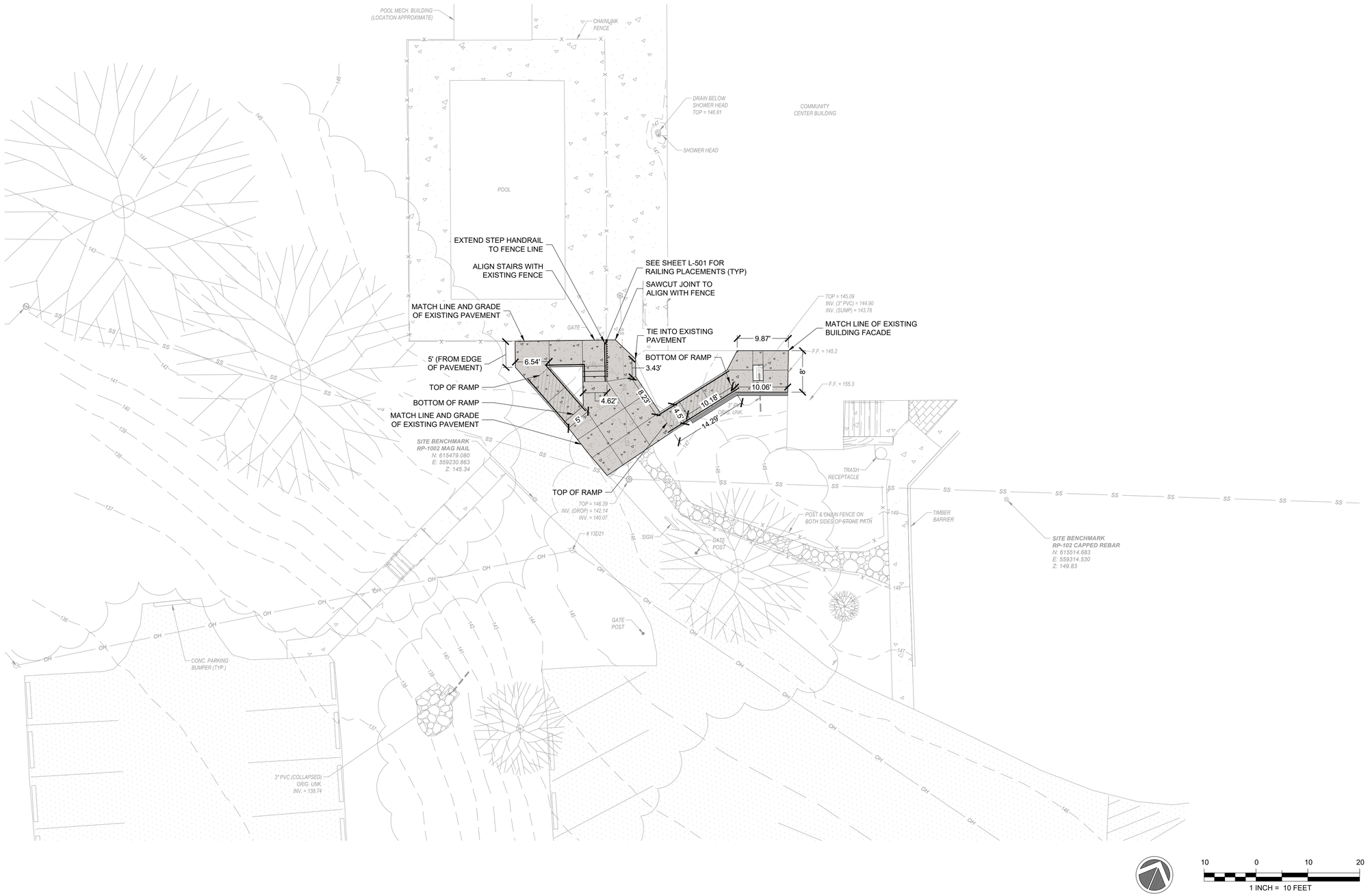

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CHECKED BY:	MG

DRAWING TITLE:
SITE LAYOUT PLAN

SHEET NUMBER:
L-102

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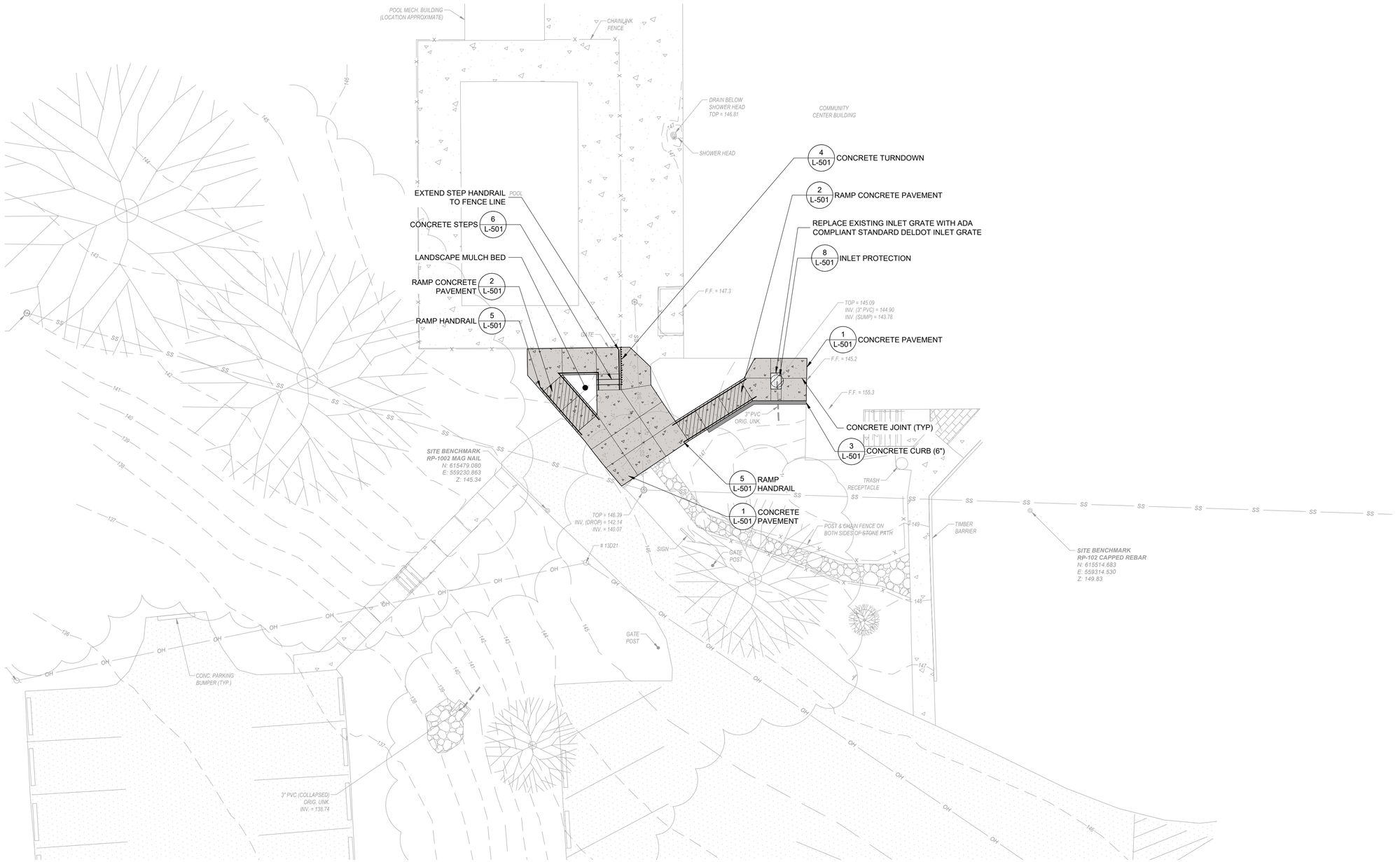

MATERIALS NOTES

1. DO NOT SCALE DRAWINGS
2. ALL DISTURBED AREAS OF SITE WITHOUT PROPOSED SITE FEATURES SHALL RECIEVE TOPSOIL AND BE SEEDED PER SPECIFICATIONS
3. THE CONTRACTOR SHALL HAVE ALL REQUIRED SUBMITTAL APPROVALS PRIOR TO BEGINNING THE WORK OF ORDERING MATERIALS.
4. DRAWINGS FOR DESIGN INTENT ONLY. FIELD ADJUSTMENTS MAY BE REQUIRED WITH WRITTEN AUTHORIZATION BY OWNER AND/OR LANDSCAPE ARCHITECT.
5. CONSULT OWNER AND/OR LANDSCAPE ARCHITECT FOR FINAL IN-THE-FIELD PLACEMENT OF SITE AMENITIES.

LEGEND

INLET PROTECTION

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CHECKED BY:	MG

DRAWING TITLE:
MATERIALS PLAN

SHEET NUMBER:
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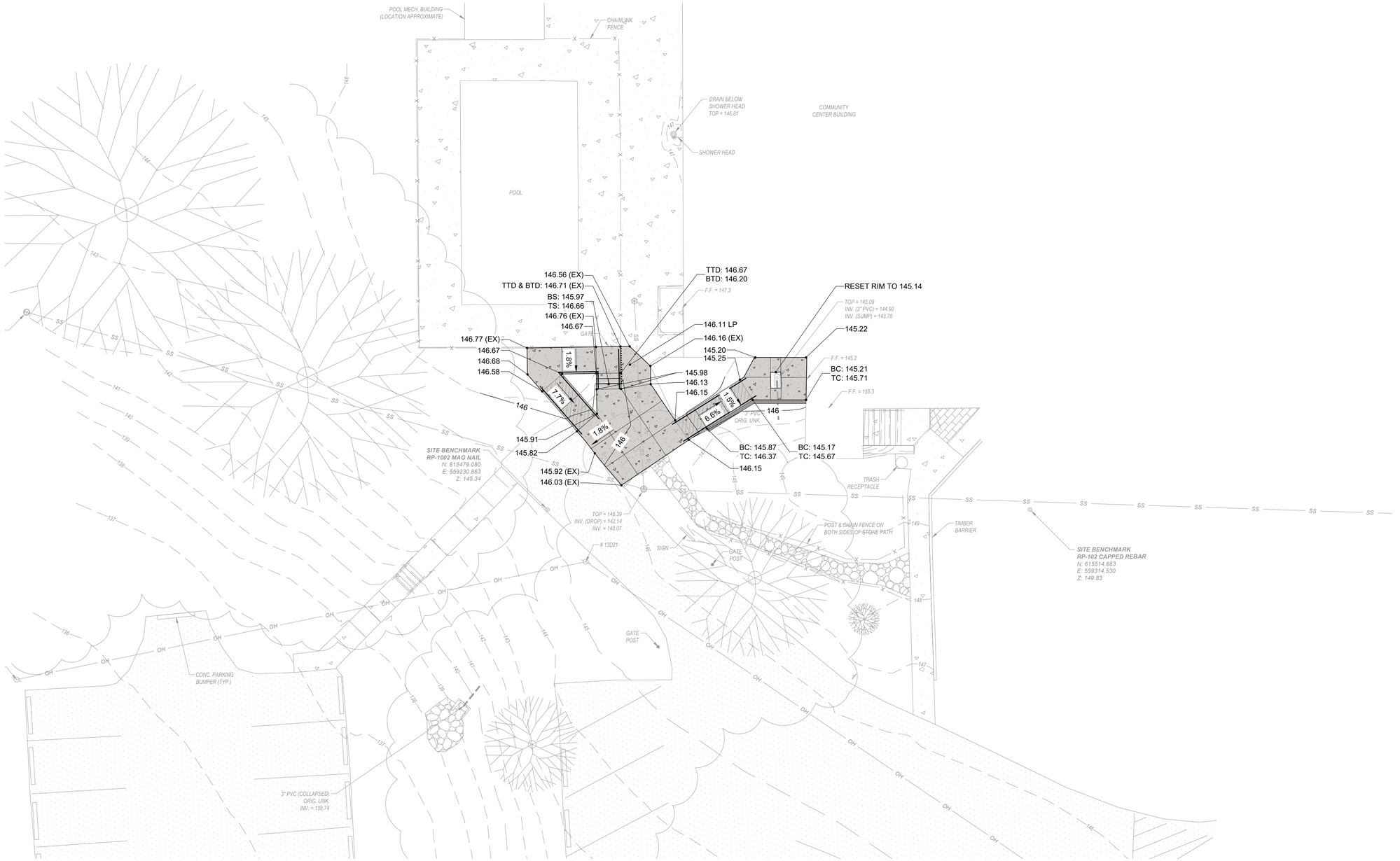

GRADING NOTES

1. WHERE PROPOSED PAVEMENT ABUTS EXISTING PAVEMENT, MATCH LINE AND GRADE OF THE EXISTING PAVEMENT.
2. ALL GRADING SHALL BE SMOOTH AND CONTINUOUS. TOPS AND BOTTOMS OF ALL SLOPES SHALL BE ROUNDED.
3. PLAN LOCATIONS AND DIMENSIONS SHALL BE STRICTLY ADHERED TO UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4. UNDER NO CIRCUMSTANCES SHALL THE PROPOSED RAMPS/WALK CREATE A LOW SPOT OR POND WATER. GRADING FOR WALKS SHALL ONLY DISTURB WHAT IS NECESSARY TO CONSTRUCT WALK AND MAINTAIN DRAINAGE FLOW.
5. FINISH GRADES OF PAVEMENTS AND SOIL ALONG BOTTOM OF CURBS AND WALLS SHALL HAVE A CONSTANT SLOPE UNLESS INDICATED BY SPOT ELEVATIONS.
6. ANY DISCREPANCY BETWEEN FIELD CONDITIONS AND DOCUMENTED EXISTING OR PROPOSED CONDITIONS SHALL BE REPORTED TO THE ENGINEER IN WRITING.
7. LAWNS AND PLANT BEDS SHALL BE EXCAVATED TO THE DEPTHS REQUIRED TO ACHIEVE DESIGN SOIL PROFILE DEPTHS- SEE SPECIFICATIONS, LANDSCAPE PLANS AND DETAILS.
8. AT HIGH POINTS AND LOW POINTS IN PAVED AREAS, SLOPES SHALL NOT BE GRADED TO A POINT OR SHARP RIDGE; GRADES SHALL BE TRANSITIONED. AVOID LOW SPOTS IN PAVEMENTS THAT MAY RESULT IN PUDDLING.
9. INTERIORS OF PLANT BEDS SHALL NOT BE MOUNDED UNLESS INDICATED.
10. CONTRACTOR MUST VERIFY THAT ALL RAMP AND PAVEMENT SLOPES ARE PER DESIGNED SLOPES.

LEGEND:

(EX)	ASSUMED EXISTING ELEVATION
TS	TOP OF STEP
BS	BOTTOM OF STEP
TR	TOP OF RAMP
BR	BOTTOM OF RAMP
TC	TOP OF CURB
BC	BOTTOM OF CURB
TTD	TOP OF TURN-DOWN
BTD	BOTTOM OF TURN-DOWN

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1 INCH = 10 FEET

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PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
WWW.NEWARKDE.GOV
@CityofNewarkDE

MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	09-26-2025
SCALE:	AS INDICATED
DESIGNED BY:	JT
DRAWN BY:	JT
CHECKED BY:	MG

DRAWING TITLE:
GRADING PLAN

SHEET NUMBER:
L-104

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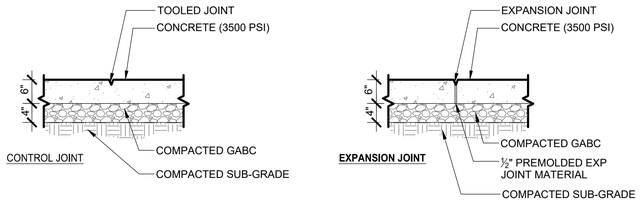
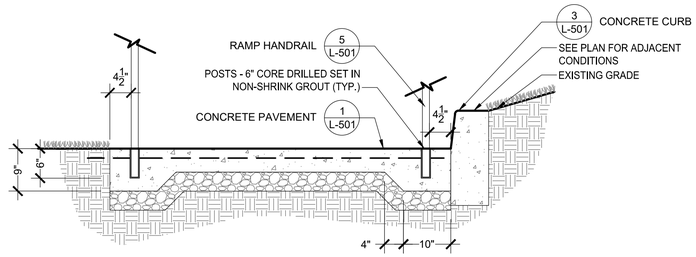
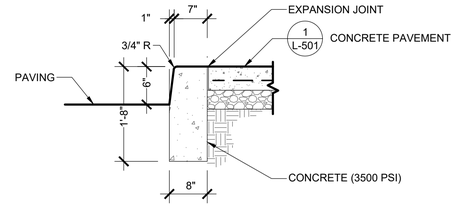


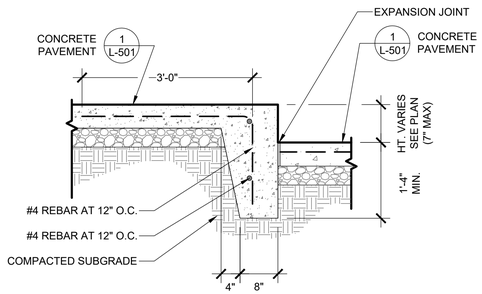
1 L-501 **CONCRETE PAVEMENT**
NTS



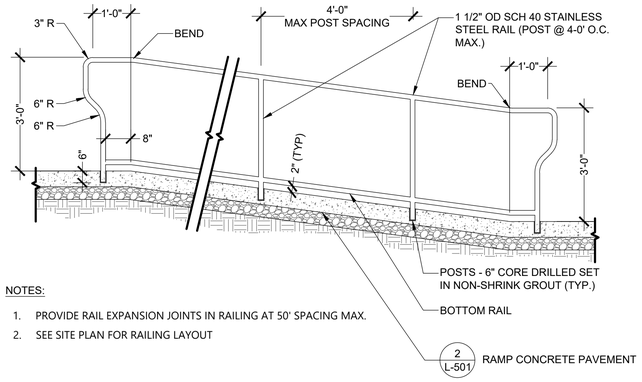
2 L-501 **RAMP CONCRETE PAVEMENT**
NTS



3 L-501 **CONCRETE CURB**
NTS



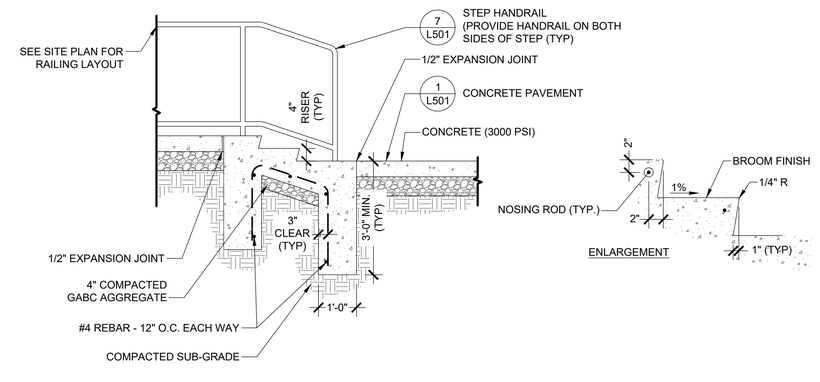
4 L-501 **CONCRETE TURNDOWN**



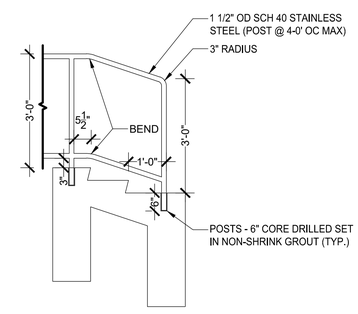
NOTES:

1. PROVIDE RAIL EXPANSION JOINTS IN RAILING AT 50' SPACING MAX.
2. SEE SITE PLAN FOR RAILING LAYOUT

5 L-501 **RAMP HANDRAIL**
NTS



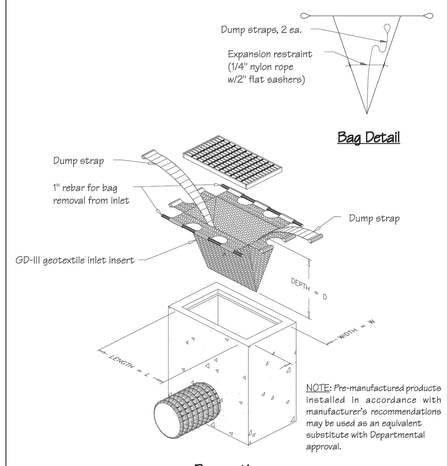
6 L-501 **CONCRETE STEPS**
NTS



7 L-501 **STEPS HANDRAIL**
NTS

Standard Detail & Specifications

Inlet Protection - Type 2



Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	IP-2	**DE-ESC-3.1.5.2** Sheet 1 of 2 Effective July 2023

Standard Detail & Specifications

Inlet Protection - Type 2

Notes:

1. This practice shall only be used in situations in which Inlet Protection - Type 1 cannot be used due to site constraints. These include, but are not limited to partially completed parking areas, streets, roads, etc.
2. It may be necessary to transition from Type 1 to Type 2 Inlet Protection as construction proceeds.
3. For areas where there is a concern for oil run-off or spills, insert shall meet one of the above specifications with an oil-absorbant pillow or shall be made completely from an oil-absorbant material with a woven pillow.

Materials:

The geotextile inlet insert shall meet or exceed the specifications of Type GD-III geotextile in accordance with Appendix A-3 of the Delaware Erosion & Sediment Control Handbook.

Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	IP-2	**DE-ESC-3.1.5.2** Sheet 2 of 2 Effective July 2023

8 L-501 **INLET PROTECTION**
NTS

File Path
7/26/2010 11:53:18 AM

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121 CONTINENTAL DR #300, NEWARK, DELAWARE 19713
302.266.9600
WWW.JMT.COM

NEWARK DELAWARE
Committed to Service Excellence

SEAL:

CHRISTOPHER R. BRIENDEL — LICENSE — No. 18168 — DELAWARE — PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: 18168, EXP DATE: 06/30/2026.

PROJECT:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS
CONTRACT NO. 25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
WWW.NEWARKDE.GOV
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DRAWING TITLE:
DETAILS

SHEET NUMBER:
L-501

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ABBREVIATIONS

@	AT
AB	ANCHOR BOLT
ACP	ACOUSTICAL CEILING PANEL
ACT	ACOUSTICAL CEILING TILE
ADA	AMERICANS WITH DISABILITIES ACT
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
ALUM	ALUMINUM
APPROX	APPROXIMATE
ARCH	ARCHITECT
BLDG	BUILDING
BLKG	BLOCKING
BLKHD	BULKHEAD
BO	BOTTOM OF
BOT	BOTTOM
BTWN	BETWEEN
BUR	BUILT-UP ROOFING
CAB	CABINET
CL	CENTER LINE
CLG	CEILING
CLOS	CLOSET
CLR	CLEAR, CLEARANCE
CM	CONSTRUCTION MANAGER
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CT	CERAMIC TILE
CW	COLD WATER
D	DEEP, DEPTH
DBL	DOUBLE
DET	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DS	DOWNSPOUT
DW	DISHWASHER
DWG	DRAWING
EA	EACH
EIFS	EXTERIOR INSULATION & FINISH SYSTEM
ELEC	ELECTRIC
EMER	EMERGENCY
ENCL	ENCLOSURE
EPS	EXPANDED POLYSTYRENE BOARD (INSULATION)
EQ	EQUAL
EQUIP	EQUIPMENT
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
F.O.	FACE OF
FAB	FABRICATED
FD	FLOOR DRAIN
FE(C)	FIRE EXTINGUISHER (CABINET)
FIN	FINISH
FLR(G)	FLOOR(ING)
FLUOR	FLUORESCENT
FOIC	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
FT(G)	FOOT(ING)
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GL	GLASS / GLAZING
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
H	HIGH
HDR	HEADER
HDWD	HARDWOOD
HDWR	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HT	HEIGHT
HVAC	HEATING, VENTILATING & AIR CONDITIONING
HW	HOT WATER
HWH	HOT WATER HEATER
ID	INSIDE DIAMETER
INSUL	INSULATION
INT	INTERIOR
JAN	JANITOR
JT	JOINT
L	LONG, LENGTH
LAM	LAMINATE
LB(S)	POUND(S)
LLV	LONG LEG VERTICAL
LT(G)	LIGHT(ING)
MAS	MASONRY
MATL	MATERIAL
MDF	MEDIUM DENSITY FIBERBOARD
MDO	MEDIUM DENSITY OVERLAY
MECH	MECHANICAL
MEMB	MEMBRANE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTD	MOUNTED
MTL	METAL
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD
OPNG	OPENING
OPP (HD)	OPPOSITE (HAND)
PART	PARTITION
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
PNL(G)	PANEL(ING)
PR	PAIR
PT	PRESSURE TREATED
PTD	PAINTED
PVF	POLYVINYL FLUORIDE (PLASTIC)
QT	QUARRY / QUARTZ TILE
R	RADIUS
R&R	REVISE & RESUBMIT
RD	ROOF DRAIN
REF	REFRIGERATOR
REINF	REINFORCE
REQ'D	REQUIRED
REV	REVISED, REVISION
RM	ROOM
RO	ROUGH OPENING
RTU	ROOF TOP UNIT
SAN	SANITARY
SC	SOLID CORE
SCHED	SCHEDULE
SECT	SECTION
SF	SQUARE FOOT (FEET)
SG	SEMI-GLOSS
SGL	SINGLE
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURAL
SUSP	SUSPEND
SVC	SERVICE
SW	STORM WATER
T	TALL
T&G	TONGUE & GROOVE
TEL	TELEPHONE
TEMP	TEMPORARY
THK	THICKNESS
TO	TOP OF
TYP	TYPICAL
UC	UNDERCUT
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
VAR	VARIES
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VIF	VERIFY IN FIELD
W	WIDE
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WIN	WINDOW
WSCT	WAINSCOT
WT	WEIGHT

GENERAL DEMOLITION NOTES

1. SEPARATE CONSTRUCTION AREAS FROM NON-CONSTRUCTION AREAS BY CONSTRUCTING DUST PARTITIONS. KEEP DUST PARTITIONS TIGHT WITH TAPED POLY, AND SEAL DUCT INTAKES AS REQUIRED TO PREVENT SYSTEM CONTAMINATION FROM DUST. COORDINATE FINAL LOCATIONS OF DUST PARTITIONS WITH PROJECT MANAGER. ALL LUMBER AND POLY REQUIRED TO BE FIRE RETARDANT TYPE. LOCATE OPENINGS AS REQUIRED.

2. COORDINATE EXTENT OF DEMOLITION WORK WITH REQUIREMENTS SET FORTH ON FLOOR PLANS FOR NEW WORK.

3. FIELD VERIFY ALL EXISTING CONSTRUCTION RELATED CONDITIONS PRIOR TO STARTING DEMOLITION OR NEW CONSTRUCTION. BRING ALL DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT OR OWNER'S REPRESENTATIVE.

4. SEE MECHANICAL, PLUMBING, ELECTRICAL, AND STRUCTURAL DRAWINGS FOR ADDITIONAL DEMOLITION WORK AND COORDINATE WITH ARCHITECTURAL DEMO.

5. FOR CONSTRUCTION THAT REMAINS AFTER DEMOLITION, REMOVE ALL EXISTING MORTAR, ANCHORS, FINISH MATERIAL, ETC. AND PATCH, FILL HOLES, CLEAN, PREPARE, PRIME, AND APPLY NEW FINISH SO THAT COMPLETED WORK IS INDISTINGUISHABLE FROM ADJACENT WORK.

6. REMOVE ANY EXISTING CONDUIT, WIRING, OR OTHER SURFACE MOUNTED ITEMS THAT DO NOT SERVE ANY PURPOSE/FUNCTION. REPAIR/REINSTALL ANY UNSIGHTLY SURFACE MOUNTED WIRING AS REQUIRED.

7. CAP AND REMOVE EXISTING PLUMBING SERVICES AS REQUIRED PER THE MEP DRAWINGS. REMOVE ALL FLOOR AND WALL TILE, VCT, BASE, AND SETTING BED AS REQUIRED TO TERMINATE INDICATED PLUMBING SERVICES.

8. EXIT ACCESS IN NON CONSTRUCTION AREAS SHALL BE MAINTAINED DURING CONSTRUCTION.

9. ALL FLOOR REMOVAL TO BE DONE TO AVOID DAMAGE TO THE UNDERFLOOR/ SUBFLOOR. HOWEVER, IN ALL AREAS WHERE DEMOLITION (REMOVAL OF TILE, CARPETING, PARTITIONS, ETC.) CAUSES UNEVENESS IN SLAB, THE CONTRACTOR SHALL LEVEL THE SLAB TO RECEIVE NEW FINISH FLOORING. PREPARATION SHALL INCLUDE FILLING VOIDS AND CRACKS AND OTHER IMPERFECTIONS THAT WOULD TELEGRAPH THROUGH NEW FLOORING, AS WELL AS GRINDING DOWN ANY BUMPS OR RAISED AREAS.

10. WHERE RUBBER/VINYL BASE AND ADHESIVE IS REMOVED, PREPARE REMAINING SURFACE TO RECEIVE NEW BASE.

11. COORDINATE WITH THE OWNER, ALL DEMOLITION AND CONSTRUCTION ACTIVITIES, TO MINIMIZE DISRUPTION OF THE NORMAL DAILY FUNCTIONING OF THE OWNER'S OCCUPIED AREAS.

12. MAINTAIN THE BUILDING IN A WATERTIGHT CONDITION AT ALL TIMES.

13. DO NOT REMOVE TEMPORARY WALLS UNTIL ALL FINISHED WORK IS COMPLETED OR UPON OWNER APPROVAL. UPON REMOVAL OF TEMPORARY PARTITIONS, PATCH TO MATCH EXISTING ADJACENT CONSTRUCTION.

14. WHERE A RATING HAS BEEN GIVEN TO AN EXISTING WALL, SEAL AND FIREPROOF ALL PENETRATIONS (EXISTING OR NEW) PER THAT RATING.

15. IN AREAS WHERE FLOORING IS TO REMAIN, PROTECT EXISTING FLOORING FOR DURATION OF DEMOLITION AND CONSTRUCTION PHASES WITH TAPED FIBERBOARD OR EQUAL. ANY DAMAGE WHICH OCCURS DURING CONSTRUCTION WILL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.

16. CONTRACTOR WILL COORDINATE AND BE RESPONSIBLE FOR RELOCATING FURNISHING INCLUDING, BUT NOT LIMITED TO, ALL TABLES, CHAIRS, EQUIPMENT, AND MOVABLE AUDIO/VISUAL EQUIPMENT. CONTRACTOR TO RELOCATE MATERIALS AFTER CONSTRUCTION IS COMPLETE. COORDINATE WITH PROJECT MANAGER.

17. CONTRACTOR TO BE RESPONSIBLE FOR PROTECTION OF ALL ITEMS TO REMAIN DURING CONSTRUCTION AND TO BE RESPONSIBLE FOR ANY DAMAGE. ANY PORTION OF CONSTRUCTION AFFECTED BY DEMOLITION WILL BE PATCHED AND REPAIRED TO BE OF "LIKE NEW" QUALITY;TYPICAL.

18. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

GENERAL CONSTRUCTION NOTES

1. ALL PLAN DIMENSIONS ARE FROM FINISHED FACE TO FINISHED FACE, V.I.F.

2. CONTRACTOR TO VERIFY ALL +/- DIMENSIONS PRIOR TO COMMENCEMENT TO CONSTRUCTION, AND NOTIFY ARCHITECT OF ANY DISCREPANCIES.

3. DO NOT SCALE DRAWINGS. USE WRITTEN DIMENSIONS ONLY.

4. ALL DIMENSIONS, NOTES, FINISHES AND FIXTURES SHOWN ON TYPICAL FLOOR PLANS, SECTIONS, OR DETAILS SHALL APPLY TO ALL SIMILAR, SYMMETRICAL, OR OPPOSITE HAND PLANS, SECTIONS, OR DETAILS.

5. ALL DOOR JAMBS SHALL BE LOCATED 4" FROM INTERSECTING WALL, U.N.O.

6. CONTRACTOR TO PROVIDE AND INSTALL EXIT SIGNS AND EMERGENCY LIGHTING AS REQUIRED BY APPLICABLE CODES. COORDINATE WITH ELECTRICAL DRAWINGS.

7. COORDINATE ALL PROPOSED FLOOR, WALL, AND ROOF PENETRATIONS.

8. CONTRACTOR SHALL COORDINATE FLOOR PLAN PARTITION DIMENSIONS IN CASEWORK AREAS WITH ACTUAL DIMENSIONS BEFORE INSTALLATION OF NEW CASEWORK TO ENSURE PROPER FIT.

9. CONTRACTOR TO PROVIDE BLOCKING AS NECESSARY IN WALLS TO SUPPORT ALL CASEWORK, WALL MOUNTED DEVICES, AND EQUIPMENT. WOOD BLOCKING REQUIRED TO BE FIRE RETARDANT TREATED.

10. ALL CONTRACTORS SHALL COORDINATE LOCATIONS, CLEARANCES, AND ELEVATIONS OF BUILDING STRUCTURE, HVAC WORK, ELECTRICAL WORK, LIGHT FIXTURES, MECHANICAL WORK, CEILINGS AND THE LIKE WITH THEIR RESPECTIVE WORK PRIOR TO FABRICATION AND INSTALLATION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR POTENTIAL CONFLICTS BEFORE PROCEEDING WITH THE WORK.

11. WHERE DISCREPANCIES EXIST BETWEEN VARIOUS DRAWINGS, THE CONTRACTOR WILL OBTAIN THE ENGINEER'S INTERPRETATION BEFORE PROCEEDING. THE CONTRACTOR WILL BE RESPONSIBLE FOR IMPLEMENTING ANY REASONABLE INTERPRETATION AT NO ADDITIONAL COST TO THE OWNER.

ADD ALTERNATE INFORMATION

ADD ALTERNATE NO. 1
AREA OF WORK: CLASSROOM #004 AND CORRIDOR #001
SCOPE OF WORK:
1. REMOVE AND DISPOSE OF EXISTING VCT FLOORING AND VINYL WALL BASE AND PREP FLOOR TO RECEIVE NEW FINISH.
2. PROVIDE AND INSTALL NEW EPOXY RESIN FLOORING W/ 4" INTEGRAL COVE BASE.
REFER TO DEMOLITION AND NEW WORK DRAWINGS

ADD ALTERNATE NO. 2
AREA OF WORK: EXISTING STAIR A AND B (BOTH LEVELS)
SCOPE OF WORK:
1. PREP AND PAINT ALL WALLS.
2. PREP AND PAINT ALL METALS HANDRAILS AND RAILING.
3. PROVIDE AND INSTALL NEW RUBBER STAIR TREADS WITH INTEGRAL RISERS.
4. PROVIDE AND INSTALL COORDINATING RUBBER FLOORING AT LANDINGS.
REFER TO DEMOLITION AND NEW WORK DRAWINGS

ADD ALTERNATE NO. 3
AREA OF WORK: BUILDING EXTERIOR - EAST AND WEST SIDES
SCOPE OF WORK:
1. PREP AND PAINT THE EXISTING AREAS OF STUCCO ON THE EAST AND WEST EXTERIOR FACADES
REFER TO DEMOLITION AND NEW WORK DRAWINGS

NOTES:

1. THE OWNER RESERVES THE RIGHT TO ACCEPT OR REJECT ANY OR ALL ADD ALTERNATES IN ANY ORDER OF PRIORITY PRIOR TO OR AT THE TIME OF CONTRACT AWARD.

2. BIDDERS ARE REQUIRED TO PROVIDE SEPARATE PRICING FOR EACH ADD ALTERNATE AS INDICATED IN THE BID FORM.

3. THE SCOPE OF WORK FOR EACH ADD ALTERNATE IS DETAILED IN THE RESPECTIVE SECTIONS OF THE PROJECT SPECIFICATIONS AND ACCOMPANYING DRAWINGS

SYMBOLS

EXISTING PARTITION TO BE DEMOLISHED

EXISTING PARTITION TO REMAIN

NEW PARTITION

EXISTING DOOR TO BE DEMOLISHED

EXISTING DOOR TO REMAIN

NEW DOOR WITH DOOR TAG — 101

ROOM NAME AND TAG — ROOM NAME / 101

WALL TAGS — A04A

TOILET ACCESSORY TAG — 1

COLUMN REFERENCE — 2 / B

NOT IN CONTRACT (NIC)

REMOVE EXISTING CONCRETE SLAB

NEW CONCRETE SLAB

NORTH ARROW — N

EXTERIOR ELEVATION — 8E / A801 — ELEVATION / SHEET NUMBER

INTERIOR ELEVATION — A B C D / A801 — ELEVATION / SHEET NUMBER

BUILDING SECTION — 8E / A801 — SECTION / SHEET NUMBER — 8E / A801

WALL SECTION — 8E / A801 — SECTION / SHEET NUMBER

DETAIL SECTION — 8E / A801 — DETAIL / SHEET NUMBER

CALLOUT — 8E / A801 — DETAIL / SHEET NUMBER

FACE OF WALLS — ALIGN

SPOT ELEVATION REFERENCE — XXX

ELEVATION LEVEL REFERENCE — Name / Elevation

CENTERLINE — ℄

MATERIALS

EARTH
STONE
GRAVEL/ CRUSHED STONE
MORTAR/ PLASTER/ GWB
CONCRETE
PRECAST CONCRETE
BRICK
CONCRETE MASONRY UNIT
STEEL (SMALL SCALE)
STEEL (DRAFTING)
STONE
METAL (ELEVATION)
WOOD (FINISHED)
WOOD (CONTINUOUS BLOCKING)
WOOD (BLOCKING)
PLYWOOD
GLASS (LARGE SCALE)
GLASS (SMALL SCALE)
INSULATION (RIGID)
BATT INSULATION

JOHNSON, MIRMIRAN & THOMPSON, INC.
121 CONTINENTAL DR #300, NEWARK, DELAWARE 19713
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NEWARK DELAWARE
Committed to Service Excellence

SEAL:
DANIEL C HUMMER
No. SS-008366
STATE OF DELAWARE
REGISTERED ARCHITECT

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: SS-008366, EXP DATE: 01/31/2026.

PROJECT:
GEORGE WILSON CENTER IMPROVEMENTS
FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:
CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
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MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	10/10/2025
SCALE:	AS INDICATED
DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:
ARCHITECTURAL SYMBOLS AND GENERAL NOTES

SHEET NUMBER:
A-001

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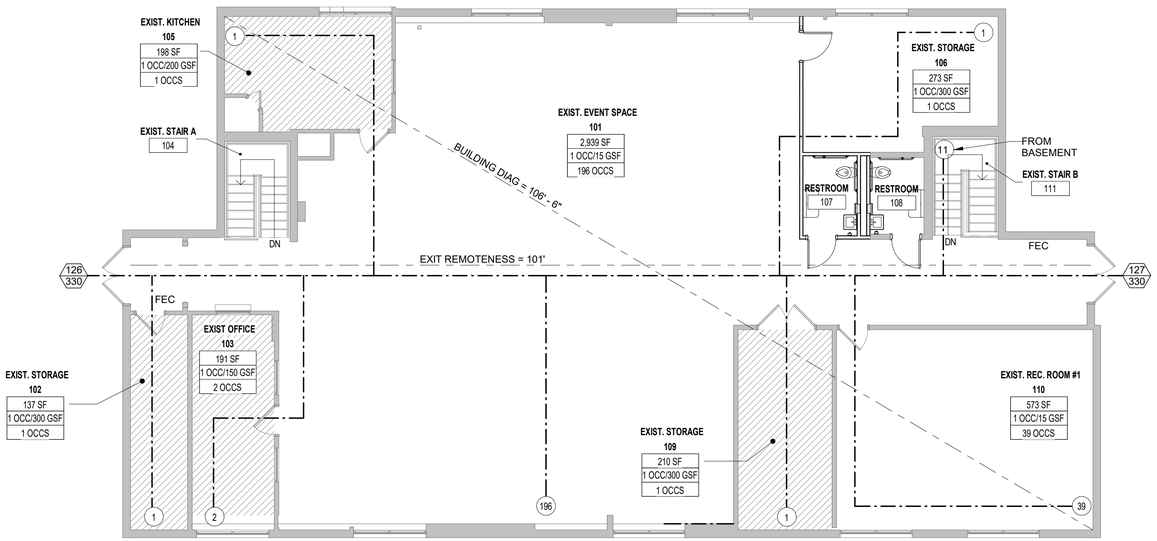
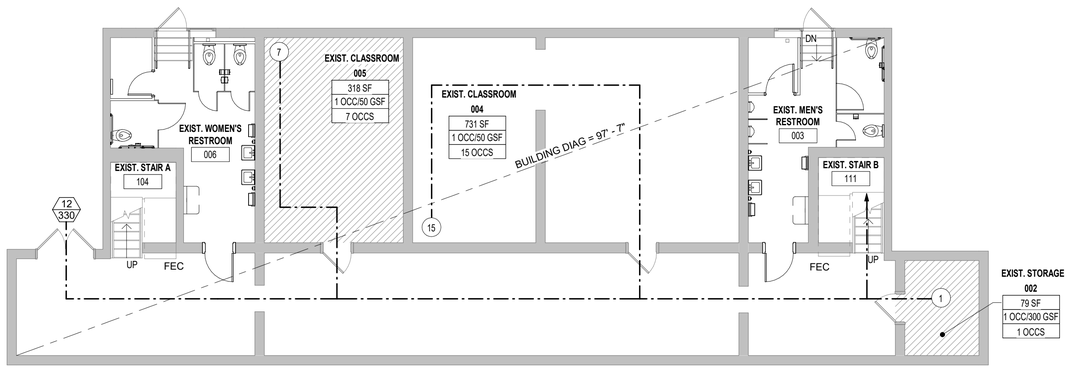
Autodesk Docs://20-03026-049- George Wilson Center Improvements/20-03026-049_George Wilson Center Improvements_Arch.rvt
10/10/2025 5:00:21 PM



1 A-002 FIRST FLOOR - LIFE SAFETY PLAN

1/8" = 1'-0"



2 A-002 BASEMENT - LIFE SAFETY PLAN

1/8" = 1'-0"

CODE SYNOPSIS

SITE LOCATION:	GEORGE WILSON COMMUNITY CENTER, 303 NEW LONDON RD, NEWARK DE 19711
BUILDING OWNER:	CITY OF NEWARK
APPLICANT:	JOHNSON, MIRMIRAN & THOMPSON 121 CONTINENTAL DR #300, NEWARK, DELAWARE 19713
DESIGN PROFESSIONAL:	SAME AS APPLICANT
APPLICABLE CODES:	INTERNATIONAL BUILDING CODE, 2018 INTERNATIONAL EXISTING BUILDING CODE, 2018 INTERNATIONAL ENERGY CONSTRUCTION CODE, 2018 INTERNATIONAL FIRE CODE, 2018 DELAWARE STATE FIRE PREVENTION CODE NFPA FIRE PREVENTION CODES
ACCESSIBILITY:	STATE OF DELAWARE ARCHITECTURAL ACCESSIBILITY STANDARDS
FIRE SUPPRESSION:	NOT SPRINKLERED
OCCUPANCY:	NON-SEPARATED MIXED USE B - BUSINESS/ A-3 ASSEMBLY/ S-1 STORAGE
CONSTRUCTION TYPE:	IIB, UNPROTECTED
ALLOWABLE STORIES PER TABLE 504.4: ACTUAL STORIES:	 2 STORY, 55'-0" (BASED ON A-3 RESTRICTIONS) 2 STORY, 26'-6"
ALLOWABLE SQUARE FOOTAGE PER TABLE 506.2:	 9,500 SF
BUILDING TOTAL AREA:	5,009 SF 1ST FLOOR 2,947 SF BASEMENT 7,956 SF TOTAL
OCCUPANTS:	B OCCUPANCY- 26 OCCUPANTS S-1 OCCUPANCY - 4 OCCUPANTS A-3 OCCUPANCY - 235 OCCUPANTS TOTAL- 265 OCCUPANTS

NOTE: THERE IS NO INCREASE IN BUILDING SQUARE FOOTAGE OR OCCUPANT LOAD. PER CODE THIS IS A LEVEL II ALTERATION AND THE RENOVATIONS REDUCE THE EXISTING OCCUPANT LOAD.

EXITS REQD./ PROVIDED: ENTIRE BLDG.: 3 / 5

ACTUAL AREA OF RENNOVATION: 5,426 SF

ALL EGRESS DOORS ARE A MINIMUM OF 36" WIDE. EGRESS CAPACITY IS CALCULATED ON 33" CLEAR OPENING WIDTH FOR A 36" DOOR.

EGRESS AISLES & PASSAGEWAYS WILL BE KEPT FREE AND CLEAR OF EQUIPMENT AND BARRIERS THAT WOULD LIMIT READY ACCESS TO AND THE USE OF FIRE FIGHTING EQUIPMENT.

MAXIMUM TRAVEL DISTANCE PER TABLE 1017.2: 200' (ACTUAL: 121')

COMMON PATH OF EGRESS TRAVEL PER TABLE 1006.2.1 :75' (ACTUAL:< 75')

NO DEAD END CORRIDORS OVER 20 FEET IN LENGTH PER SECTION 1020.4.

EGRESS DOORS WILL BE SELF-CLOSING.

PORTABLE FIRE EXTINGUISHERS ARE PROVIDED.

LEGEND

- DIRECTION TO PATH OF TRAVEL
- EGRESS PATHWAY
- FEC — FIRE EXTINGUISHER CABINET W/ ABC EXTINGUISHER
- EXIT SIGN - CEILING MOUNTED DIRECTIONAL
- EXIT SIGN - WALL MOUNTED
- WOMEN'S T.R. 114 — ROOM NAME TAG
- X / XX — # OCCUPANTS EGRESS THOUGH OPENING; # OCCUPANTS PERMITTED TO EGRESS THROUGH OPENING PER CODE

0 4' 8' 16'
0 2'
1/8" = 1'-0"

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SEAL:

DANIEL C HUMMER
No. S5-008366
STATE OF DELAWARE
REGISTERED ARCHITECT

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE.
LICENSE NUM: S5-008366, EXP DATE: 01/31/2026.

PROJECT:
GEORGE WILSON CENTER IMPROVEMENTS
FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
WWW.NEWARKDE.GOV
@CityofNewarkDE

MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	10/10/2025
SCALE:	AS INDICATED
DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:
CODE COMPLIANCE AND LIFE SAFETY PLAN

SHEET NUMBER:
A-002

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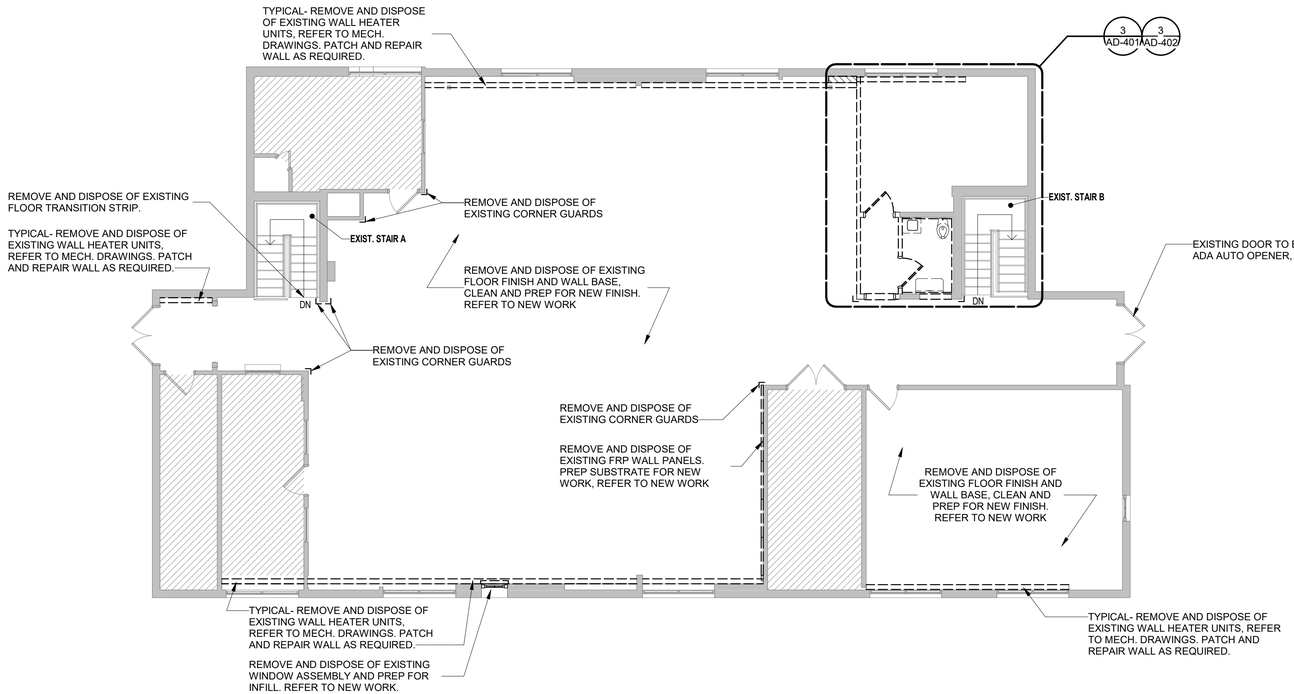
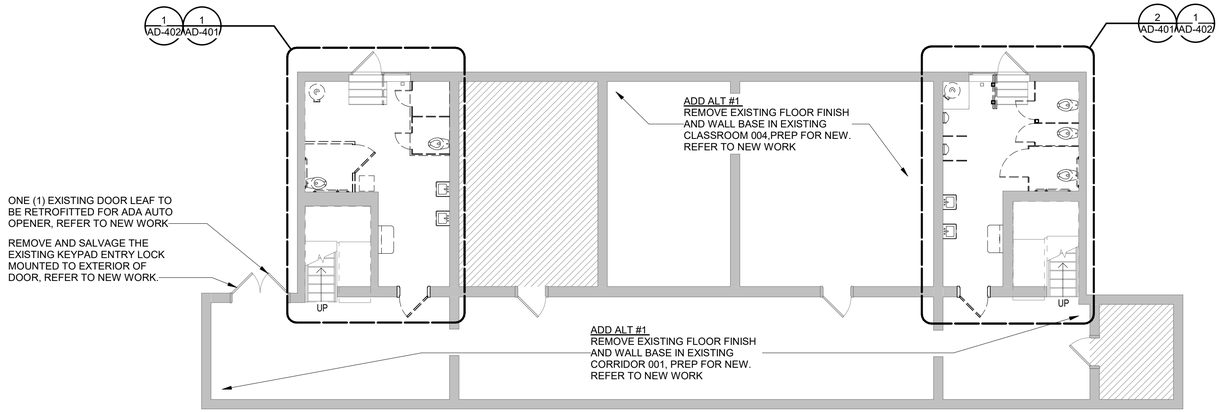


1 AD-101 FIRST FLOOR DEMOLITION FLOOR PLAN

1/8" = 1'-0"



2 AD-101 BASEMENT DEMOLITION FLOOR PLAN

NOT TO SCALE

0 4' 8' 16'
0 2'
1/8" = 1'-0"

N

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FACILITY RENOVATIONS
CONTRACT NO.25-01

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PROJECT NO:	20-03026-049
DATE:	10/10/2025
SCALE:	AS INDICATED
DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:

DEMOLITION FLOOR PLANS

SHEET NUMBER:

AD-101

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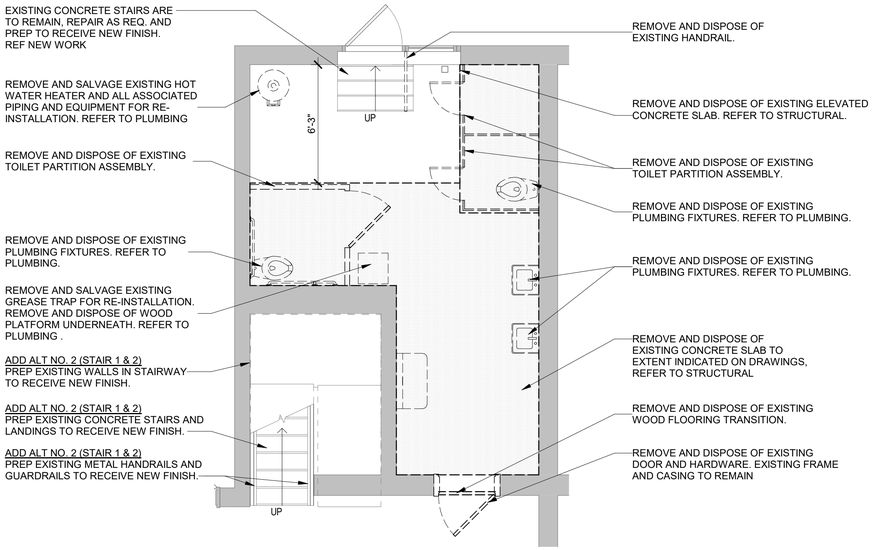
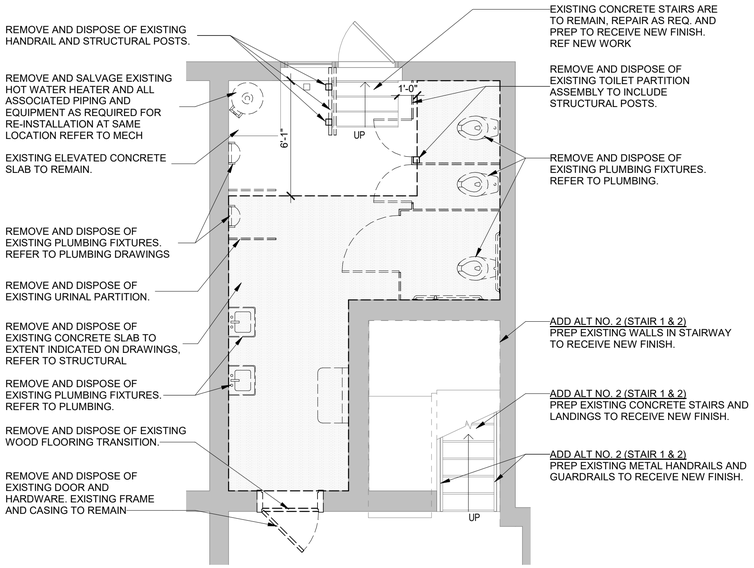


1 AD-401 WOMEN'S TOILET ROOM ENLARGED PLAN - DEMOLITION

1/4" = 1'-0"

NOTES:

1. PREP WALLS TO RECEIVE NEW FINISH, REFER TO NEW WORK.
2. REMOVE AND DISPOSE OF ALL EXISTING TOILET ACCESSORIES. PATCH AND REPAIR WALL AS REQUIRED.
3. REMOVE AND DISPOSE OF EXISTING TILE FLOORING AND WALL BASE. PREP FLOOR TO RECEIVE NEW FINISH, REFER TO NEW WORK.

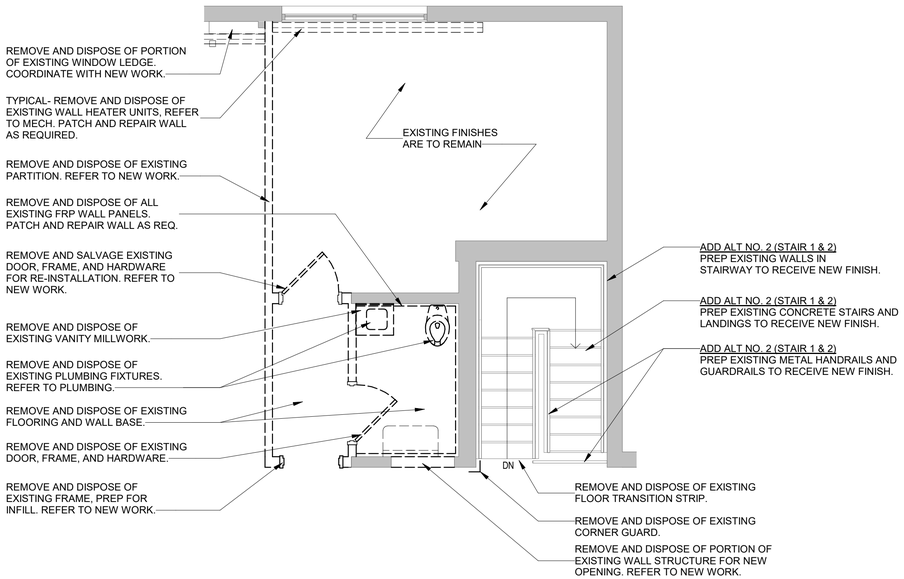


2 AD-401 MEN'S TOILET ROOM ENLARGED PLAN - DEMOLITION

1/4" = 1'-0"

NOTES:

1. PREP WALLS TO RECEIVE NEW FINISH, REFER TO NEW WORK.
2. REMOVE AND DISPOSE OF ALL EXISTING TOILET ACCESSORIES. PATCH AND REPAIR WALL AS REQUIRED.
3. REMOVE AND DISPOSE OF EXISTING TILE FLOORING AND WALL BASE. PREP FLOOR TO REQUIRE NEW FINISH, REFER TO NEW WORK.



3 AD-401 ENLARGED PLAN - DEMOLITION

1/4" = 1'-0"

NOTES:

1. REMOVE AND DISPOSE OF ALL EXISTING TOILET ACCESSORIES. PATCH AND REPAIR WALL AS REQUIRED.

0 2' 4' 8'
0 2'
1/4" = 1'-0"

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PROJECT:

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FACILITY RENOVATIONS
CONTRACT NO.25-01

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DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:

ENLARGED FLOOR PLANS - DEMOLITION WORK

SHEET NUMBER:

AD-401

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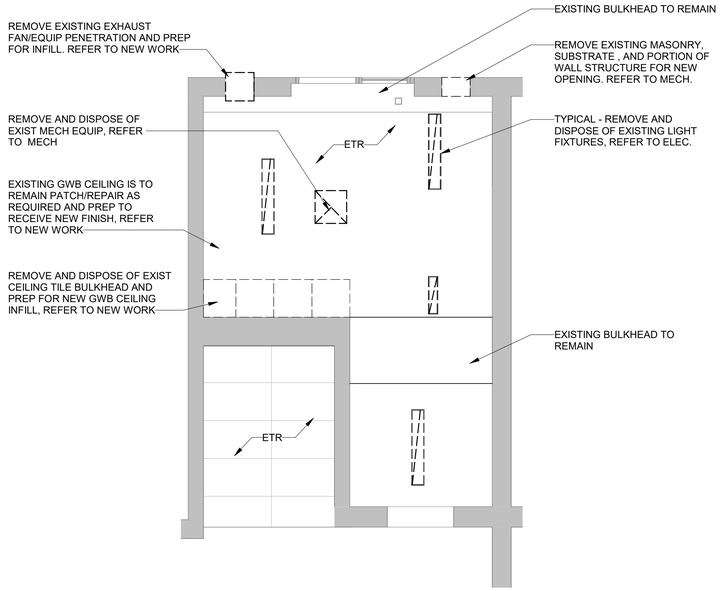
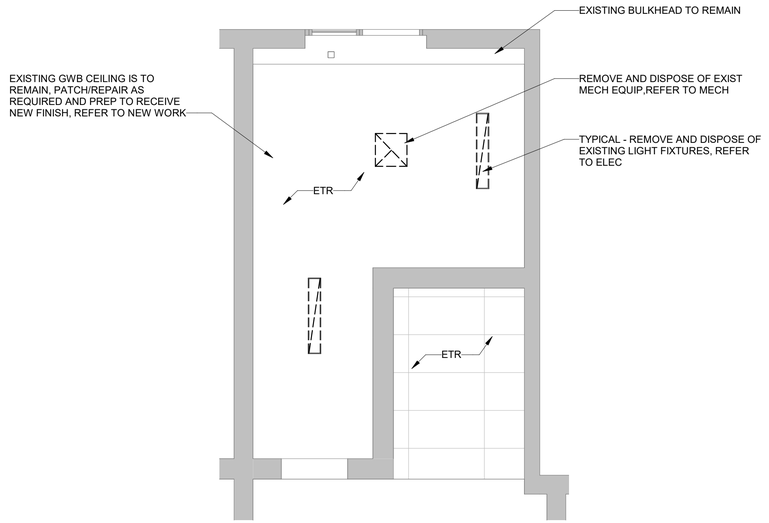


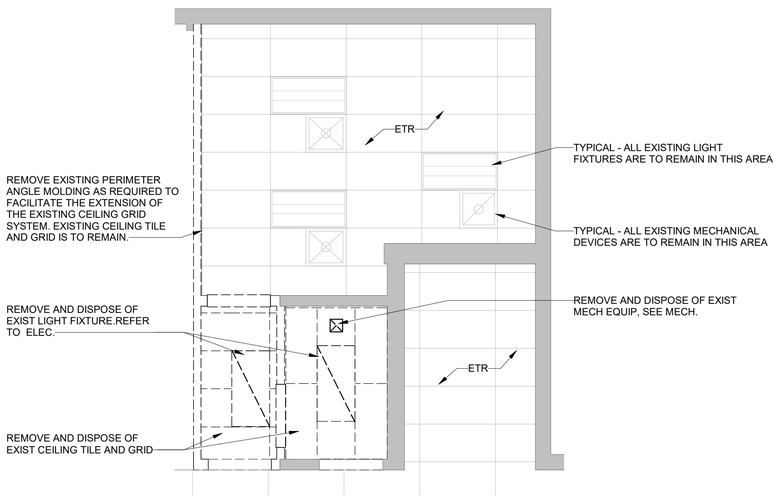
1 AD-402 WOMEN'S TOILET ROOM ENLARGED REFLECTED CEILING PLAN - DEMOLITION

1/4" = 1'-0"



2 AD-402 MEN'S TOILET ROOM ENLARGED REFLECTED CEILING PLAN - DEMOLITION

1/4" = 1'-0"



3 AD-402 ENLARGED REFLECTED CEILING PLAN - DEMOLITION

1/4" = 1'-0"

CEILING LEGEND

- REMOVE AND DISPOSE OF EXISTING 2'x4' ACOUSTICAL CEILING TILE AND GRID
- EXISTING 2'x4' ACOUSTICAL CEILING TILE AND GRID TO REMAIN
- GWB CEILING TO REMAIN (SEE DRAWING NOTES)
- REMOVE AND DISPOSE OF EXISTING 2'X4' LIGHT FIXTURE (SEE ELECTRICAL)
- EXISTING 2'X4' LIGHT FIXTURE TO REMAIN (SEE ELECTRICAL)
- REMOVE AND DISPOSE OF EXISTING CEILING MOUNTED LIGHT FIXTURES (SEE ELECTRICAL)
- 2'X2' RETURN AIR GRILLE (SEE MECHANICAL)
- 2'X2' RETURN AIR DIFFUSER (SEE MECHANICAL)
- REMOVE AND DISPOSE OF EXISTING EXHAUST FAN (SEE MECHANICAL)

0 2" 4" 8"
0 2"
1/4" = 1'-0"

N

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PROJECT:
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PROJECT NO:	20-03026-049
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DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:
ENLARGED REFLECTED CEILING PLANS - DEMOLITION

SHEET NUMBER:
AD-402

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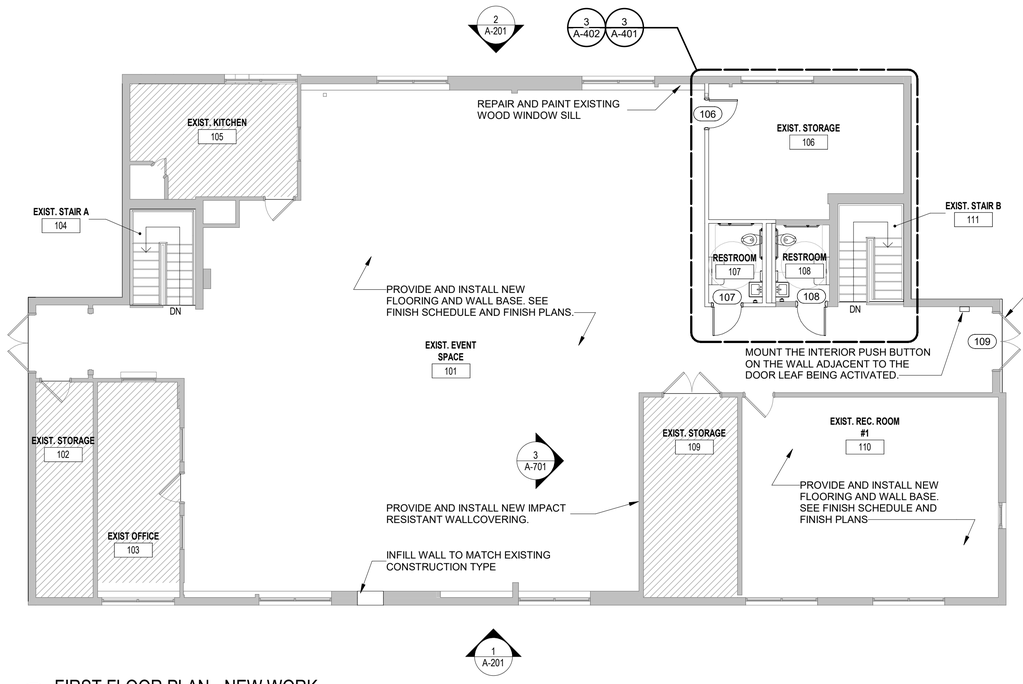
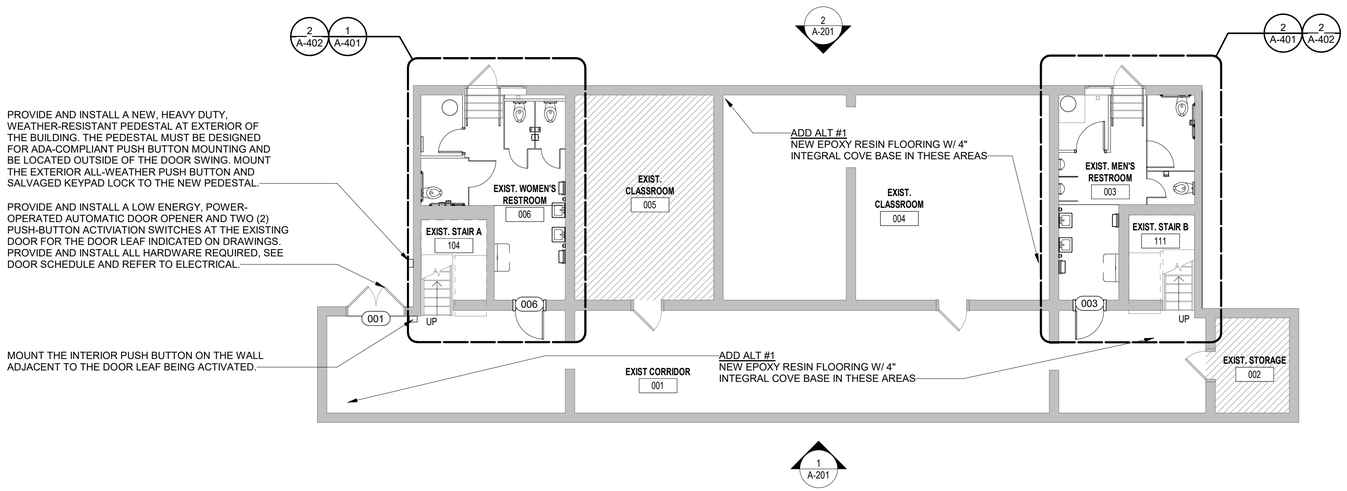


1 A-101 FIRST FLOOR PLAN - NEW WORK

1/8" = 1'-0"



2 A-101 BASEMENT FLOOR PLAN - NEW WORK

1/8" = 1'-0"

0 4' 8' 16'
0 2"
1/8" = 1'-0"

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PROJECT:

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FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK
DE 19711

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DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:

FLOOR PLANS - NEW WORK

SHEET NUMBER:

A-101

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PREP ALL EXTERIOR STUCCO SURFACES TO RECEIVE NEW FINISH TO INCLUDE PATCHING AND REPAIRING ANY CRACKS OR VOIDS PER MANUFACTURER'S RECOMMENDATIONS. PAINT ALL STUCCO SURFACES WITH PAINT P-5 PER MANUFACTURER'S GUIDELINES.

PREP ALL EXTERIOR STUCCO SURFACES TO RECEIVE NEW FINISH TO INCLUDE PATCHING AND REPAIRING ANY CRACKS OR VOIDS PER MANUFACTURER'S RECOMMENDATIONS. PAINT ALL STUCCO SURFACES WITH PAINT P-5 PER MANUFACTURER'S GUIDELINES.

PREP ALL EXTERIOR STUCCO SURFACES TO RECEIVE NEW FINISH TO INCLUDE PATCHING AND REPAIRING ANY CRACKS OR VOIDS PER MANUFACTURER'S RECOMMENDATIONS. PAINT ALL STUCCO SURFACES WITH PAINT P-5 PER MANUFACTURER'S GUIDELINES.

1 A-201 EAST ELEVATION- ADD ALTERNATE #3

NOT TO SCALE

NOTE: DIMENSIONS ARE APPROXIMATE TO ASSIST CONTRACTOR IN BID. CONTRACTOR SHALL BE RESPONSIBLE TO FIELD VERIFY AREA AND QUANTITIES REQUIRED FOR COATING OF STUCCO AREAS.

PREP ALL EXTERIOR STUCCO SURFACES TO RECEIVE NEW FINISH TO INCLUDE PATCHING AND REPAIRING ANY CRACKS OR VOIDS PER MANUFACTURER'S RECOMMENDATIONS. PAINT ALL STUCCO SURFACES WITH PAINT P-5 PER MANUFACTURER'S GUIDELINES.

PREP ALL EXTERIOR STUCCO SURFACES TO RECEIVE NEW FINISH TO INCLUDE PATCHING AND REPAIRING ANY CRACKS OR VOIDS PER MANUFACTURER'S RECOMMENDATIONS. PAINT ALL STUCCO SURFACES WITH PAINT P-5 PER MANUFACTURER'S GUIDELINES.

2 A-201 WEST ELEVATION - ADD ALTERNATE #3

NOT TO SCALE

NOTE: DIMENSIONS ARE APPROXIMATE TO ASSIST CONTRACTOR IN BID. CONTRACTOR SHALL BE RESPONSIBLE TO FIELD VERIFY AREA AND QUANTITIES REQUIRED FOR COATING OF STUCCO AREAS.

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NEWARK DELAWARE
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SEAL:

DANIEL C HUMMER
No. S5-008366
STATE OF DELAWARE
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PROJECT:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
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MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	10/10/2025
SCALE:	AS INDICATED
DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:

EXTERIOR ELEVATIONS

SHEET NUMBER:

A-201

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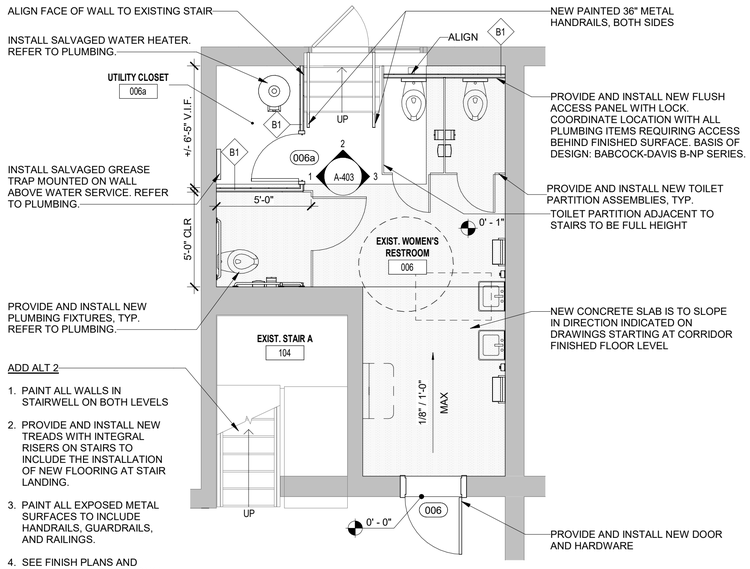
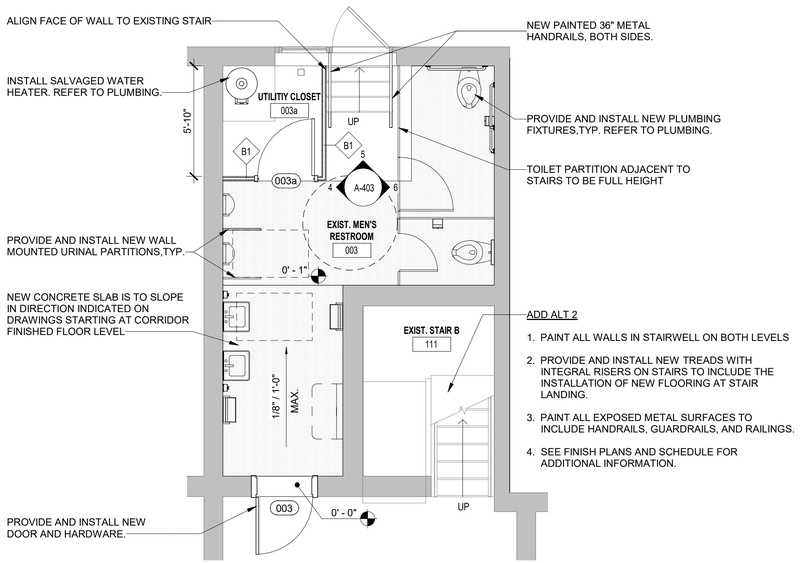


1 A-401 — BASEMENT PLAN ENLARGEMENT - WOMENS TOILET ROOM

1/4" = 1'-0"

NOTES:

1. PAINT ALL CMU WALLS. SEE FINISH SCHEDULE.
2. PROVIDE AND INSTALL NEW TOILET ACCESSORIES.
3. PROVIDE AND INSTALL NEW EPOXY RESIN FLOORING WITH INTEGRAL COVE BASE.
4. NEW CONCRETE SLAB TO BE ALIGNED WITH EXISTING CONCRETE SLAB LEVEL AT STAIR AND SLOPED TO MATCH ELEVATION AT DOOR TO CORRIDOR.



2 A-401 — BASEMENT PLAN ENLARGEMENT - MENS TOILET ROOM

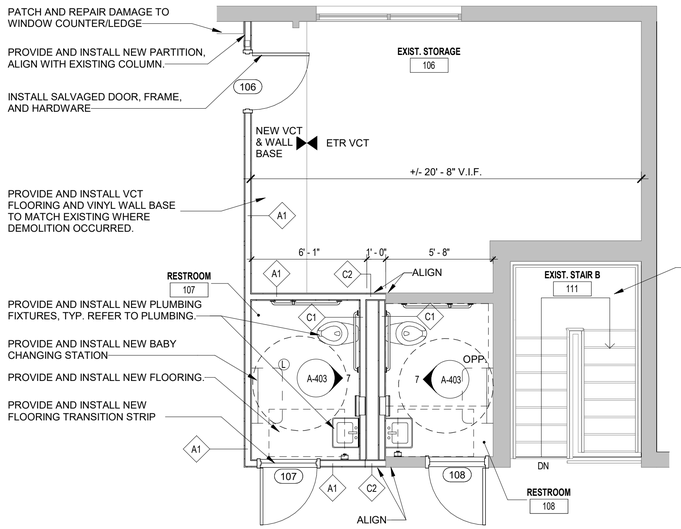
1/4" = 1'-0"

NOTES:

1. PAINT ALL CMU WALLS. SEE FINISH SCHEDULE.
2. PROVIDE AND INSTALL NEW TOILET ACCESSORIES.
3. PROVIDE AND INSTALL NEW EPOXY RESIN FLOORING WITH INTEGRAL COVE BASE.
4. NEW CONCRETE SLAB TO BE ALIGNED WITH EXISTING CONCRETE SLAB LEVEL AT STAIR AND SLOPED TO MATCH ELEVATION AT DOOR TO CORRIDOR.

GENERAL NOTES

1. CONTRACTOR IS TO INSPECT THE EXISTING CONCRETE SLAB AFTER DEMOLITION IS COMPLETE AND IDENTIFY ALL CRACKS, VOIDS, OR HOLES IN SLAB AND FILL USING APPROPRIATE CONCRETE PATCHING MIXTURE.
2. CONTRACTOR IS TO INSPECT THE EXISTING CONCRETE SLAB TO DETERMINE BEST LEVELING APPROACH. THE EXISTING SLAB IS TO BE LEVELED AS REQUIRED USING THE APPROPRIATE LEVELING COMPOUND AND NO SLOPES IN FLOORING SHALL EXCEED 2%.
3. THE CONTRACTOR WILL ENSURE THAT THE REQUIREMENTS OF THE NEW FLOORING ARE MET PER MANUFACTURER'S INSTRUCTIONS AND REQUIREMENTS.
4. PRIOR TO ANY WORK BEING PERFORMED, THE CONTRACTOR IS TO REVIEW THEIR PLAN OF ACTION WITH OWNER'S REP AND OBTAIN FINAL APPROVAL PRIOR TO STARTING WORK.



ADD ALT 2

1. PAINT ALL WALLS IN STAIRWELL ON BOTH LEVELS.
2. PROVIDE AND INSTALL NEW TREADS WITH INTEGRAL RISERS ON STAIRS TO INCLUDE THE INSTALLATION OF NEW FLOORING AT STAIR LANDING.
3. PAINT ALL EXPOSED METAL SURFACES TO INCLUDE HANDRAILS, GUARDRAILS, AND RAILINGS
4. SEE FINISH PLANS AND SCHEDULE FOR ADDITIONAL INFORMATION

3 A-401 — FIRST FLOOR PLAN ENLARGEMENT

1/4" = 1'-0"

NOTES:

1. PROVIDE AND INSTALL NEW TOILET ACCESSORIES.
2. PROVIDE AND INSTALL NEW WALL TILE, FULL HEIGHT, ON WET WALL ONLY AT REAR OF NEW FIXTURES. PAINT REMAINING WALLS, SEE FINISH SCHEDULE

0 2" 4" 8"
0 2"
1/4" = 1'-0"

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SEAL:

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CHECKED BY:	DCH

DRAWING TITLE:

ENLARGED PLANS

SHEET NUMBER:

A-401

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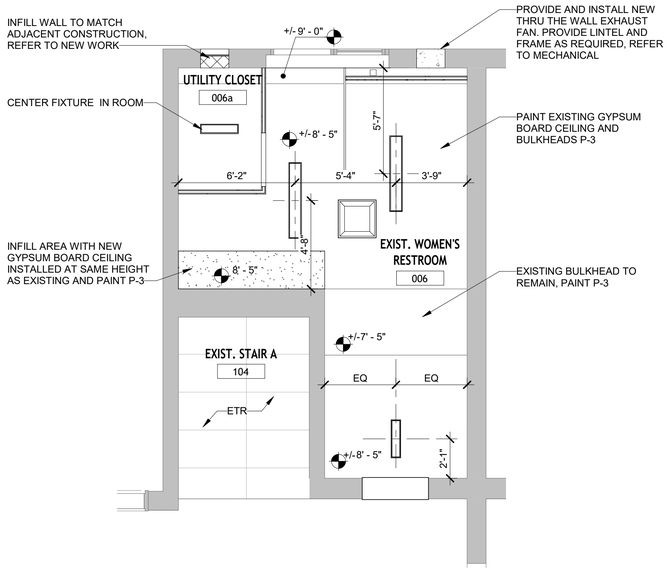
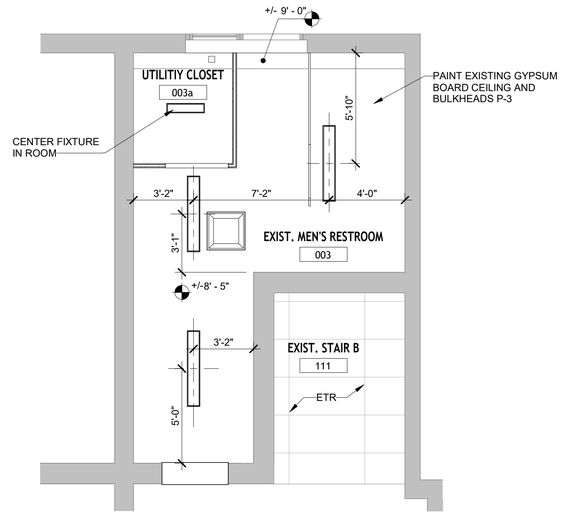


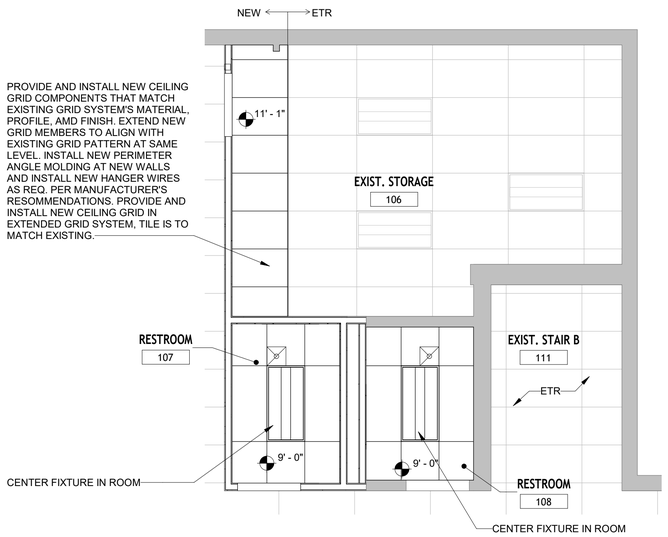
1 A-402 WOMEN'S TOILET ROOM ENLARGED REFLECTED CEILING - NEW WORK

1/4" = 1'-0"



2 A-402 MEN'S TOILET ROOM ENLARGED REFLECTED CEILING PLAN - NEW WORK

1/4" = 1'-0"



3 A-402 ENLARGED REFLECTED CEILING PLAN - NEW WORK

1/4" = 1'-0"

CEILING LEGEND

- NEW 2'x4' ACOUSTICAL CEILING TILE AND GRID
- NEW GWB CEILING
- NEW CEILING MOUNTED LED LIGHT FIXTURE (SEE ELECTRICAL)
- EXISTING 2'x4' ACOUSTICAL CEILING TILE AND GRID TO REMAIN
- NEW 2'X4' DIRECT/INDIRECT FIXTURE (SEE ELECTRICAL)
- NEW EXHAUST FAN (SEE MECHANICAL)
- NEW GWB CEILING (SEE DRAWING NOTES)
- EXISTING 2'X4' DIRECT/INDIRECT FIXTURE (SEE ELECTRICAL)
- NEW UNIT HEATER (SEE MECHANICAL)

0 2' 4' 8'
0 2"
1/4" = 1'-0"

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Committed to Service Excellence

SEAL:

DANIEL C HUMMER
No. S5-008366
STATE OF DELAWARE
REGISTERED ARCHITECT

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: S5-008366, EXP DATE: 01/31/2026.

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GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
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@CityofNewarkDE

MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	10/10/2025
SCALE:	AS INDICATED
DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:

ENLARGED REFLECTED CEILING PLANS - NEW WORK

SHEET NUMBER:

A-402

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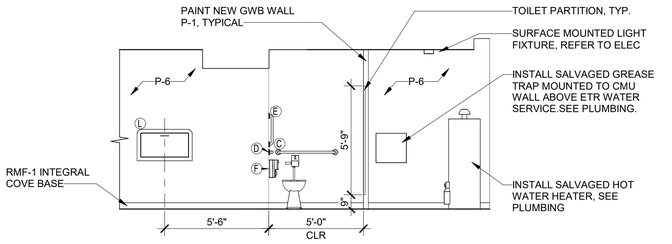
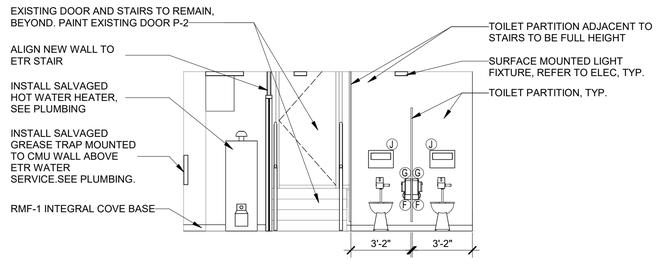
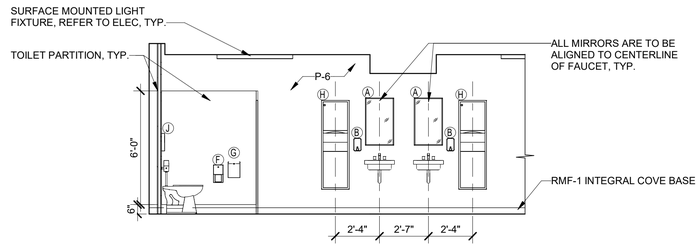


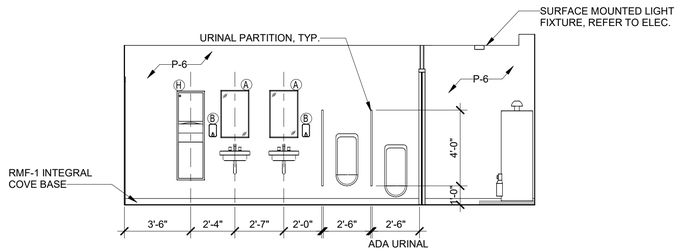
1 A-403 WOMENS TOILET ROOM SOUTH ELEVATION
1/4" = 1'-0"



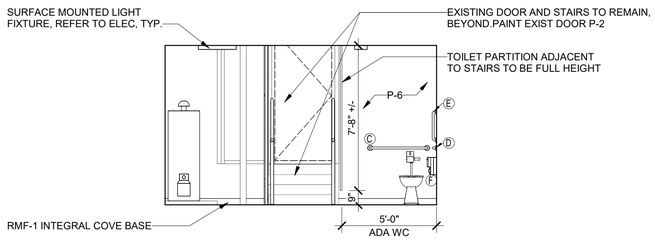
2 A-403 WOMENS TOILET ROOM WEST ELEVATION
1/4" = 1'-0"



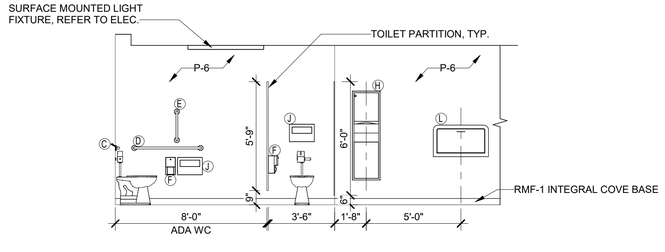
3 A-403 WOMENS TOILET ROOM NORTH ELEVATION
1/4" = 1'-0"



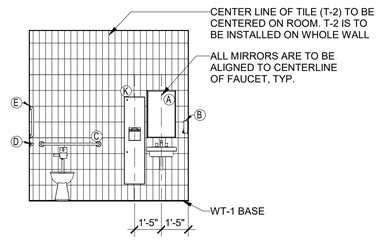
4 A-403 MENS TOILET ROOM SOUTH ELEVATION
1/4" = 1'-0"



5 A-403 MENS TOILET ROOM WEST ELEVATION
1/4" = 1'-0"



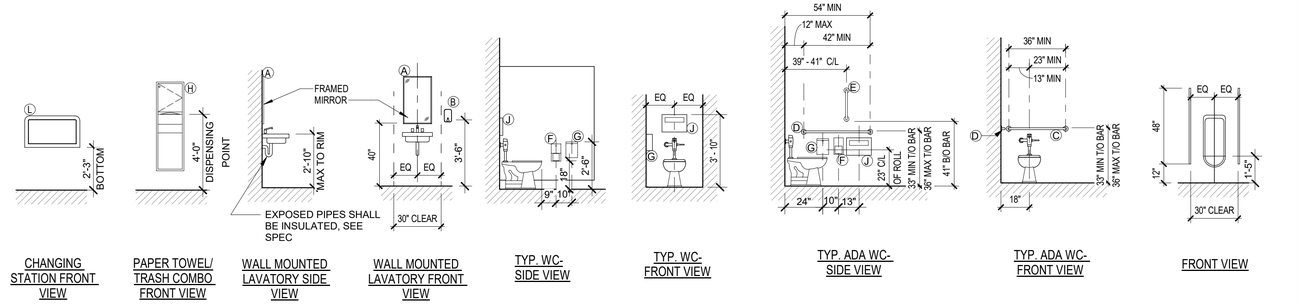
6 A-403 MENS TOILET ROOM NORTH ELEVATION
1/4" = 1'-0"



7 A-403 ADA TOILET ROOM NORTH ELEVATION
1/4" = 1'-0"

TOILET ROOM ACCESSORY SCHEDULE

MARK	ITEM
A	Tempered Glass Channel Frame Mirror
B	Surface-Mounted Soap Dispenser
C	36" Wide Straight Grab Bar
D	42" Wide Straight Grab Bar
E	18" Wide Straight Grab Bar
F	Toilet Tissue Dispenser
G	Surface Mounted Sanitary Napkin Disposal
H	Surface Mounted Convertible Combination Towel and Waste Unit
J	Surface Mounted Seat Cover Dispenser
K	Semi-Recessed Paper Towel Dispenser And Waste Receptacle
L	Baby Changing Station



CHANGING STATION FRONT VIEW | PAPER TOWEL/ TRASH COMBO FRONT VIEW | WALL MOUNTED LAVATORY SIDE VIEW | WALL MOUNTED LAVATORY FRONT VIEW | TYP. WC- SIDE VIEW | TYP. WC- FRONT VIEW | TYP. ADA WC- SIDE VIEW | TYP. ADA WC- FRONT VIEW | FRONT VIEW

TOILET ACCESSORIES MOUNTING DIAGRAM

0 2" 4" 8"
0 2"
1/4" = 1'-0"

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CHECKED BY:	DCH

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ELEVATIONS AND DETAILS

SHEET NUMBER:
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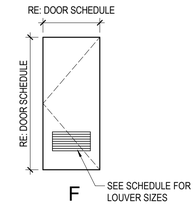
DOOR SCHEDULE

MARK	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR THK	DOOR TYPE	DOOR MATL	DOOR FIN	FRAME ELEV	FRAME DEPTH	FRAME MTL	FRAME FINISH	FRAME HEAD	FRAME JAMB	FRAME SILL	NOTES
001	6' - 0"	8' - 0"	1 3/4"	EXIST	EXIST	EXIST	EXIST		EXIST	PTD	EXIST	EXIST	EXIST	NEW ADA PUSH BUTTON/ONE LEAF AND RELOCATED ENTRY KEYPAD
003	3' - 0"	6' - 6"	1 3/4"	F	SCWD	PTD	EXIST	3 7/8"	EXIST	PTD	EXIST	EXIST	S1	LOUVER 18" x 18"
003a	3' - 0"	7' - 0"	1 3/4"	F	SCWD	PTD	1	3 7/8"	HM	PTD	H1	J1	S1	
006	3' - 0"	6' - 6"	1 3/4"	F	SCWD	PTD	EXIST	3 7/8"	EXIST	PTD	EXIST	EXIST	S1	LOUVER 18" x 18"
006a	2' - 6"	7' - 0"	1 3/4"	F	SCWD	PTD	1	3 7/8"	HM	PTD	H1	J1	S1	
106	3' - 0"	7' - 0"	1 3/4"	EXIST	EXIST	PTD	EXIST	5 7/8"	EXIST	PTD	EXIST	EXIST	EXIST	EXISTING DOOR AND FRAME RELOCATED
107	3' - 0"	7' - 0"	1 3/4"	F	SCWD	PTD	1	5 7/8"	HM	PTD	H1	J1	S1	UNDERCUT DOOR 1"
108	3' - 0"	7' - 0"	1 3/4"	F	SCWD	PTD	1	5 7/8"	HM	PTD	H1	J1	S1	UNDERCUT DOOR 1"
109	6' - 0"	8' - 0"	1 3/4"	EXIST	EXIST	EXIST	EXIST		EXIST	PTD	EXIST	EXIST	EXIST	NEW ADA PUSH BUTTON/ ONE LEAF

OPENINGS SCHEDULE LEGEND

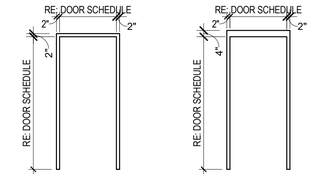
HM	HOLLOW METAL
PTD	PAINTED DOOR OR FRAME
SCWD	SOLID CORE WOOD

DOOR TYPES



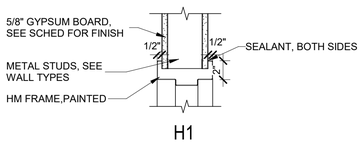
F

DOOR FRAME TYPES

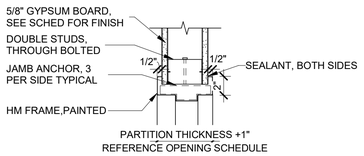


1 HOLLOW METAL FRAME

2 HOLLOW METAL FRAME @ CMU



H1



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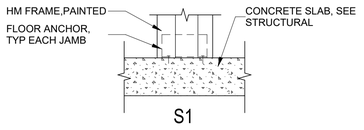
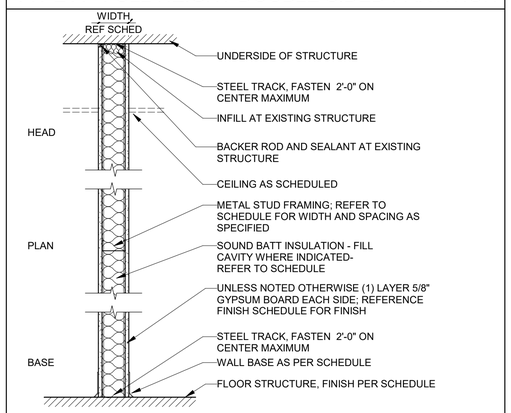


S1

1 / A-601 TYPICAL INTERIOR HM FRAME @ GWB

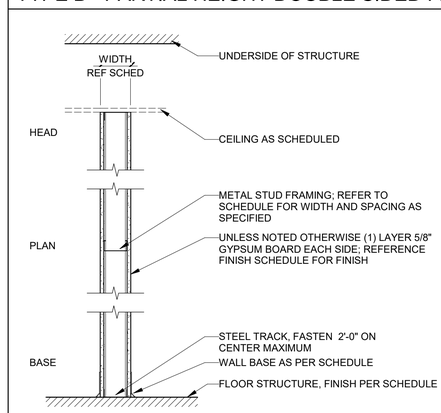
1 1/2" = 1'-0"

TYPE A - FULL HEIGHT DOUBLE SIDED PARTITION



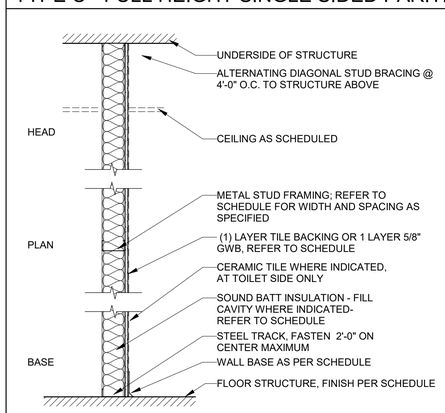
TYPE	WIDTH	FRAMING WIDTH	SOUND INSUL.	STC	COMMENTS
A1	4 7/8"	3 5/8"	Yes	39	

TYPE B - PARTIAL HEIGHT DOUBLE SIDED PARTITION



TYPE	WIDTH	FRAMING WIDTH	SOUND INSUL.	STC	COMMENTS
B1	2 7/8"	1 5/8"	No	N/A	

TYPE C - FULL HEIGHT SINGLE SIDED PARITION



TYPE MARK	WIDTH	FRAMING WIDTH	SOUND INSUL.	STC	COMMENTS
C1	0' - 4 7/8"	0' - 3 5/8"	Yes	39	TILE BACKER PANEL
C2	0' - 4 7/8"	0' - 3 5/8"	Yes	39	5/8" GWB

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DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:

DOOR SCHEDULE, PARTITION TYPES, AND DETAILS

SHEET NUMBER:

A-601

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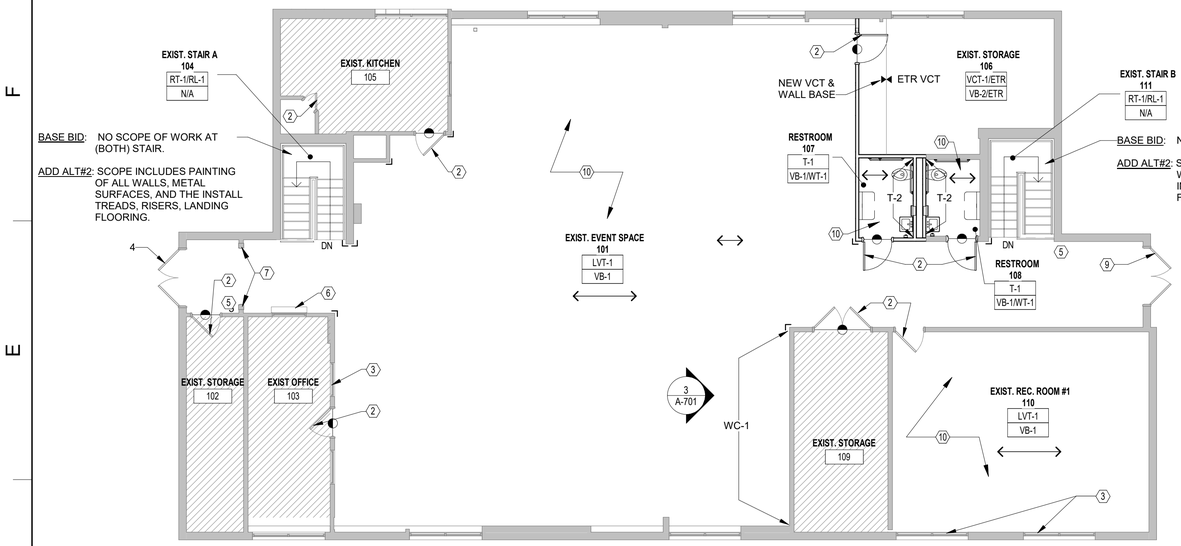
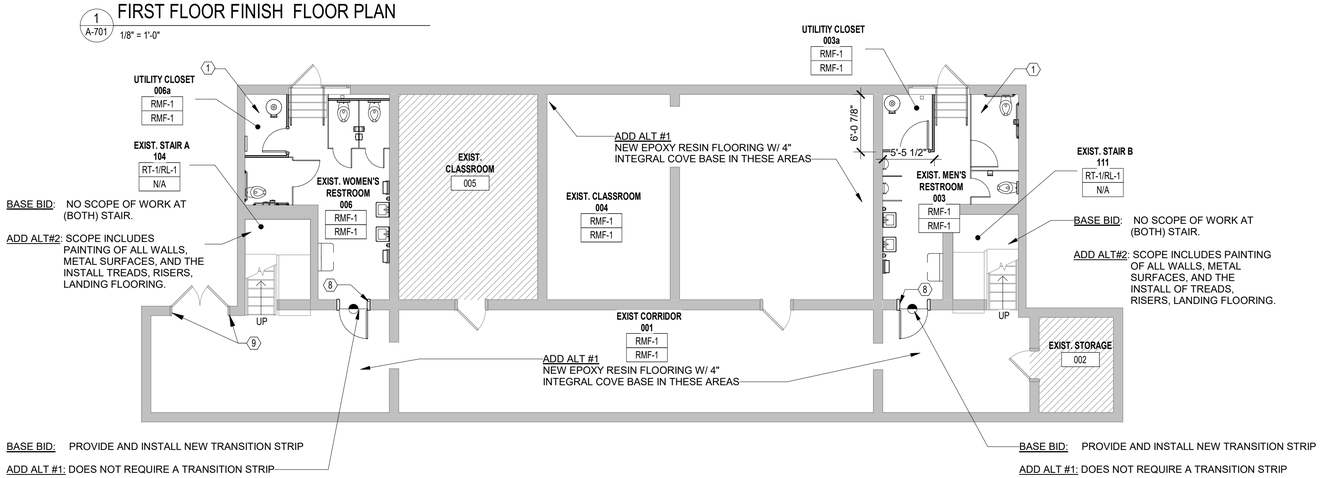
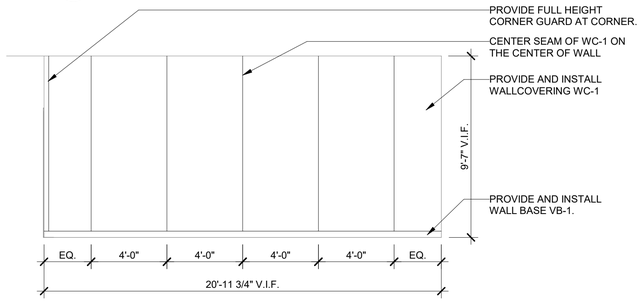


1 A-701 FIRST FLOOR FINISH FLOOR PLAN
1/8" = 1'-0"



2 A-701 BASEMENT FINISH FLOOR PLAN
1/8" = 1'-0"



3 A-701 NORTH ELEVATION
1/4" = 1'-0"

FINISH PLAN LEGEND

XX / XX	FLOOR MATERIAL / BASE MATERIAL
⟷	INDICATES FLOORING INSTALL ORIENTATION
⟷●	FLOORING TRANSITION REQUIRED
L	CG-1 CORNER GUARD LOCATION
X-X	FINISH DESIGNATION, SEE A701

GENERAL FINISH NOTES

1. REFER TO INTERIOR ELEVATIONS AND SECTIONS FOR ADDITIONAL FINISH INFORMATION. ANY FINISH MATERIAL SHOWN IN ELEVATIONS OR SECTIONS SHALL BE PROVIDED AS NOTED OR DEPICTED ON THE DRAWINGS OR SPECIFICATIONS.
2. WALL AND CEILING FINISHES SHALL INCLUDE ALL PROJECTIONS, BEAM ENCLOSURES, RECESSES, BULKHEADS, MATERIAL CHANGES, AND OTHER ENCLOSURES.
3. REFER TO SPECIFICATIONS FOR SEALANT TYPES.
4. ALL EXISTING BLUE DOOR FRAMES, DOORS, FIRE EXTINGUISHER CABINETS, AND INTERIOR GLAZING FRAMES ARE TO BE PAINTED, P-2.

SHEET KEYNOTES

1. PAINT ALL ETR CMU WALLS P-6 AND ALL NEW GWB WALLS P-1, TYPICAL.
2. PAINT ALL DOOR FRAMES, BOTH SIDES, P-2. PAINT ALL DOORS P-2.
3. PAINT ALL EXISTING WINDOW FRAMES AND SILLS P-2, TYPICAL.
4. PAINT EXISTING EXTERIOR DOOR AND FRAME, INSIDE ONLY P-2.
5. PAINT EXISTING FIRE EXTINGUISHER ENCLOSURE P-2.
6. PAINT EXISTING TRANSACTION WINDOW FRAME (BOTH SIDES) AND TRANSACTION LEDGE P-2
7. PAINT EXISTING FRAMED OPENING, TO INCLUDE GLASS FRAMING, P-2.
8. PAINT NEW DOOR AND FRAME P-2 ON BOTH SIDES.
9. PAINT EXISTING EXTERIOR DOOR FRAME, INSIDE ONLY, P-2 TO INCLUDE GLASS FRAMING.
10. PAINT ALL WALLS IN AREA OF WORK P-1, UNLESS NOTED OTHERWISE.

FINISH SCHEDULE

NO.	NAME	FLOOR	BASE	WALLS NORTH	WALLS SOUTH	WALLS EAST	WALLS WEST	CELING	KEYED FINISH REMARKS
001	EXIST CORRIDOR	RMF-1	RMF-1	ETR	ETR	ETR	ETR	ETR	1
003	EXIST. MEN'S RESTROOM	RMF-1	RMF-1	P-6	P-6	P-6	P-6	A-2	3, 6
003a	UTILITIY CLOSET	RMF-1	RMF-1	P-1	P-6	P-1	P-6	ETR	
004	EXIST. CLASSROOM	RMF-1	RMF-1	ETR	ETR	ETR	ETR	ETR	1
006	EXIST. WOMEN'S RESTROOM	RMF-1	RMF-1	P-6	P-6	P-6	P-6	ETR	3, 6
006a	UTILITY CLOSET	RMF-1	RMF-1	P-1	P-6	P-1	P-6	ETR	
101	EXIST. EVENT SPACE	LVT-1	VB-1	P-1	P-1	P-1	P-1	ETR	
104	EXIST. STAIR A	RT-1/RL-1	N/A	P-1	P-1	P-1	P-1	ETR	2, 4
106	EXIST. STORAGE	VCT-1/ETR	VB-2/ETR	P-1	P-1	P-1	P-1	A-1	
107	RESTROOM	T-1	VB-1/WT-1	T-2	P-1	P-1	P-1	A-1	5, 7
108	RESTROOM	T-1	VB-1/WT-1	P-1	T-2	P-1	P-1	A-1	5, 7
110	EXIST. REC. ROOM #1	LVT-1	VB-1	P-1	P-1	P-1	P-1	ETR	
111	EXIST. STAIR B	RT-1/RL-1	N/A	P-1	P-1	P-1	P-1	ETR	2, 4

KEYED FINISH REMARKS

1. SCOPE OF WORK IS PART OF ADD ALT#1.
2. SCOPE OF WORK IS PART OF ADD ALT#2.
3. PAINT ETR GYPSUM BOARD CEILINGS P-3.
4. ALL METAL STRUCTURES ARE TO BE CLEANED AND SURFACES PREPARED BEFORE PAINTED FINISH (P-4) IS APPLIED. (ADD ALT#2)
5. PROVIDE WT-1 AT TILED WALL TRANSITIONS, T-2 (WALL TILE) TO T-1 (FLOOR TILE).
6. PAINT CEILING MOUNTED AIR DEVICES TO MATCH CEILING (A-2).
7. REFER TO FINISH PLAN & ELEVATION FOR WALL TILE LAYOUT AND LOCATIONS.

ROOM FINISH LEGEND

FLOOR
- T PORCELAIN TILE
- RMF RESINOUS FLOORING
- VCT VINYL COMPOSITION TILE
- RL RUBBER TILE FLOORING
- LVT LUXURY VINYL TILE
- RT RUBBER TREADS/RISER

BASE
- VB VINYL COVE BASE
- RMF RESINOUS COVE BASE

CEILING
- A-1 24" x 48" ACOUSTICAL CEILING TILE
- A-2 GWB PAINTED

WALL
- GWB GYPSUM WALL BOARD
- P PAINTED
- T CERAMIC WALL TILE
- WC WALL COVERING

MISCELLANEOUS
- ETR EXISTING FINISHES ARE TO REMAIN
- WT EXISTING FINISHES ARE TO REMAIN

FINISH KEY

PAINT

P-1 GENERAL WALL PAINT
MANUF: TBD
COLOR: TBD
FINISH: EGGSHELL

P-2 DOOR/TRIM PAINT
MANUF: TBD
COLOR: TBD
FINISH: SEMI-GLOSS

P-3 GWB CEILING & BULKHEADS
MANUF: SHERWIN WILLIAMS
COLOR: SW7007 CEILING BRIGHT WHITE
FINISH: EGGSHELL

P-4 METAL FABRICATIONS (ADD ALT#2)
MANUF: SHERWIN WILLIAMS
COLOR: TBD
FINISH: SEMI-GLOSS

P-5 EXTERIOR PAINT (STUCCO) ADD ALT#3
MANUF: SHERWIN WILLIAMS
PRODUCT: TEXTURE HIGH BUILD ACRYLIC COATING
COLOR: TBD
FINISH: MEDIUM

P-6 INTERIOR CMU WALL PAINT
MANUF: SHERWIN WILLIAMS
PRODUCT: WATERBASED PRE-CAT EPOXY
COLOR: TBD
FINISH: EGGSHELL

P-7 ACCENT WALL PAINT
MANUF: TBD
COLOR: TBD
FINISH: EGGSHELL

SPECIALTY FLOORING

RMF-1 RESINOUS MATRIX FLOORING W/ INTEGRAL 4" H COVE BASE
MANUF: STONEHARD
STYLE: STONESHEILD HRI
COLOR: TBD

LUXURY VINYL TILE

LVT-1 MANUF: COBALT
COLLECTION: KATANGA
PRODUCT: KP5-###
COLOR: TBD
SIZE: 7" X 48"
INSTALL: ASHLAR
NOTE: INSTALL IS TO BE GLUE DOWN

VINYL COMPOSITE TILE

VCT-1 MANUF: TARKETT
PRODUCT: VINYL COMPOSITION TILE
COLOR: TO MATCH EXISTING
INSTALL: TO MATCH EXISTING

4" H VINYL COVE BASE

VB-1 MANUF: JOHNSONITE
PRODUCT: TRADITIONAL VINYL WALL BASE 4 1/8"
COLOR: TBD

VB-2 MATCH EXIST

WALL COVERING

WC-1 FULL HEIGHT IMPACT RESISTANT
MANUF: INPRO CORPORATION
STYLE: RICOCHET FLEXIBLE WALL PROTECTION
COLOR: TBD
NOTE: PROVIDE ALL REQUIRED ACCESSORIES

WALL AND FLOOR TILE

T-1 RESTROOM PORCELAIN FLOOR TILE
MANUF: ARCHITESSA
COLLECTION: STRAND
COLOR: TBD
SIZE: 12" x 24"
GROUT: MAPEI
GROUT COLOR: TBD
INSTALL: OFFSET

T-2 RESTROOM CERAMIC WALL TILE
MANUF: ARCHITESSA
COLLECTION: HUES
COLOR: WHITE MATTE BEVELED
SIZE: 4" X 10"
GROUT: MAPEI
GROUT COLOR: TBD
INSTALL: STACKED

CEILING

A-1 24" x 48" ACOUSTICAL TEGULAR CEILING PANEL & GRID
STYLE: TO MATCH EXISTING
GRID: TO MATCH EXISTING

A-2 GWB PAINTED, P-3

STAIR TREADS AND RISERS (ADD ALT #2)

RT-1 RUBBER TREADS W/INTEGRAL RISER
MANUF: JOHNSONITE
COLLECTION: ANGLEFIT RUBBER STAIR TREAD WITH INTEGRATED RISER
PRODUCT: RAISED SQUARE TREAD/ RISER #RNSQTR
COLOR: TBD

STAIR LANDING (ADD ALT #2)

RL-1 RUBBER TILE FLOORING
MANUF: JOHNSONITE
PRODUCT: RUBBER LANDING TILE
TEXTURE: RAISED SQUARE
SIZE: 24" X 24"
COLOR: TBD (TO MATCH RT-1)

WALL & FLOOR TRANSITIONS

WT-1 TILE FLOOR TO TILED WALL TRANSITION
MANUF: SCHLUTER
STYLE: DILEX-AHK
COLOR: ALUM BRUSHED CHROME

WT-2 EXISTING CARPET, VCT, LVT FLOORING TO NEW LVT-1 AND NEW T-1 TO NEW LVT-1
MANUF: JOHNSONITE/TARKETT
PRODUCT: SLIM LINE TRANSITIONS
COLOR: TBD

WALL PROTECTION

CG-1 CORNER GUARDS
MANUF: INPRO
PRODUCT: 150 HIGH IMPACT CORNER GUARD
PART#: 154 (3" X 3" X 4')
COLOR: TBD

0 4' 8' 16'
0 2'
1/8" = 1'-0"

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SEAL:
DANIEL C HUMMER
No. SS-008366
STATE OF DELAWARE
REGISTERED ARCHITECT

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE.
LICENSE NUM: SS-008366, EXP DATE: 01/31/2026.

PROJECT:
GEORGE WILSON CENTER IMPROVEMENTS
FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
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@CityofNewarkDE

MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	10/10/2025
SCALE:	AS INDICATED
DESIGNED BY:	JLH
DRAWN BY:	CKM
CHECKED BY:	DCH

DRAWING TITLE:
FINISH SCHEDULE AND FINISH FLOOR PLAN

SHEET NUMBER:
A-701

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10/10/2025 5:00:28 PM

EXISTING CONDITIONS:

GENERAL CONTRACTOR SHALL FIELD VERIFY EXISTING SIZES, DIMENSIONS, NOTES OR CONDITIONS PRIOR TO ANY DETAILING, OR FABRICATION OF MATERIALS.

DEMOLITION:

1. PROTECTION: PROTECT EXISTING CONSTRUCTION TO REMAIN DURING REMOVAL, CUTTING AND PATCHING TO PREVENT DAMAGE.
2. CUTTING: CUT EXISTING CONSTRUCTION USING METHODS LEAST LIKELY TO DAMAGE ELEMENTS TO BE RETAINED OR ADJOINING CONSTRUCTION. IN GENERAL, WHERE CUTTING IS REQUIRED, USE HAND OR SMALL POWER TOOLS DESIGNED FOR SAWING OR GRINDING, NOT HAMMERING AND CHOPPING. CUT HOLES AND SLOTS NEATLY TO SIZE REQUIRED WITH MINIMUM DISTURBANCE OF ADJACENT SURFACES. TEMPORARILY COVER OPENINGS WHEN NOT IN USE. CUT THROUGH CONCRETE AND MASONRY USING A CUTTING MACHINE SUCH AS CARBORUNDUM SAW OR DIAMOND CORE DRILL.
3. CUT-OFF PIPE OR CONDUIT IN WALLS OR PARTITIONS TO BE REMOVED, RELOCATED OR ABANDONED. CUT-OFF PIPE OR CONDUIT IN WALLS OR PARTITIONS TO BE REMOVED. CAP VALVE OR PLUG AND SEAL THE REMAINING PORTION OF PIPE OR CONDUIT TO PREVENT ENTRANCE OF MOISTURE OR OTHER FOREIGN MATTER AFTER BY-PASSING AND CUTTING.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL UTILITIES THAT ARE INVOLVED IN THE DEMOLITION ACTIVITIES AND COORDINATE THEIR REMOVAL OR RELOCATION WITH THE OWNERS REPRESENTATIVE. WORK AT NO COST TO OWNER.

CONCRETE:

STRUCTURAL CAST-IN-PLACE CONCRETE:

MATERIALS:

CONCRETE:

1. EXPOSURE CATEGORY – INTERIOR SLAB ON GRADE: F0, S0, W0, C0, 4000 PSF MIN. COMPRESSIVE STRENGTH

AGGREGATES:

COARSE AGGREGATE OR BETTER: ASTM C33

WATER

POTABLE AND ASTM C94

REINFORCING STEEL:

1. DEFORMED BARS SHALL CONFORM TO ASTM A615, GRADE 60 OR ASTM A706, GRADE 60

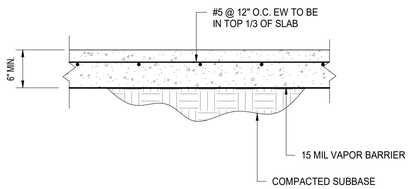
EXECUTION:

SLABS:

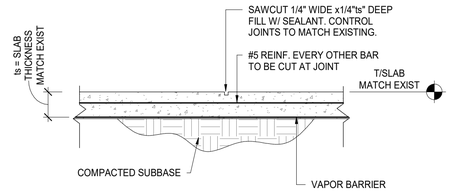
1. EXACT LOCATION OF CONTROL JOINTS SHALL BE ESTABLISHED PRIOR TO CUTTING OF REINFORCING AND PLACING OF CONCRETE. FIELD CONTROL SHALL ASSURE THAT THE JOINTS OCCUR OVER THE CUT REINFORCING.
2. SAWING OF THE JOINTS:
   A. THE PREFERRED METHOD FOR SAWING CONTROL JOINTS IS WITH THE "SOFF-CUT " SAW WITHIN ONE HOUR OF FINISHED CONCRETE.
   B. THE CONVENTIONAL CONCRETE SAW CUTTING A 3/16" (5MM) WIDE GROOVE IS ALSO ACCEPTABLE. SAWING SHALL BEGIN AS SOON AS THE CONCRETE SURFACE HAS SUFFICIENTLY HARDENED TO PERMIT SAWING WITHOUT EXCESSIVE RAVELING AND BEFORE SHRINKAGE CRACKS OCCUR. SAWING SHALL BEGIN WITHIN 10 HOURS OF THE FINAL FINISHING OPERATION.
   C. WHERE THE SAW IS OBSTRUCTED, TOOLED OR FORMED JOINTS SHALL BE PROVIDED TO JOIN THE SAW CUT JOINT AND COMPLETE THE CONTROL JOINT
   D. THE CONTRACTOR SHALL MAKE ALL NECESSARY PROVISIONS TO ENSURE THAT SAWED JOINTS ARE MADE IN THE PROPER INTERVAL INCLUDING, BUT NOT LIMITED TO LIGHTING, TWO SHIFTS, OVERTIME, ETC.
3. ALL DOWELS SHALL BE SAW CUT, NOT SHEARED, CONFORMING TO ASTM A615 PLAIN, GRADE 60, AND SHALL BE LOCATED AT MID-DEPTH OF THE SLAB. DOWELS SHALL BE CAREFULLY AND FIRMLY SUPPORTED DURING CONSTRUCTION. DOWELS SHALL BE COATED WITH A BOND BREAKER PRIOR TO PLACING CONCRETE IN THE SECOND POUR.
4. INSTALL VAPOR BARRIER CONFORMING TO ASTM E1745 AND 15 MIL THICK UNDER SLAB. OVERLAP SPLICES 6" MINIMUM OR PER MANUFACTURER'S RECOMMENDATION.
5. SLAB CONTROL JOINTS SHALL BE PLACED SUCH THAT SPACING DOES NOT EXCEED EXISTING CONTROL JOINT UP TO A MAXIMUM 15 FEET BETWEEN JOINTS PER ACI 302. JOINTS SHALL BE CUT INTO THE SLAB AT A DEPTH OF 1/4 TIMES THE THICKNESS OF THE SLAB WITHIN 12 HOURS OF PLACEMENT.

REINFORCING STEEL:

1. DETAIL REINFORCEMENT BASED ON THE PROJECT REQUIREMENTS AND APPLICABLE CODES / STANDARDS NOTED.
2. ALL LAP SPLICES ARE TO BE ACI STANDARD CLASS B TENSION LAP SPLICES. WHERE BARS OF DIFFERENT SIZES LAP, PROVIDE LAP SPLICE LENGTH FOR LARGER BAR.
3. WHERE DOWELS ARE INDICATED BUT NOT SIZED, PROVIDE DOWELS THAT MATCH SIZE AND LOCATION OF MAIN REINFORCEMENT AND LAP SPLICE WITH THE MAIN REINFORCEMENT.
4. REINFORCEMENT SHALL HAVE THE FOLLOWING CONCRETE PROTECTION (CLEAR COVER), UON.
   A. SURFACES NOT FORMED: 3"
   B. SLABS AND JOISTS, TOP BARS: 3/4"

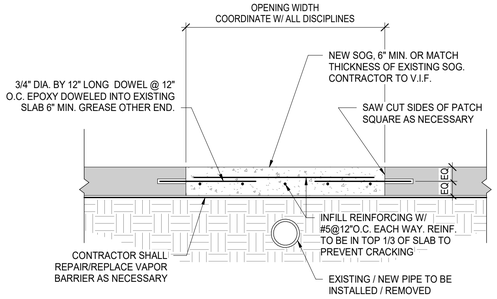


1 S510 TYP. SLAB SECTION
1" = 1'-0"



NOTE:
CONTROL JOINTS TO MATCH CONTROL JOINTS IN EXISTING SLAB OR 15'-0" MAX.

2 S510 TYP. SLAB ON GRADE DETAIL - CONTROL JOINT
1" = 1'-0"



3 S510 SLAB ON GRADE REPAIR DETAIL
3/4" = 1'-0"

4 S510 TYPICAL CMU INTERIOR WALL FOOTING SECTION
3/4" = 1'-0"

5 S510 TYP. SLAB ON GRADE JOINT LAYOUT
1" = 1'-0"

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SEAL:

SHANNON BOYD LICENSE No. 30590 10/10/25 DELAWARE PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE.
LICENSE NUM: -, EXP DATE: -.

PROJECT:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS

CONTRACT NO. 25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK

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MARK	DATE	DESCRIPTION

PROJECT NO:	20-03026-049
DATE:	
SCALE:	AS INDICATED
DESIGNED BY:	SB/EP
DRAWN BY:	EP
CHECKED BY:	SB

DRAWING TITLE:

TYPICAL DETAILS

SHEET NUMBER:

S510

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C:\Users\EPerkins\Documents\George_Wilson_Center_Struct Slab Repair Details_R24_EPerkinsRK7NJ.rvt
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DUCTWORK SYMBOLS

SINGLE LINE	DOUBLE LINE	
		NEW WORK
		EXISTING WORK TO REMAIN
		HIDDEN WORK
		DROP IN DUCT ELEVATION
		RISE IN DUCT ELEVATION
		DUCT UP
		DUCT DOWN
		ROUND DUCT UP
		ROUND DUCT DOWN
		TRANSITION (RECTANGULAR)
		TRANSITION (RECTANGULAR TO ROUND)
VD	VD	VOLUME DAMPER (VD)
FD	FD	FIRE DAMPER (FD)
		FLEXIBLE CONNECTION (FXC)
		VANED ELBOW
		RADIUSED ELBOW
		45° BRANCH TAKE–OFF
		45° BRANCH TAKE–OFF TO DIFFUSER
		90° SPLIT TEE
AP AP	AP AP	ACCESS PANEL (AP)
AD AD	AD AD	ACCESS DOOR (AD)
		FLEXIBLE DUCTWORK
		LINED TRANSFER AIR DUCT

ABBREVIATIONS

BTU	BRITISH THERMAL UNITS
CFM	CUBIC FEET PER MINUTE
CW	COLD WATER
°F	DEGREES FAHRENHEIT
D	DRAIN
DWG.	DRAWING
(E)	EXISTING
EA	EXHAUST AIR
EB	ELECTRIC BASEBOARD HEATER
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ER	EXHAUST REGISTER
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
FPM	FEET PER MINUTE
FT.	FEET
FXC	FLEXIBLE CONNECTION
IN.	INCHES
KW	KILOWATT
LB.	POUNDS
MAX.	MAXIMUM
MBH	1000 BTU
MIN.	MINIMUM
MOCB	MAXIMUM OVERCURRENT CIRCUIT BREAKER
(N)	NEW
PSIG	POUNDS PER SQUARE INCH
QTY.	QUANTITY
(R)	RELOCATE
RD	ROUND DUCT
RPM	REVOLUTIONS PER MINUTE
TEMP.	TEMPERATURE
TYP.	TYPICAL
UH	UNIT HEATER
VD	VOLUME DAMPER

FITTING SYMBOLS

- DIRECTION OF FLOW
- DIRECTION OF PITCH
- ECCENTRIC REDUCER OR INCREASER
- CONCENTRIC REDUCER OR INCREASER
- PIPE RISING UP
- PIPE DROPPING DOWN
- BOTTOM TEE
- CAP
- FLEXIBLE PIPE CONNECTION
- UNION (<2–1/2") OR FLANGE (>2")
- THERMOMETER
- PRESSURE GAUGE

AIR DEVICE LEGEND

- SUPPLY/RETURN AIR DIRECTION
- AIRFLOW ARROW
- 4–WAY BLOW DIFFUSER (CD)
- 3–WAY BLOW DIFFUSER (CD)
- 2–WAY BLOW DIFFUSER (CD)
- 2–WAY CORNER BLOW DIFFUSER (CD)
- 1–WAY BLOW DIFFUSER (CD)
- ROUND DIFFUSER (CD)
- RETURN AIR REGISTER (RAR)
- EXHAUST AIR REGISTER (EAR)
- SUPPLY AIR REGISTER (SAR)
- LINEAR DIFFUSER (LD)
- LINEAR RETURN (LR)
- AIR DEVICE CALL OUT BOX
  LINE 1 = AIR DEVICE TAG
  LINE 2 = CFM
  LINE 3 = SIZE

CONTROL DIAGRAM LEGEND

- EXTERIOR FAN
- INTERIOR FAN
- INLINE FAN
- GRAVITY DAMPER
- MOTORIZED DAMPER
- FIXED LOUVER
- MOTOR OPERATED LOUVER

CONTROL DEVICE SYMBOLS

- (T) WALL MOUNTED TEMPERATURE SENSOR
- (S) TOGGLE SWITCH

REFERENCE SYMBOLS

- POINT OF CONNECTION BETWEEN NEW WORK AND EXISTING WORK
- POINT BETWEEN EXISTING WORK TO REMAIN AND EXISTING WORK TO BE REMOVED
- (X) SHEET NOTE DESIGNATION
- (X) DEMOLITION NOTE DESIGNATION
- A / M–100 DETAIL LETTER/NUMBER DESIGNATION DRAWING NUMBER CONTAINING DETAIL
- A / M–100 SECTION LETTER/NUMBER DESIGNATION DRAWING NUMBER CONTAINING SECTION
- TO BE DEMOLISHED

EQUIPMENT TAG LEGEND

XX – YY – ZZ	EQUIPMENT TAG
XX	BUILDING NUMBER – IF APPLICABLE
YY	EQUIPMENT TYPE, SEE EQUIPMENT SCHEDULES
ZZ	EQUIPMENT TAG NUMBER FOR BUILDING

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SEAL:

CURTIS L. JAMES LICENSE No. 19096 DELAWARE PROFESSIONAL ENGINEER

10/15/2025

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM. 19096, EXP DATE: 06/30/2026.

PROJECT:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
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PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	PJS
DRAWN BY:	PJS
CHECKED BY:	CLJ

DRAWING TITLE:

LEGEND - MECHANICAL

SHEET NUMBER:

H-001

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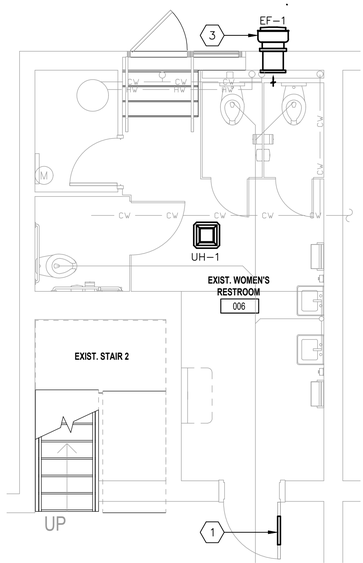
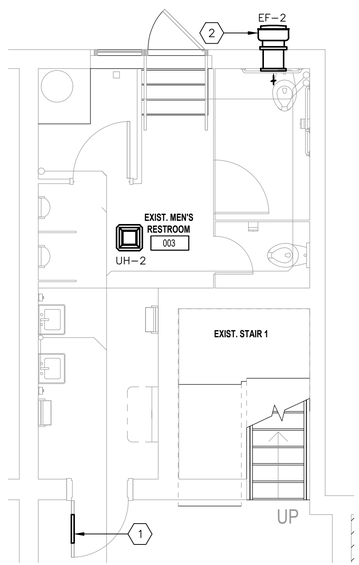
KEYNOTES:

1. 18"X18" DOOR LOUVER – SEE ARCHITECTURAL DRAWINGS.
2. INSTALL NEW FAN AT EXISTING PENETRATION. MODIFY PENETRATION AS REQUIRED.
3. PROVIDE NEW PENETRATION FOR FAN INSTALLATION.
4. 6" Ø EXHAUST DUCT UP THROUGH ROOF. PROVIDE GOOSENECK TERMINATION.



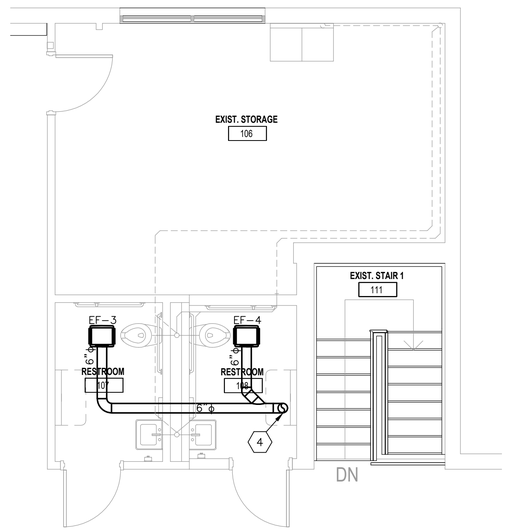
1 H-101 WOMEN'S RESTROOM HEATING PLAN

SCALE: 1/4" = 1'-0"



2 H-101 MEN'S RESTROOM HEATING PLAN

SCALE: 1/4" = 1'-0"



3 H-101 STORARE AREA RESTROOMS HEATING PLAN

SCALE: 1/4" = 1'-0"

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SEAL:

CURTIS L. JAMES LICENSE No. 19096 DELAWARE PROFESSIONAL ENGINEER

10/15/2025

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PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	PJS
DRAWN BY:	PJS
CHECKED BY:	CLJ

DRAWING TITLE:

FLOOR PLAN - HEATING AND VENTILATION - MECHANICAL

SHEET NUMBER:

H-101

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EXHAUST FAN SCHEDULE

TAG NUMBER	MANUFACTURER	LOCATION	MODEL NUMBER	PRESSURE DROP		FAN TYPE	COLLAR OPENING (in.)	APPLICATION	DRIVE	CFM	DAMPER SIZE (in.)	MOTOR HP	FAN RPM	ELECTRICAL	NOTES
				EXTERNAL S.P.	TOTAL S.P.									VOLTS-PH-HZ	
EF-1	GREENHECK	006 WOMEN'S RESTROOM	CUE-070	0.15	0.20	SIDEWALLL	13x13	EXHAUST	DIRECT	280	8x8	1/30	1,545	120-1-60	BS, GD, OP, OS, WB, WG
EF-2	GREENHECK	003 MEN'S RESTROOM	CUE-070	0.15	0.20	SIDEWALLL	13x13	EXHAUST	DIRECT	280	8x8	1/30	1,545	120-1-60	BS, GD, OP, OS, WB, WG
EF-3	GREENHECK	107 RESTROOM	SP-A90	0.20	0.25	CEILING	NA	EXHAUST	DIRECT	70	6" DIAMETER	0.14 AMPS	870	120-1-60	GD, OS
EF-4	GREENHECK	108 RESTROOM	SP-A90	0.20	0.25	CEILING	NA	EXHAUST	DIRECT	70	6" DIAMETER	0.14 AMPS	870	120-1-60	GD, OS

EXHAUST FAN KEYNOTES:

BS – BIRD SCREEN (INTERNAL)

GD – GRAVITY DAMPER

OP – OVERLOAD PROTECTION

OS – CONTROLLED BY OCCUPANCY SENSOR– SEE ELECTRICAL DRAWINGS

WB – WALL BRACKET

WG–WALL GRILLE

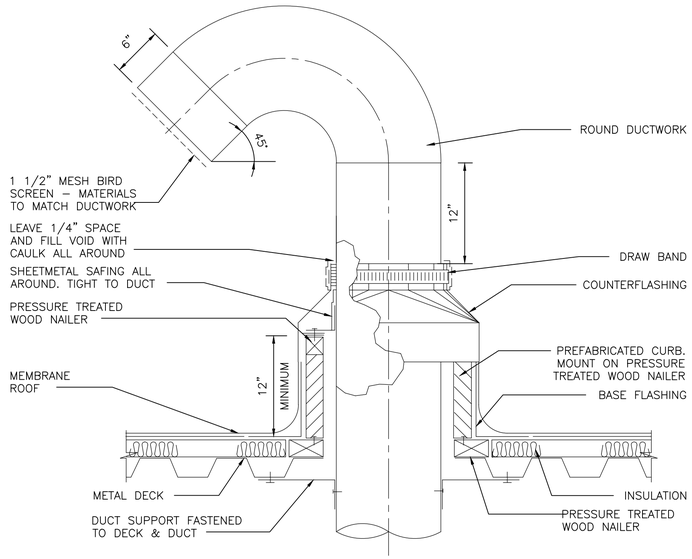
UNIT HEATER SCHEDULE

TAG NUMBER	MANUFACTURER	LOCATION	MODEL NUMBER	TYPE	KW/BTUH (IN/OUT)	ELECTRICAL			FAN CFM	NOTES
						VOLTS	PHASE	AMPS		
UH-1	REZNOR	006 WOMEN'S RESTROOM	ECS-3	CEILING SURFACE MOUNT	3/10,250	208	1	14.42	310	DS, T1
UH-2	REZNOR	003 MEN'S RESTROOM	ECS-3	CEILING SURFACE MOUNT	3/10,250	208	1	14.42	310	DS, T1

UNIT HEATER KEYNOTES:

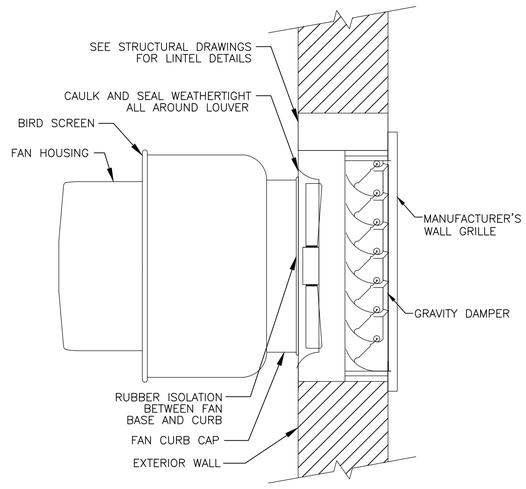
DS – DISCONNECT SWITCH

T1 – INTERNAL TAMPER PROOF THERMOSTAT



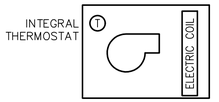
GOOSENECK INSTALLATION DETAIL

NOT TO SCALE



WALL MOUNTED EXHAUST FAN DETAIL

NOT TO SCALE (EF-1 AND EF-2)

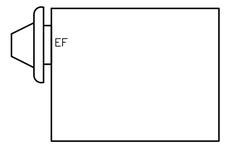


A. GENERAL

1. AS SPACE TEMPERATURE DROPS BELOW SETPOINT OF 55 DEGREES F (ADJ.), AS SENSED AT THE INTEGRAL THERMOSTAT, ELECTRIC UNIT HEATER FAN SHALL START AND ELECTRIC COIL SHALL ENERGIZE.
2. UPON A RISE IN TEMPERATURE ABOVE SETPOINT FAN SHALL BE DE-ENERGIZED AND ELECTRIC COIL SHALL BE DE-ENERGIZE.

ELECTRIC HEATER CONTROL SCHEMATIC

NOT TO SCALE APPLIES TO UH-1 AND UH-2



A. GENERAL

1. EXHAUST FAN IS CONTROLLED BY OCCUPANCY SENSOR – SEE ELECTRICAL DRAWINGS FOR ADDITIONAL DETAILS

EXHAUST FAN CONTROL SCHEMATIC (TYP.)

NOT TO SCALE APPLIES TO EF-1 AND EF-2 (EF-3 AND EF-4 SIMILAR)

NOTES:

1. PROVIDE DURAVENT 99659 20" STORM COLLAR. THE STORM COLLAR HAS A 22" INSIDE DIAMETER AND 33" OUTSIDE DIAMETER. SEAL INNER EDGE OF COLLAR TO PIPING WITH NON-HARDENING SEALANT (MINIMUM RATING OF 200°F)

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DESIGNED BY:	PJS
DRAWN BY:	PJS
CHECKED BY:	CLJ

DRAWING TITLE:

SCHEDULES AND DETAILS - MECHANICAL

SHEET NUMBER:

H-601

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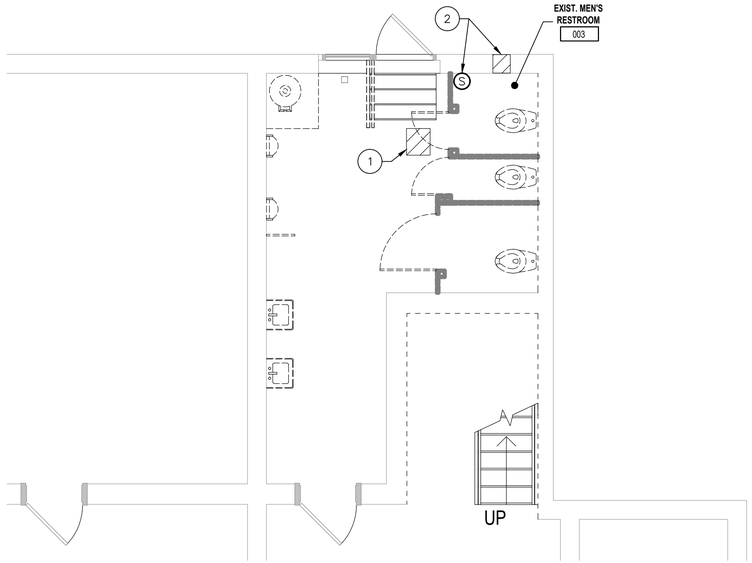
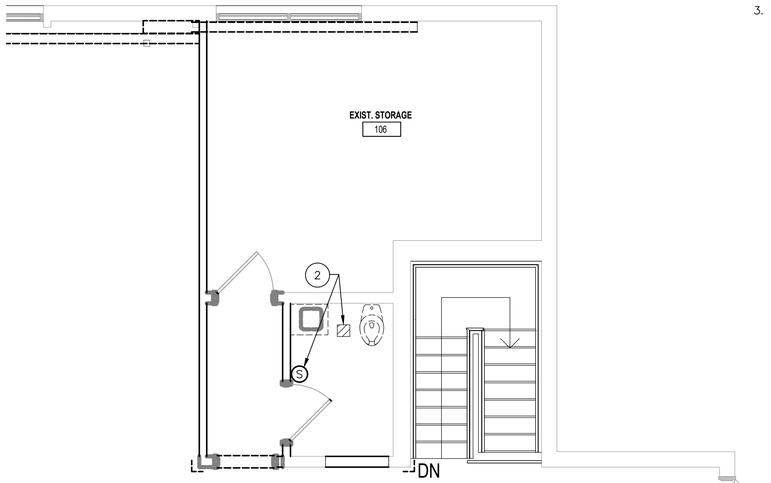
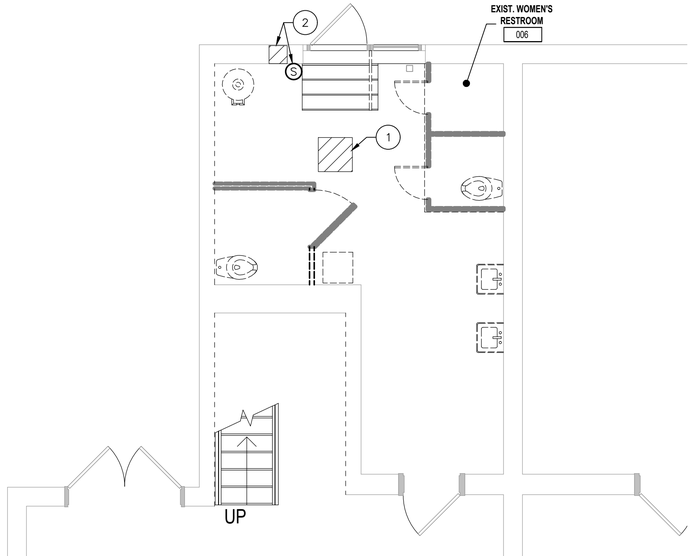


1 HD-101 MEN'S RESTROOM DEMOLITION PLAN
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10





2 HD-101 WOMEN'S RESTROOM DEMOLITION PLAN
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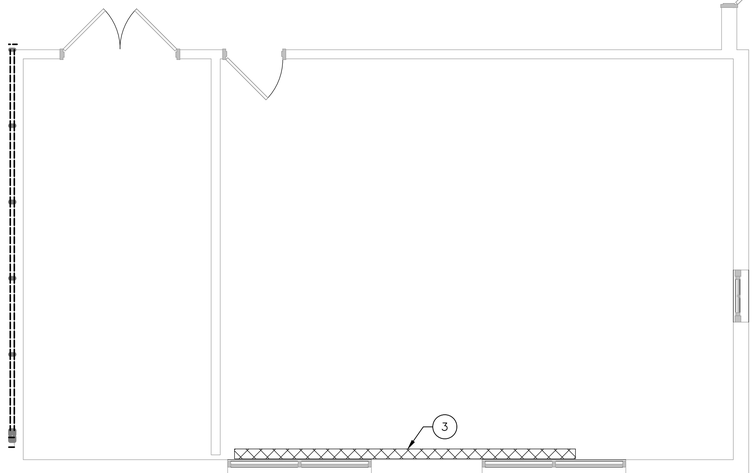

3 HD-101 FIRST FLOOR DEMOLITION PLAN
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10

DEMOLITION GENERAL NOTES:

1. REMOVE PIPING/INSULATION AS REQUIRED TO ACCOMMODATE THE NEW LAYOUT.

DEMOLITION KEYNOTES:

1. REMOVE EXISTING ELECTRIC UNIT HEATER, CEILING MOUNTING HARDWARE, INTEGRAL THERMOSTAT AND OTHER ACCESSORIES. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
2. REMOVE EXISTING EXHAUST FAN, RETURN GRILLE, TOGGLE SWITCH, AND ACCESSORIES. SEE ARCHITECTURAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
3. REMOVE EXISTING ELECTRIC BASEBOARD HEATER, INTEGRAL THERMOSTAT, MOUNTING HARDWARE, AND ACCESSORIES.

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Keystone ENGINEERING GROUP

SEAL:

CURTIS L. JAMES LICENSE No. 19096 DELAWARE PROFESSIONAL ENGINEER

10/15/2025

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: 19096, EXP DATE: 06/30/2026.

PROJECT:
GEORGE WILSON CENTER IMPROVEMENTS
FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
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@CityofNewarkDE

PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	PJS
DRAWN BY:	PJS
CHECKED BY:	CLJ

DRAWING TITLE:
FLOOR PLANS - DEMOLITION HVAC

SHEET NUMBER:
HD-101

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GENERAL NOTES:

1. ALL PLUMBING EQUIPMENT AND INSTALLATIONS SHALL CONFORM WITH THE REQUIREMENTS OF THE LATEST APPLICABLE VERSION OF THE INTERNATIONAL PLUMBING CODE (IPC) INTERNATIONAL BUILDING CODE (IBC), INTERNATIONAL ENERGY CONSERVATION CODE (IECC), AS ADOPTED BY THE AUTHORITY HAVING JURISDICTION (AHJ) AND UNDERWRITERS LABORATORIES (UL).
2. PRIOR TO PURCHASING ANY MATERIALS OR COMMENCING WORK, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, PIPING SIZES AND LOCATIONS, EQUIPMENT, ETC. SHOWN ON THE DRAWINGS OR AFFECTING THIS WORK AND SHALL REPORT ANY DEVIATIONS TO THE ENGINEER.
3. PROVIDE ALL LABOR, MATERIAL, AND EQUIPMENT COMPLETELY TO PROVIDE FULLY OPERATIONAL SYSTEMS.
4. ALL PLUMBING EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
5. WATER PIPING ABOVE THE CEILING AND IN EXTERIOR WALLS SHALL BE INSTALLED ON THE HEATED SIDE (UNDERSIDE) OF CEILING INSULATION AND HEATED SIDE (INSIDE) OF WALL INSULATION.
6. SANITARY AND VENT PIPING WITH A DIAMETER OF 2 1/2 INCHES AND SMALLER SHALL BE INSTALLED WITH A MINIMUM SLOPE OF 1/4 INCH PER FOOT. PIPING WITH A DIAMETER OF 3 INCHES UP TO 6 INCHES SHALL BE SLOPED AT A MINIMUM OF 1/8 INCH PER FOOT. PIPING WITH A DIAMETER OF 8 INCHES OR LARGER SHALL BE SLOPED AT A MINIMUM OF 1/16 INCH PER FOOT.
7. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL PLUMBING EQUIPMENT, PIPING, ETC. TO FIT WITHIN THE SPACE ALLOWED BY THE ARCHITECTURAL AND STRUCTURAL CONDITIONS. CUTTING OR ALTERING ANY STRUCTURAL MEMBERS SHALL NOT BE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE ARCHITECT OR STRUCTURAL ENGINEER.
8. PROVIDE SHOCK ABSORBERS ON ALL DOMESTIC WATER PIPING SERVING FLUSH VALVE FIXTURES, WASHING MACHINE SUPPLIES, SOLENOID VALVES, AND OTHER QUICK CLOSING VALVES.
9. ALL DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENTS, APPROXIMATE SIZES, AND RELATIVE LOCATIONS OF PRINCIPAL ELEMENTS. PROVIDE OFFSETS AS REQUIRED FOR COORDINATED INSTALLATIONS. PROVIDE EQUIPMENT, MATERIALS, AND METHODS NOT SHOWN OR SPECIFIED, BUT REQUIRED TO COMPLETE THE WORK. DO NOT SCALE DRAWINGS FOR DIMENSIONS.
10. REFER TO DIVISION I SECTIONS "CUTTING AND PATCHING" AND "SELECTIVE DEMOLITION" FOR GENERAL DEMOLITION REQUIREMENTS AND PROCEDURES.
11. EXISTING CONDITIONS AS SHOWN ARE BASED ON LIMITED FIELD OBSERVATIONS AND LIMITED RECORD DRAWINGS. PRIOR TO START OF WORK, CONTRACTOR SHALL NOTIFY ENGINEER, IN WRITING, OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONTRACT DOCUMENTS.
12. DO NOT INSTALL PIPING OVER, AROUND, IN FRONT OF, IN BACK OF, OR BELOW ELECTRICAL CONTROLS, PANELS, SWITCHES, TERMINAL BOXES, OR SIMILAR ELECTRICAL EQUIPMENT. DRIP PANS ARE NOT PERMITTED EXCEPT WHERE SPECIFICALLY SHOWN.
13. DO NOT ALLOW EQUIPMENT, PIPING TO INFRINGE UPON WORKING CLEARANCES REQUIRED BY NEC.
14. DO NOT INSTALL PIPING OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT ROOMS, OR TELECOMMUNICATION CLOSETS.
15. POSITION ALL PLUMBING WORK FOR EASY UNOBSTRUCTED MAINTENANCE ACCESS AND OPERATION.
16. WORK WILL OCCUR IN AND AROUND OWNER OPERATIONS. PROVIDE MINIMUM ONE WEEK NOTICE FOR SHUTDOWNS TO ANY SYSTEMS. WHERE PARTS OF EXISTING SYSTEMS BEING REMOVED REQUIRE CONTINUOUS OPERATION, INSTALL AND MAKE NEW SYSTEMS OPERATIONAL, PRIOR TO REMOVAL OF EXISTING SYSTEMS.
17. CONTRACTOR SHALL REFERENCE ARCHITECTURAL PLANS AND DIVISION 1 SECTIONS FOR CONSTRUCTION PHASING AND SUPPLEMENTAL CONDITIONS.
18. THE TERM "FURNISH" SHALL MEAN TO OBTAIN AND DELIVER TO THE JOB SITE. THE TERM "INSTALL" SHALL MEAN TO UNPACK, STORE, ASSEMBLE, FIX IN POSITION, AND CONNECT FOR USE. THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL. THE TERM "CONTRACTOR" SHALL MEAN THE PLUMBING CONTRACTOR OR ANY PLUMBING SUBCONTRACTOR.
19. THE CONTRACTOR SHALL ENSURE THAT ALL RULES AND REGULATIONS, INCLUDING THOSE WHICH MAY BE ISSUED BY THE OWNER, ARE BEING OBSERVED. THE CONTRACTOR SHALL INSTALL SIGNAGE, BARRIERS AND OTHER MEANS TO PROVIDE WARNINGS AND RESTRICT ACCESS TO CONSTRUCTION AREAS.
20. EACH CONTRACTOR SHALL COORDINATE ITS OPERATIONS WITH OPERATIONS OF OTHER TRADE CONTRACTORS THAT DEPEND ON EACH OTHER FOR PROPER INSTALLATION, CONNECTION AND OPERATION.
21. THE INSTALLATION OF ALL EQUIPMENT SHALL PERMIT ADEQUATE ACCESSIBILITY FOR PROPER MAINTENANCE.
22. UNLESS THE CONTRACT DOCUMENTS INCLUDE MORE STRINGENT REQUIREMENTS, APPLICABLE CONSTRUCTION INDUSTRY STANDARDS HAVE THE SAME FORCE AND EFFECT AS IF COPIED DIRECTLY INTO THE CONTRACT DOCUMENTS TO THE EXTENT REFERENCE. SUCH STANDARDS ARE MADE PART OF THE CONTRACT DOCUMENTS BY REFERENCE.
23. COMPLY WITH STANDARDS IN EFFECT AS OF THE DATE OF THE CONTRACT DOCUMENTS UNLESS OTHERWISE INDICATED.
24. THE CONTRACTOR SHALL BE FAMILIAR WITH INDUSTRY STANDARDS APPLICABLE TO ITS CONSTRUCTION ACTIVITY. WHERE COPIES OF STANDARDS ARE NEEDED TO PERFORM A REQUIRED CONSTRUCTION ACTIVITY, OBTAIN COPIES DIRECTLY FROM PUBLICATION SOURCE.
25. THE CONTRACTOR SHALL COMPLY WITH ALL LAWS, ORDINANCES, STATUTES AND LAWFUL ORDERS ISSUED BY AUTHORITIES HAVING JURISDICTION AND RULES, CONVENTIONS, AND AGREEMENTS WITHIN THE CONSTRUCTION INDUSTRY THAT CONTROL THE PERFORMANCE OF THE WORK.
26. THE PRODUCTS SHOWN ON THE DRAWINGS ARE BASED ON A SPECIFIC MANUFACTURER, MAKE, AND MODEL. THESE PRODUCTS ESTABLISH SIGNIFICANT QUALITIES RELATED TO TYPE, FUNCTION, DIMENSION, IN-SERVICE PERFORMANCE, PHYSICAL PROPERTIES, APPEARANCE, AND OTHER CHARACTERISTICS FOR PURPOSES OF EVALUATING PRODUCTS OF OTHER NAMED MANUFACTURERS.
27. THE ENGINEER WILL CONSIDER REQUESTS FOR SUBSTITUTION WHEN THE FOLLOWING CONDITIONS ARE SATISFIED: REQUESTED SUBSTITUTION OFFERS OWNER A SUBSTANTIAL ADVANTAGE IN COST, TIME OR ENERGY CONSERVATION AFTER DEDUCTING ADDITIONAL RESPONSIBILITIES THE SUBSTITUTION MAY PRESENT TO THE OWNER INCLUDING COMPENSATION TO ENGINEER FOR REDESIGN AND EVALUATION SERVICES AND INCREASED CONSTRUCTION COSTS OF RELATED WORK; DOES NOT REQUIRE EXTENSIVE REVISIONS TO THE CONTRACT DOCUMENTS; IS CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND WILL PRODUCE THE INDICATED RESULTS; IS FULLY DOCUMENTED AND PROPERLY SUBMITTED; WILL NOT ADVERSELY AFFECT THE CONTRACTOR'S CONSTRUCTION SCHEDULE; AND HAD BEEN COORDINATED WITH OTHER RELATED WORK.
28. THE CONTRACTOR SHALL DELIVER, STORE, AND HANDLE PRODUCTS USING MEANS AND METHODS THAT WILL PREVENT DAMAGE, DETERIORATION, AND LOSS. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. THE CONTRACTOR SHALL STORE MATERIALS IN A MANNER THAT WILL NOT ENDANGER PROJECT STRUCTURE.
29. THE CONTRACTOR SHALL COMPLETE OR CORRECT ALL WORK IDENTIFIED AS NOT CONFORMING TO THE CONTRACT DOCUMENTS.
30. PROVIDE PERMANENT IDENTIFICATION LABELS FOR ALL NEW EQUIPMENT.
31. THE CONTRACTOR SHALL PREPARE ELECTRONIC AS BUILT DRAWINGS AND PROVIDE SOURCE INFORMATION, MANUFACTURERS, MAINTENANCE DOCUMENTATION, MAINTENANCE PROCEDURES, MAINTENANCE AND SERVICE SCHEDULES, SPARE PARTS LISTS, AND WARRANTY AND BOND INFORMATION FOR EACH PIECE OF EQUIPMENT AS PER DIVISION 1 SPECIFICATION REQUIREMENTS.
32. THE CONTRACTOR SHALL TRAIN OWNER'S PERSONALLY IN THE OPERATION, EMERGENCY PROCEDURES, ADJUSTMENT TROUBLESHOOTING, MAINTENANCE AND REPAIR OF EACH PIECE OF EQUIPMENT.
33. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AS REQUIRED TO FIT THE WORK PROPERLY. WHERE PORTIONS OF THE WORK ARE INDICATED TO FIT TO OTHER CONSTRUCTION, VERIFY DIMENSIONS OF OTHER CONSTRUCTION BY FIELD MEASUREMENTS BEFORE FABRICATION.
34. THE CONTRACTOR SHALL INSTALL VERTICAL WORK PLUMB AND HORIZONTAL WORK LEVEL UNLESS OTHERWISE INDICATED. WHERE SPACE IS LIMITED, INSTALL COMPONENTS TO MAXIMIZE SPACE AVAILABLE FOR MAINTENANCE AND EASE OF REMOVAL FOR REPLACEMENT. CONCEAL PIPES, WIRING, ETC, IN FINISHED AREAS UNLESS EASE OF REMOVAL FOR REPLACEMENT. CONCEAL PIPES, WIRING, ETC, IN FINISHED AREAS UNLESS OTHERWISE INDICATED. MAINTAIN MINIMUM HEADROOM CLEARANCE OF 8'-0" IN SPACES WITHOUT CEILINGS.
35. THE CONTRACTOR SHALL COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS FOR INSTALLING PRODUCTS IN APPLICATIONS INDICATED.
36. ALL TESTS SHALL BE COMPLETED BEFORE ANY EQUIPMENT OR PIPING INSULATION IS APPLIED.
37. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
38. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
39. ALL MISCELLANEOUS MATERIALS REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR.
40. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE AND MAINTAIN CONCEALED PLUMBING EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION.
41. ALL PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.

ABBREVIATIONS

AAV	AUTOMATIC AIR VENT	FB	FROM BELOW	PRESS.	PRESSURE
AD	AREA DRAIN	FCO	FLOOR CLEANOUT	RPZ	REDUCED PRESSURE ZONE
AFF	ABOVE FINISHED FLOOR	FD	FLOOR DRAIN	S	SANITARY
AHU	AIR HANDLING UNIT	FL.	FLOOR	SH	SHOWER
BF	BELOW FLOOR	FM	FORCED MAIN	SK	SINK
BFF	BELOW FINISHED FLOOR	FP	FIRE PROTECTION	SP	STANDPIPE
BFG	BELOW FINISHED GRADE	G	NATURAL GAS	TEMP.	TEMPERATURE
BFP	BACK FLOW PREVENTER	GM	NATURAL GAS METER	TP	TRAP PRIMER
BV	BALANCING VALVE	GPF	GALLONS PER FLUSH	TW	TEMPERED WATER
CD	CONDENSATE DRAIN	GPH	GALLONS PER HOUR	TYP.	TYPICAL
CO	CLEANOUT	GPM	GALLONS PER MINUTE	UG	UNDERGROUND
CP	CIRCULATING PUMP	EHD	EQUIVALENT HYDRAULIC DIAMETER	UR	URINAL
CFH	CUBIC FEET PER HOUR	HB	HOSE BIB	V	VENT
CONT.	CONTINUATION	IN.	INCH	VTR	VENT THROUGH ROOF
CW	DOMESTIC COLD WATER	INV.	INVERT	W	WASTE
DFU	DRAINAGE FIXTURE UNIT	IW	INDIRECT WASTE	W/	WITH
HW	DOMESTIC HOT WATER	LAV	LAVATORY	WB	WASHER BOX
DIA. / ø	DIAMETER	LPF	LITERS PER FLUSH	WC	WATER CLOSET
DN.	DOWN BELOW FLOOR LEVEL	MAX.	MAXIMUM	WCO	WALL CLEANOUT
DP	DROP IN FLOOR LEVEL	MIN.	MINIMUM	WH	WATER HEATER
DWG	DRAWING	MB	MOP BASIN	WHA	WATER HAMMER ARRESTOR
(E)	EXISTING	MV	MIXING VALVE	WSFU	WATER SUPPLY FIXTURE UNIT
EA.	EACH	(N)	NEW		

PLUMBING SYMBOLS

- NEW WORK
- EXISTING
- SANITARY PIPING
- SANITARY VENT PIPING
- DOMESTIC COLD WATER PIPING (CW — CW)
- DOMESTIC HOT WATER PIPING (HW — HW)
- DOMESTIC HOT WATER RETURN PIPING (HWR — HWR)
- DOMESTIC WATER METER (M)
- MIXING VALVE
- PIPE BREAK
- PIPE DROP IN MIDDLE
- PIPE RISER
- PIPE DROP
- PIPE CAP
- DIRECTION OF PIPE FLOW
- PIPE SLOPE (01)
- SAFETY RELIEF VALVE
- UNION

VALVE LEGEND

- SHUTOFF VALVE
- GLOBE VALVE
- BALL VALVE
- SWING CHECK VALVE
- PRESSURE REDUCING VALVE
- SAFETY RELIEF VALVE

REFERENCE LEGEND

- POINT OF CONNECTION BETWEEN NEW WORK AND EXISTING WORK
- POINT BETWEEN EXISTING WORK TO REMAIN AND EXISTING WORK TO BE REMOVED
- (X) KEY NOTE DESIGNATION
- (X) DEMOLITION NOTE DESIGNATION
- A / P-100 DETAIL LETTER/NUMBER DESIGNATION DRAWING NUMBER CONTAINING DETAIL
- TO BE DEMOLISHED

PLUMBING FIXTURE SCHEDULE (PLUMBER TO PROVIDE ALL NECESSARY COMPONENTS FOR A COMPLETE SYSTEM – FLEXIBLE CONNECTORS, PTRAPS, STOP VALVES, ETC)

UNIT NUMBER	MANUFACTURER	FIXTURE	MODEL NUMBER	MATERIAL	FAUCET	MATERIAL	C.W.	H.W.	WASTE	NOTES
ET	BELL & GOSSETT	EXPANSION TANK	PT-5	CARBON STEEL	–	–	3/4"	–	–	BRASS CONNECTION, BUTYL DIAPHRAGM, POLYPROPYLENE LINER, 2 GALLONS, 0.9 ACCEPTANCE GALLONS, NSF61
FD	J.R. SMITH	FLOOR DRAIN	2010-A	CAST IRON	–	–	–	–	2"	CAST IRON FLOOR DRAIN WITH 7" ADJUSTABLE NICKEL BRONZE TOP AND DEEP SEAL P-TRAP, PROVIDE PRO-SET "TRAP-GUARD" INSERT.
GT	J.R. SMITH	GREASE TRAP	800-T03-20	STEEL	–	–	–	–	3"	EXISTING GREASE TRAP WITH FLOW CONTROL FITTING TO BE REMOVED AND SALVAGED FOR REINSTALLATION
LV1	KOHLER	WALL MOUNT LAVATORY	K-1997-1	VITREOUS CHINA	K-10950	BRASS	3/8"	3/8"	1-1/4"	K-8998 P-TRAP, WALL HANGER, WHITE
LV2	KOHLER	CONCEALED ARM CARRIER LAVATORY	K-1997-1	VITREOUS CHINA	K-10950	BRASS	3/8"	3/8"	1-1/4"	K-8998 P-TRAP, WHITE, WATTS TCA-411-D BACK TO BACK FLOOR MOUNT CARRIER, 4" CHROME PLATED ESCUTCHEONS, WASTE LINE ACCESS
UR	KOHLER	WALL MOUNT URINAL	K-4991-ETSS	VITREOUS CHINA	–	–	3/4"	–	2"	ANTI-MICROBIAL FINISH, TOP SPUD, WHITE, ZURN 1.0 GPF SENSOR OPERATED URINAL FLUSH VALVE WITH 10 YEAR LONG LIFE BATTERY #ZTR6201-WS1
WC1	KOHLER	FLOOR MOUNT WATER CLOSET	K-96057-SS	VITREOUS CHINA	–	–	1"	–	4"	ANTI-MICROBIAL FINISH, TOP SPUD, WHITE, ZURN 1.6 GPF SENSOR OPERATED WATER CLOSET FLUSH VALVE WITH 10 YEAR LONG LIFE BATTERY #ZTR-6200
WC2	KOHLER	CONCEALED CARRIER WATER CLOSET	K-84325	VITREOUS CHINA	–	–	1"	–	4"	ANTI-MICROBIAL FINISH, TOP SPUD, WHITE, ZURN 1.6 GPF SENSOR OPERATED WATER CLOSET FLUSH VALVE WITH 10 YEAR LONG LIFE BATTERY #ZTR-6200, WATTS BACK TO BACK 750 LB CLOSET CARRIER #SCA-123-D
WH1	RHEEM	WATER HEATER	6E724							EXISTING WATER HEATER TO BE REMOVED AND SALVAGED FOR REINSTALLATION, 80 GALLONS, 2 @ 4,500 WATT ELEMENTS FOR NON-SIMULTANEOUS OPERATION (WOMEN'S RESTROOM)
WH2	RHEEM	WATER HEATER	XE50M06ST45U0							EXISTING WATER HEATER TO BE REMOVED AND SALVAGED FOR REINSTALLATION, 50 GALLONS, 2 @ 4,500 WATT ELEMENTS FOR NON-SIMULTANEOUS OPERATION

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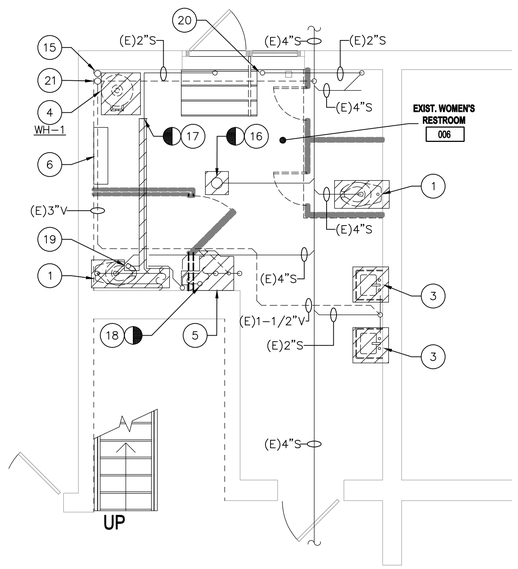

1 PD-101 WOMEN'S RESTROOM ENLARGED PLAN SANITARY AND VENT – DEMOLITION

SCALE: 1/4" = 1'-0"

0 2 4 6 8 10

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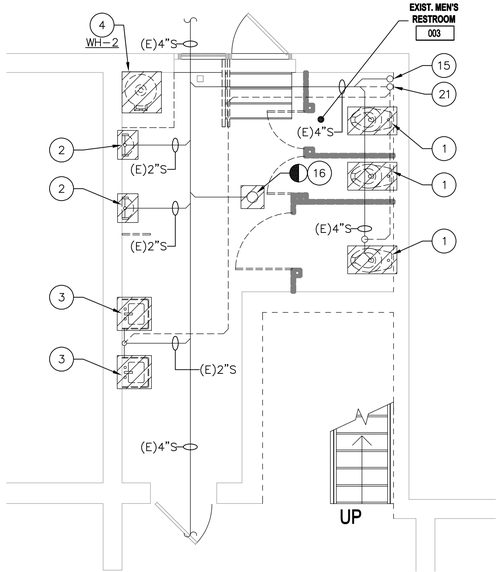

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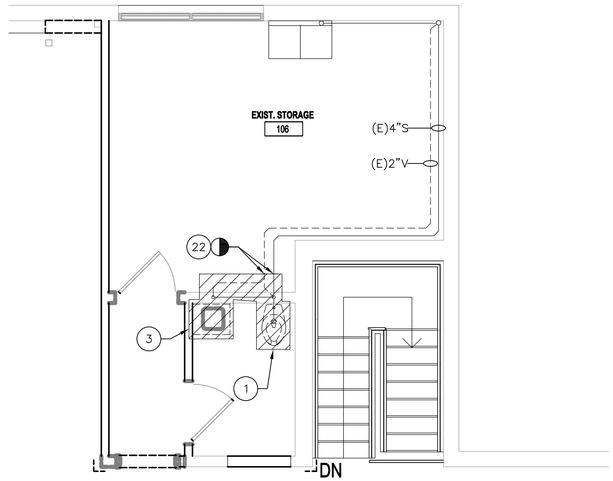

3 PD-101 FIRST FLOOR RESTROOM ENLARGED PLAN SANITARY AND VENT – DEMOLITION

SCALE: 1/4" = 1'-0"

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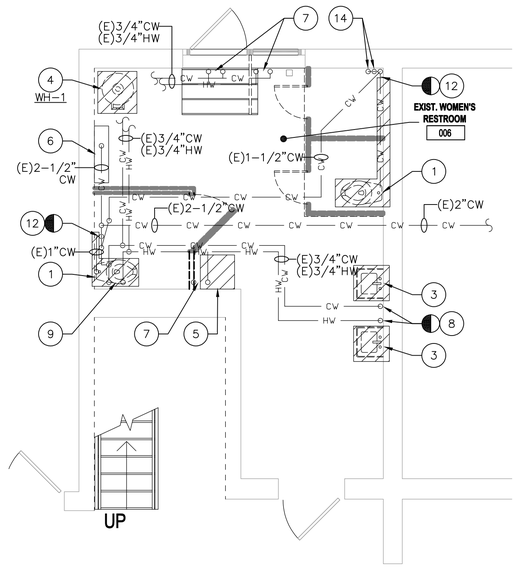

4 PD-101 WOMEN'S RESTROOM ENLARGED PLAN WATER – DEMOLITION

SCALE: 1/4" = 1'-0"

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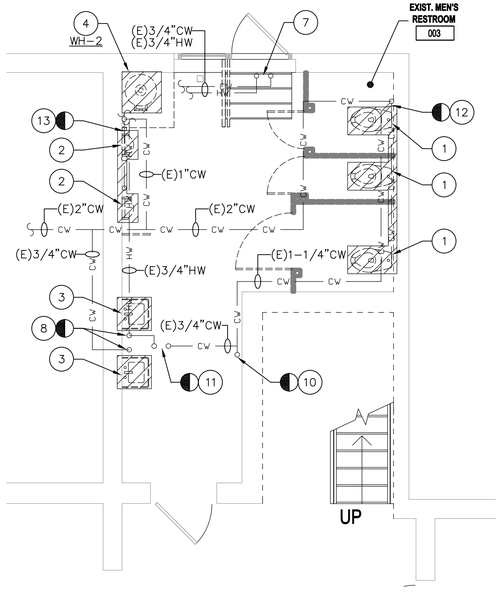

5 PD-101 MEN'S RESTROOM ENLARGED PLAN WATER – DEMOLITION

SCALE: 1/4" = 1'-0"

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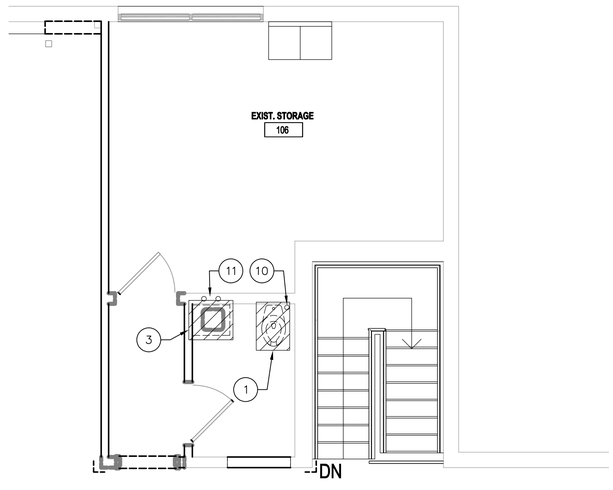

6 PD-101 FIRST FLOOR RESTROOM ENLARGED PLAN WATER – DEMOLITION

SCALE: 1/4" = 1'-0"

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N

DEMOLITION GENERAL NOTES:

1. REMOVE PIPING/INSULATION AS REQUIRED TO ACCOMMODATE THE NEW LAYOUT.

DEMOLITION KEYNOTES:

1. REMOVE EXISTING FLOOR MOUNTED WATER CLOSET, BATTERY OPERATED FLUSHOMETER, AND ACCESSORIES. DISCONNECT WATER AND SANITARY PIPING AND REMOVE AS REQUIRED TO ACCOMMODATE NEW INSTALLATION.
2. REMOVE EXISTING WALL HUNG URINAL, BATTERY OPERATED FLUSHOMETER, MOUNTING HARDWARE, AND ACCESSORIES. DISCONNECT WATER AND SANITARY PIPING AND REMOVE AS REQUIRED TO ACCOMMODATE NEW INSTALLATION.
3. REMOVE EXISTING WALL HUNG LAVATORY, FAUCET, MOUNTING HARDWARE, AND ACCESSORIES. DISCONNECT WATER AND SANITARY PIPING.
4. REMOVE AND SALVAGE EXISTING WATER HEATER FOR REINSTALLATION. REFER TO RISER DIAGRAMS FOR PIPING DEMOLITION.
5. REMOVE AND SALVAGE EXISTING GREASE TRAP FOR REINSTALLATION. REMOVE DISCHARGE PIPING AND VENT TO CONNECTION WITH MAINS AND CAP. SALVAGE EXISTING FLOW CONTROL FITTING FOR REINSTALLATION.
6. EXISTING WATER SERVICE TO REMAIN.
7. EXISTING ¾" COLD AND HOT WATER UP TO SINK TO REMAIN.
8. EXISTING COLD AND HOT WATER ON WALL DOWN TO LAVATORIES TO BE REMOVED TO 6 FEET ABOVE FLORO LEVEL.
9. EXISTING ¾" COLD AND HOT WATER UP TO MOP RECEPTOR TO REMAIN.
10. REMOVE EXISTING 1" COLD WATER UP FROM BASEMENT TO WATER CLOSET TO BELOW THE FLOOR.
11. REMOVE EXISTING ¾" COLD AND HOT WATER UP FROM BASEMENT TO LAVATORY TO BELOW THE FIRST FLOOR.
12. REMOVE EXISTING COLD WATER ON WALL SERVING WATER CLOSETS.
13. REMOVE EXISTING COLD WATER ON WALL SERVING URINALS.
14. EXISTING COLD WATER DROPS DOWN TO BELOW THE FLOOR TO REMAIN. (1" SERVING POOL AND ¾" SERVING PUMP HOUSE).
15. EXISTING RAIN WATER CONDUCTOR TO REMAIN.
16. REMOVE EXISTING FLOOR DRAIN.
17. REMOVE EXISTING SANITARY FROM INLET OF GREASE TRAP TO POINT INDICATED.
18. REMOVE EXISTING SANITARY FROM INLET OF GREASE TRAP TO POINT OF FIRST FLOOR PENETRATION.
19. EXISTING SANITARY FROM MOP RECEPTOR TO REMAIN.
20. EXISTING SANITARY FROM SINK TO REMAIN.
21. EXISTING 4" VENT UP FROM BELOW SLAB CONTINUING TO ROOR TO REMAIN.
22. REMOVE EXISTING SANITARY AND VENT TO POINT INDICATED

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Keystone ENGINEERING GROUP

SEAL:

CURTIS L. JAMES LICENSE No. 19096 DELAWARE PROFESSIONAL ENGINEER

10/15/2025

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: 19096, EXP DATE: 06/30/2026.

PROJECT:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
WWW.NEWARKDE.GOV
@CityofNewarkDE

PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	PJS
DRAWN BY:	PJS
CHECKED BY:	CLJ

DRAWING TITLE:

FLOOR PLANS - DEMOLITION - PLUMBING

SHEET NUMBER:

PD-101

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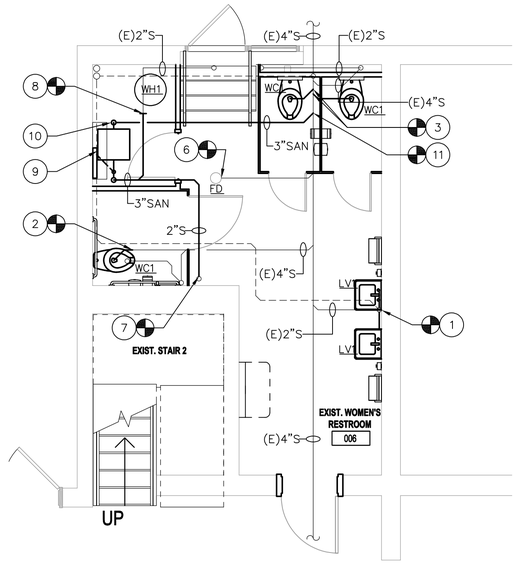
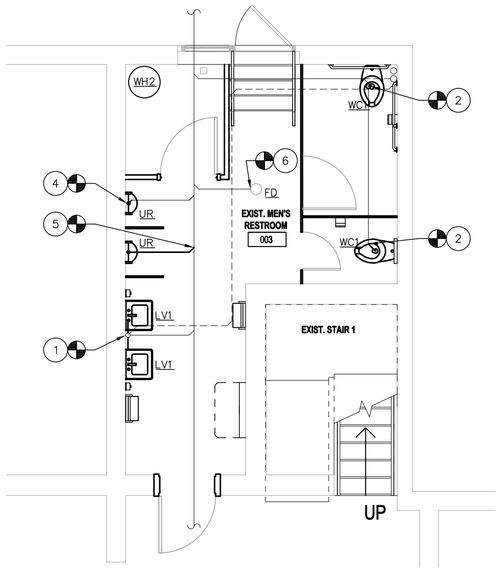
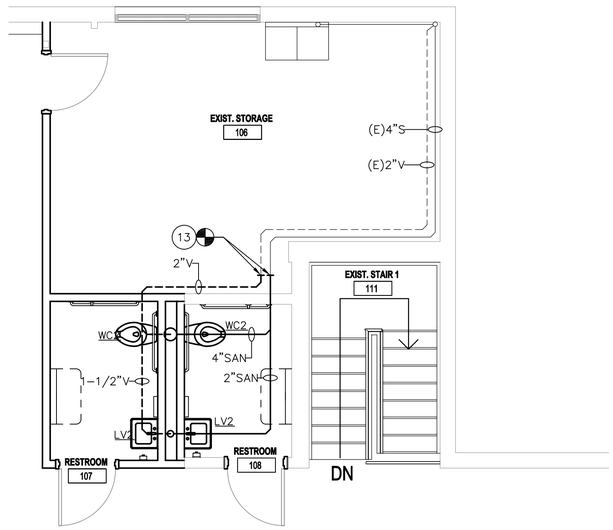


1 P-101 WOMEN'S RESTROOM ENLARGED PLAN
SANITARY AND VENT – NEW WORK
SCALE: 1/4" = 1'-0"



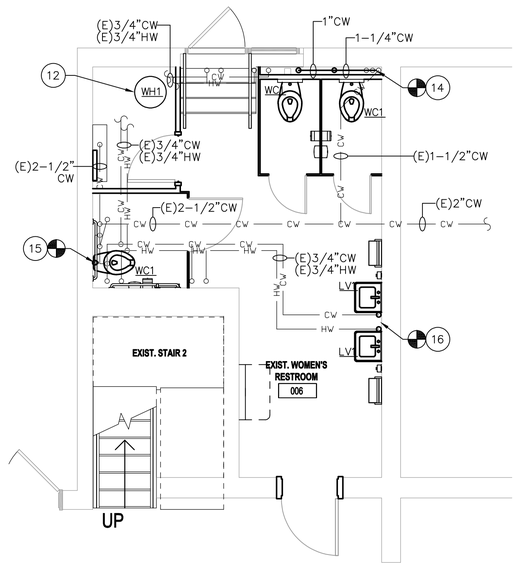
2 P-101 MEN'S RESTROOM ENLARGED PLAN
SANITARY AND VENT – NEW WORK
SCALE: 1/4" = 1'-0"



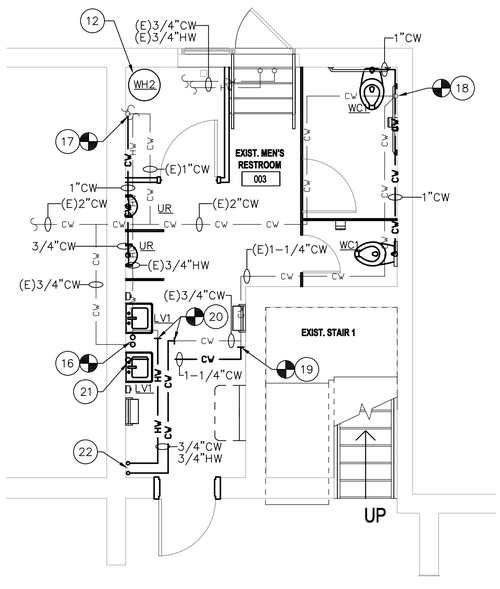
3 P-101 FIRST FLOOR RESTROOM ENLARGED PLAN
SANITARY AND VENT – NEW WORK
SCALE: 1/4" = 1'-0"

KEYNOTES:

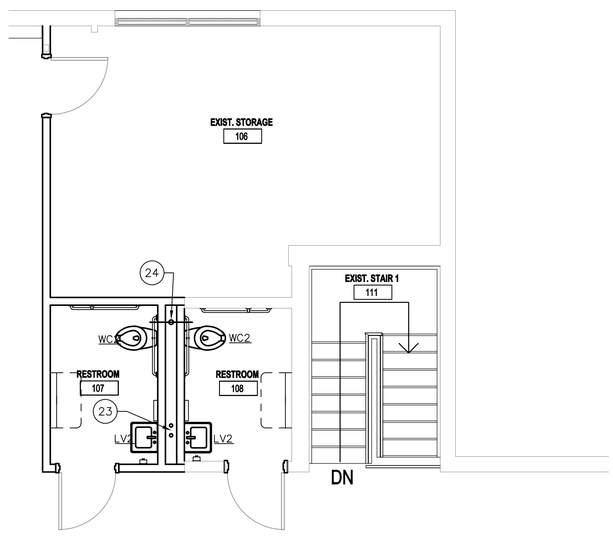
1. CONNECT (2) NEW LAVATORIES TO EXISTING DRAIN AND VENT. OFFSET/MODIFY EXISTING DRAIN AND VENT AS REQUIRED.
2. CONNECT NEW WATER CLOSET TO EXISTING SANITARY PIPING WHERE EXISTING WATER CLOSET WAS REMOVED. MODIFY EXISTING SANITARY PIPING AS REQUIRED.
3. CONNECT NEW WATER CLOSET TO EXISTING SANITARY PIPING MAIN.
4. CONNECT NEW URINAL TO EXISTING SANITARY PIPING WHERE EXISTING URINAL WAS REMOVED. MODIFY EXISTING SANITARY PIPING AS REQUIRED.
5. CONNECT NEW URINAL TO EXISTING SANITARY PIPING MAIN.
6. CONNECT NEW FLOOR DRAIN TO EXISTING SANITARY.
7. CONNECT NEW SANITARY TO DROP FROM SINK ABOVE. ROUTE AT CEILING LEVEL TO INLET OF REINSTALLED GREASE TRAP AS SHOWN.
8. CONNECT NEW SANITARY TO EXISTING AND ROUTE AT CEILING LEVEL TO REINSTALLED GREASE TRAP AS SHOWN.
9. REINSTALLED GREASE TRAP ON SHELF ABOVE EXISTING WATER SERVICE. PLUMBER TO PROVIDE SHELF/SUPPORT AS REQUIRED WHILE MAINTAINING ACCESS TO WATER SERVICE. COORDINATE GREASE TRAP AND SHELF WITH DOOR SWING.
10. DISCHARGE FROM GREASE TRAP DOWN TO BELOW FLOOR LEVEL.
11. CONNECT GREASE TRAP DISCHARGE TO EXISTING SANITARY MAIN.
12. REINSTALL SALVAGED WATER HEATER. SEE RISER DIAGRAM FOR ADDITIONAL PIPING.
13. CONNECT NEW SANITARY AND VENT TO EXISTING.
14. CONNECT NEW COLD WATER TO EXISTING TO SERVE WATER CLOSETS.
15. CONNECT NEW WATER CLOSET TO EXISTING COLD WATER. MODIFY COLD WATER PIPING AS REQUIRED.
16. CONNECT NEW LAVATORIES TO EXISTING COLD AND HOT WATER DROPS ON WALL. MODIFY COLD AND HOT WATER PIPING AS REQUIRED.
17. CONNECT NEW COLD WATER TO EXISTING THAT PREVIOUSLY SERVED URINALS AND ROUTE TO NEW URINALS.
18. CONNECT TWO NEW COLD WATERS TO EXISTING DROP AND ROUTE TO WATER CLOSETS.
19. CONNECT NEW CW TO EXISTING AND EXTEND TO SERVE TWO NEW WATER CLOSETS ON FIRST FLOOR.
20. CONNECT NEW CW AND HW TO EXISTING ADN EXTEND TO SERVE TWO NEW LAVATORIES ON FIRST FLOOR.
21. CW UP TO WATER CLOSETS ON FIRST FLOOR.
22. CW AND HW UP TO LAVATORIES ON FIRST FLOOR.
23. ¾"CW AND HW UP FROM BELOW.
24. 1–1/4"CW UP FROM BELOW.



4 P-101 WOMEN'S RESTROOM ENLARGED PLAN
WATER – NEW WORK
SCALE: 1/4" = 1'-0"



5 P-101 MEN'S RESTROOM ENLARGED PLAN
WATER – NEW WORK
SCALE: 1/4" = 1'-0"



6 P-101 FIRST FLOOR RESTROOM ENLARGED PLAN
WATER – NEW WORK
SCALE: 1/4" = 1'-0"

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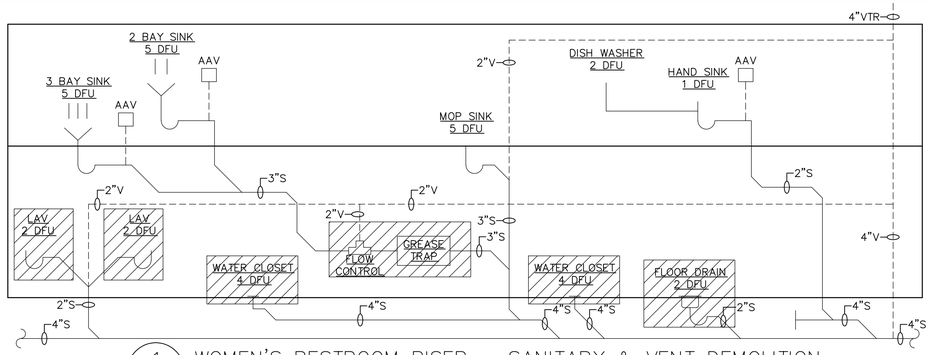
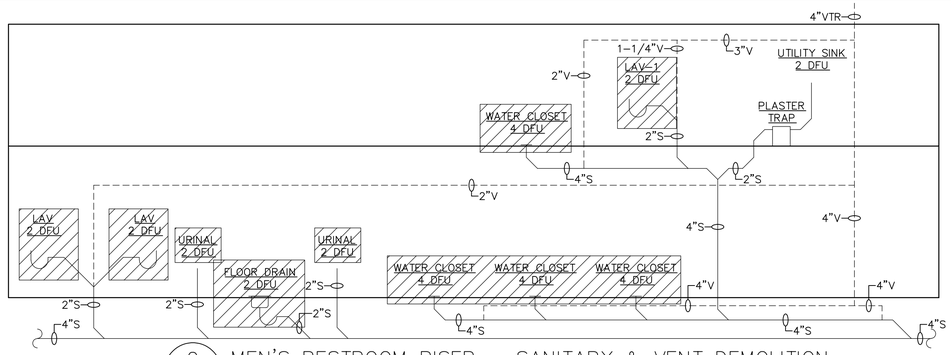


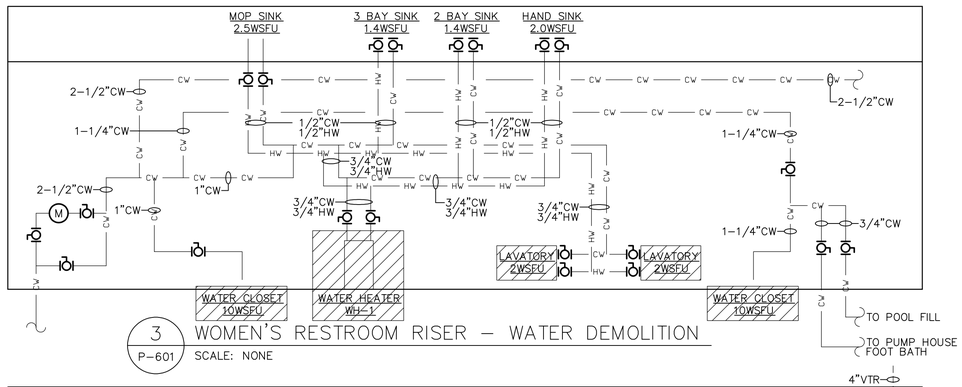
1 P-601 WOMEN'S RESTROOM RISER – SANITARY & VENT DEMOLITION

SCALE: NONE



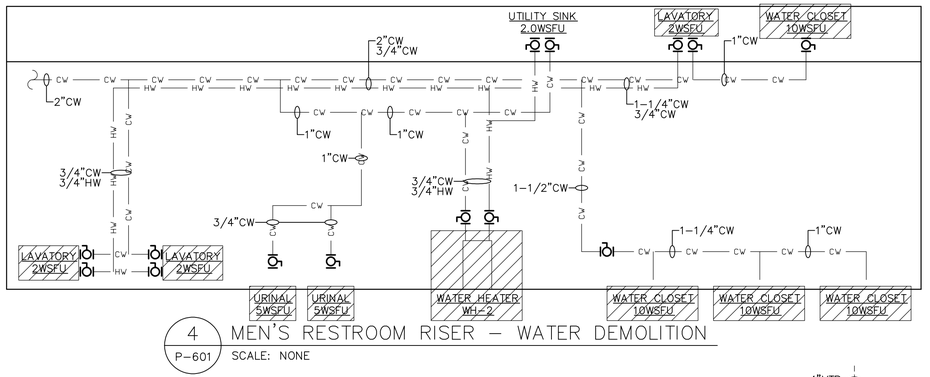
2 P-601 MEN'S RESTROOM RISER – SANITARY & VENT DEMOLITION

SCALE: NONE



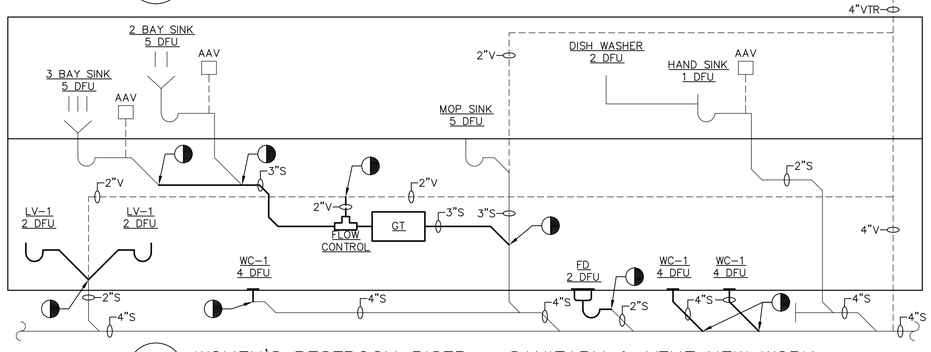
3 P-601 WOMEN'S RESTROOM RISER – WATER DEMOLITION

SCALE: NONE



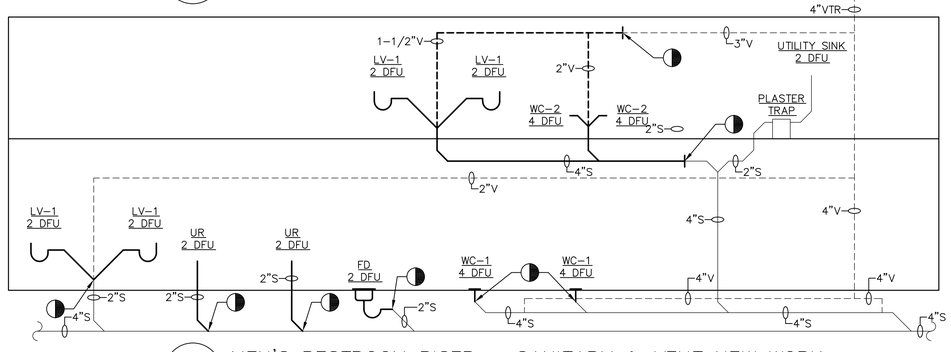
4 P-601 MEN'S RESTROOM RISER – WATER DEMOLITION

SCALE: NONE



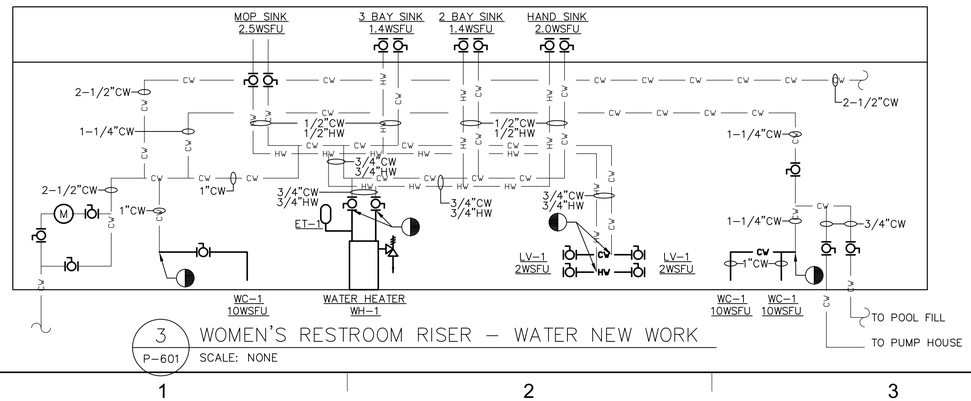
1 P-601 WOMEN'S RESTROOM RISER – SANITARY & VENT NEW WORK

SCALE: NONE



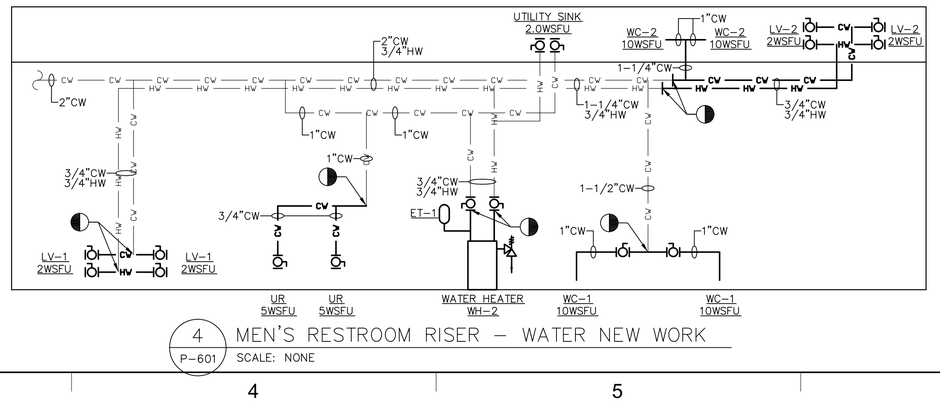
2 P-601 MEN'S RESTROOM RISER – SANITARY & VENT NEW WORK

SCALE: NONE



3 P-601 WOMEN'S RESTROOM RISER – WATER NEW WORK

SCALE: NONE



4 P-601 MEN'S RESTROOM RISER – WATER NEW WORK

SCALE: NONE

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RISERS - PLUMBING

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POWER SYMBOLS

RECEPTACLES MOUNTED 36" AFF UNLESS OTHERWISE NOTED

FLOOR BOX	WALL MOUNTED	
X	X	DUPLEX RECEPTACLE X=CIRCUIT (TYP. ALL)
		RECEPTACLE–SINGLE
		DOUBLE DUPLEX RECEPTACLE
		DATA OUTLET
		TELEPHONE OUTLET
	X	SPECIAL PURPOSE RECEPTACLE X = VOLTAGE OR PURPOSE
C		COUNTERTOP POWER STRIP
J		JUNCTION OR PULL BOX
R1		MOTOR STARTER R1 = DESIGNATION
		DISCONNECT SWITCH
		HOA SWITCH
		STOP/LOCKOUT
		EMERGENCY POWER SHUT–OFF SWITCH
X		MOTOR X = HORSEPOWER

ABBREVIATIONS

3P	3 POLE
3R	NEMA 3R
4X	NEMA 4X
A	AMP
AC	ALTERNATING CURRENT
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GUAGE
BLDG	BUILDING
CKT	CIRCUIT
CMD	COMMAND
CP	CONTROL PANEL
DIA	DIAMETER
DIV	DIVISION
DS	DISCONNECT SWITCH
EUH	ELECTRIC UNIT HEATER
EXP	EXPLOSION PROOF (NEMA 8)
FDBK	FEEDBACK
FVNR	FULL VOLTAGE NON REVERSING
FVR	FULL VOLTAGE REVERSING
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
HOA	HAND–OFF–AUTOMATIC
HP	HORSE POWER
HVAC	HEAT–VENT–AIR CONDITIONING
JB	JUNCTION BOX
KA	KILOAMPERE
KCMIL	1000 CIRCULAR MILS
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
LTG	LIGHTING
MAX	MAXIMUM
MC	MANUFACTURER'S CABLE
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MFR	MANUFACTURER
MIN	MINIMUM
MS	MOTOR STARTER
N	NEUTRAL
N/A	NOT APPLICABLE
N.C.	NORMALLY CLOSED
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
N.O.	NORMALLY OPEN
No.	NUMBER
ϕ	PHASE
PH	PHASE
PNL	PANEL
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RGS	RIGID GALVANIZED STEEL
RVSS	REDUCED VOLTAGE SOLID STATE
SP	SPARE
SS	STAINLESS STEEL
STP	SHIELDED TWISTED PAIR
TYP.	TYPICAL
TVSS	TRANSIENT VOLTAGE SURGE SUPRESSION
U.O.N.	UNLESS OTHERWISE NOTED
V	VOLT
VAC	VOLTS ALTERNATING CIRCUIT
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE
WPIU	WEATHERPROOF IN–USE
WR	WEATHER RESISTANT
XFMR	TRANSFORMER

LIGHTING SYMBOLS

X	LIGHTING FIXTURE X = TYPE
	CEILING MOUNTED SPOT FIXTURE X = TYPE
X	EMERGENCY LIGHT X = TYPE
X	EXIT SIGN X = TYPE (WHERE THE ARROW INDICATES THE PATH OF EGRESS AND THE SHADED TRIANGLES INDICATE THE FACE WITH "EXIT" DISPLAYED)
X	REMOTE EMERGENCY HEAD X = TYPE
X	EXTERIOR WALL MOUNTED FIXTURE X = TYPE
X	EXTERIOR POLE MOUNTED FIXTURE X = TYPE
X X	EXTERIOR POLE MOUNTED DOUBLE ARM FIXTURE X = TYPE

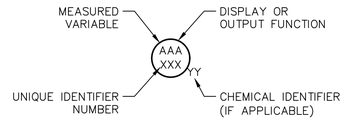
FIRE ALARM DEVICES

SD	SMOKE DETECTOR
F	FIRE ALARM PULL STATION
	FIRE ALARM HORN AND STROBE
	FIRE ALARM STROBE

SECURITY DEVICES

SC	SECURITY CAMERA

INSTRUMENT SYMBOL DECODER



FIRST LETTER 'A'		SUCCEEDING LETTERS 'B'
MEASURED VARIABLE		DISPLAY OR OUTPUT FUNCTION
A	ANALYZER	ALARM
B	BURNER	–
C	–	CONTROL
D	DIFFERENTIAL	DIFFERENTIAL
E	VOLTAGE	PRIMARY ELEMENT
F	FLOW RATE	–
G	–	GLASS
H	HAND	HIGH
I	CURRENT	INDICATE
J	POWER	SCAN
K	TIME	CONTROL STATION
L	LEVEL	LOW/LIGHT
M	MALFUNCTION	MIDDLE
N	TURBIDITY	–
O	–	ORIFICE
P	PRESSURE	–
Q	QUANTITY	INTEGRATE/TOTALIZE
R	REMOTE	RECORD/PRINT
S	SPEED/FREQUENCY	SWITCH
T	TEMPERATURE	TRANSMIT
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION	VALVE
W	WEIGHT	–
X	LIMIT	RELAY
Y	STATUS	COMPUTING OR SIGNAL CONVERTING
Z	POSITION	DRIVE/ACTUATE

CIRCUITING AND RACEWAY SYMBOLS

[CIRCUIT SIZE] XXX LPB–3 XXX	CIRCUIT DESIGNATOR, WHERE 'XXX' REPRESENTS THE CIRCUIT NUMBER AND [CIRCUIT SIZE] REPRESENTS CIRCUIT COMPOSITION, SEE THE CIRCUIT DECODER HOMERUN LPB–3 = LIGHTING PANEL "B", CIRCUIT 3 XXX = CONDUIT NUMBER
	EXISTING CONDUIT
	NEW, ABOVEGROUND CONDUIT
	NEW, UNDERGROUND CONDUIT
	UNDERGROUND ELECTRICAL DUCT BANK
	BARE COPPER GROUND CONDUCTOR, 2/0 UNLESS OTHERWISE NOTED
	SITE PLAN POWER OR UTILITY POLE
	CADWELD OR MECHANICAL BONDING
	GROUND ROD
	GROUNDING TEST WELL
	AIR TERMINAL

SWITCHING SYMBOLS

MOUNTED 48" AFF UNLESS OTHERWISE NOTED

S	SINGLE POLE WALL SWITCH
S_2	DPDT WALL SWITCH
S_3	3–WAY WALL SWITCH
S_4	4–WAY WALL SWITCH
S_D	DIMMER SWITCH
S_P	SWITCH WITH PILOT
S_M	MANUAL MOTOR STARTER SWITCH
S_{OS}	OCCUPANCY SENSOR SWITCH
S_K	KEY–OPERATED SWITCH
S_{XP}	EXPLOSION PROOF SWITCH
PC	PHOTO ELECTRIC CONTROL
OS	OCCUPATION SENSOR, CEILING MOUNTED
PP	POWER PACK
R1	LIGHTING CONTACTOR R1 = DESIGNATION
LC–1	LIGHTING CONTACTOR REMOTE PUSH BUTTON ON–OFF CONTROL LC–1 = CONTACTOR CONTROLLED
DA	DOOR ACCESS

CIRCUIT DECODER

3/4"C. 4#12, #12 GND	3/4" CONDUIT WITH (4) 12 AWG CONDUCTORS I.E., (3) PHASE AND (1) NEUTRAL, WITH (1) 12 AWG EQUIPMENT GROUNDING CONDUCTOR
(4) 4"C. 3#350, #350N, #4/0 GND EA	FOUR 4" CONDUITS WITH PARALLEL SETS OF THREE 350 KCMIL PHASE CONDUCTORS, A 350 KCMIL NEUTRAL CONDUCTOR AND A #4/0 AWG GROUND IN EACH
(2) TC 3#500, #1 GND & #1/0 GND	TWO TRAY CABLES, 3#500 KCMIL PHASE AND #1 GND WITH A SUPPLEMENTAL #1/0 GND RUN ALONG WITH THE CABLES IN THE TRAY
1"C. 1–STP	1" CONDUIT WITH ONE SHIELDED TWISTED PAIR CABLES
1"C. (1) 12–FOC	1" CONDUIT WITH ONE 12 STRAND FIBER OPTIC CABLE
1"C. (1) 8PR#16	1" CONDUIT WITH ONE 8 PAIR UNSHIELDED TWISTED PAIR CABLES
2"C. (2) 4PR#18 STP	2" CONDUIT WITH TWO 4 PAIR SHIELDED TWISTED PAIR CABLES
CBM	CABLE BY MANUFACTURER

GENERAL NOTES:

1. ALL ELECTRICAL EQUIPMENT AND INSTALLATIONS SHALL CONFORM WITH THE REQUIREMENTS OF LATEST APPLICABLE VERSION OF THE INTERNATIONAL BUILDING CODE (IBC) AND NATIONAL ELECTRICAL CODE (NFPA 70) AS ADOPTED BY THE AUTHORITY HAVING JURISDICTION (AHJ), AND UNDERWRITER'S LABORATORIES (UL) REQUIREMENTS.
2. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER. REFER TO NECA 1 – GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION AND OTHER APPLICABLE NECA STANDARDS. CONDUIT PLANS ARE DIAGRAMMATIC IN NATURE AND NOT INTENDED TO SHOW ALL TURNS, BENDS, FITTINGS, AND SPECIAL INTRICACIES. THIS DOES NOT LIMIT CONTRACTOR'S LIABILITY FOR THE INSTALLATION OF A SOUND AND COMPLETE SYSTEM THAT COMPLIES WITH THE NEC AND LOCAL CODES AND REGULATIONS.
3. PRIOR TO PURCHASING ANY MATERIALS OR COMMENCING WORK, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, CONDUIT SIZES AND LOCATIONS, EQUIPMENT, ETC. SHOWN ON THE DRAWINGS OR AFFECTING THIS WORK AND SHALL REPORT ANY DEVIATIONS TO THE ENGINEER.
4. COORDINATE ALL WORK WITH STRUCTURAL, MECHANICAL, AND OTHER CRAFTS AS REQUIRED. CONTRACTOR SHALL BECOME FAMILIAR WITH ALL WORK SHOWN ON OTHER DRAWINGS FOR VARIOUS ASPECTS OF THIS PROJECT AND COORDINATE ACCORDINGLY.
5. PROVIDE ALL LABOR, MATERIAL, AND EQUIPMENT COMPLETELY TO PROVIDE FULLY OPERATIONAL SYSTEMS.
6. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
7. WHERE CONDUIT SIZE AND FILL IS NOT DEFINED ON THE SINGLE LINE OR INTERCONNECTION DIAGRAM, PROVIDE 3/4" CONDUIT WITH 2#12 AWG AND #12 AWG GROUND CONDUCTORS FOR SINGLE PHASE AND 3/4" CONDUIT WITH 3#12 AWG AND #12 AWG GROUND CONDUCTOR FOR 3 PHASE.
8. ALL 120V OR GREATER WIRING FOR DEDICATED OR MULTIPLE CIRCUITS IN THE SAME RACEWAY SHALL INCLUDE AN EQUIPMENT GROUNDING CONDUCTOR.
9. FOR OVERALL FLOOR PLAN, SEE DRAWING A–101.

MECHANICAL/PLUMBING COORDINATION:

1. CONTRACTOR SHALL COORDINATE CHARACTERISTICS AND REQUIREMENTS OF ALL MECHANICAL AND PLUMBING EQUIPMENT WITH ELECTRICAL DRAWINGS PRIOR TO ORDERING OR INSTALLING EQUIPMENT. CONTRACTOR SHALL FURNISH EQUIPMENT COMPATIBLE FOR THE VOLTAGES SHOWN ON THE MECHANICAL/PLUMBING DRAWINGS.
2. ALL MECHANICAL AND PLUMBING EQUIPMENT REQUIRING ELECTRICAL POWER SHALL BE INSTALLED WITH DISCONNECT SWITCHES AT EACH PIECE OF EQUIPMENT. COORDINATE SWITCH TYPE (FUSED OR NON–FUSED) WITH EQUIPMENT CHARACTERISTICS, MANUFACTURER'S RECOMMENDATIONS, AND THE MECHANICAL/PLUMBING DRAWINGS.

DEMOLITION AND MODIFICATION

	EXISTING
	NEW
	TO BE MODIFIED HATCH
	DEMOLITION HATCH

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Keystone ENGINEERING GROUP

SEAL:

CURTIS L. JAMES LICENSE NO. 19096 PROFESSIONAL ENGINEER DELAWARE

10/15/2025

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: 19096, EXP. DATE: 06/30/2026.

PROJECT:

GEORGE WILSON CENTER IMPROVEMENTS

FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
302-366-7000
WWW.NEWARKDE.GOV
@CityofNewarkDE

PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	JPY
DRAWN BY:	JPY
CHECKED BY:	CLJ

DRAWING TITLE:

LEGEND - ELECTRICAL

SHEET NUMBER:

E-001

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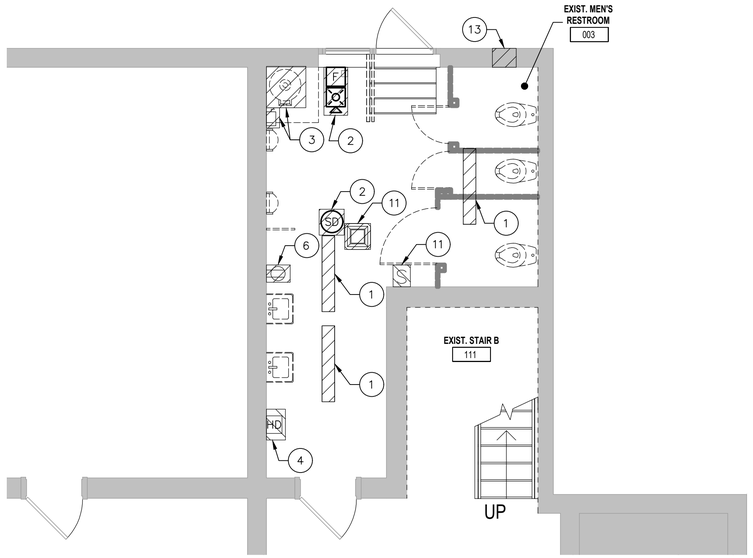
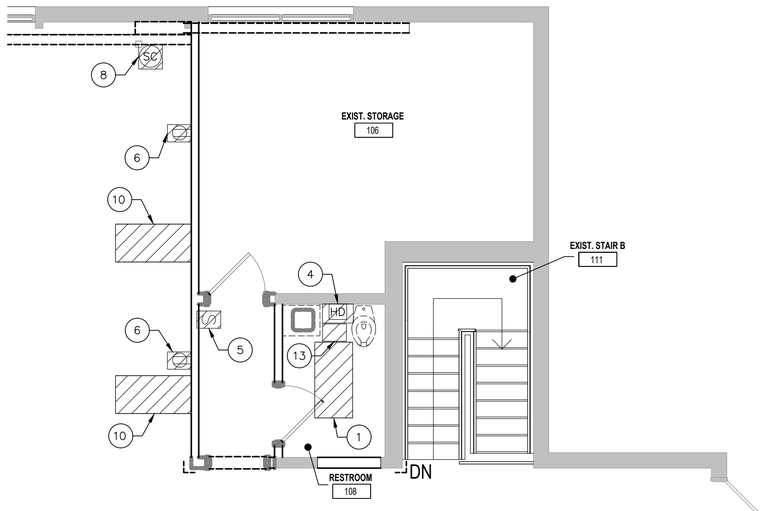
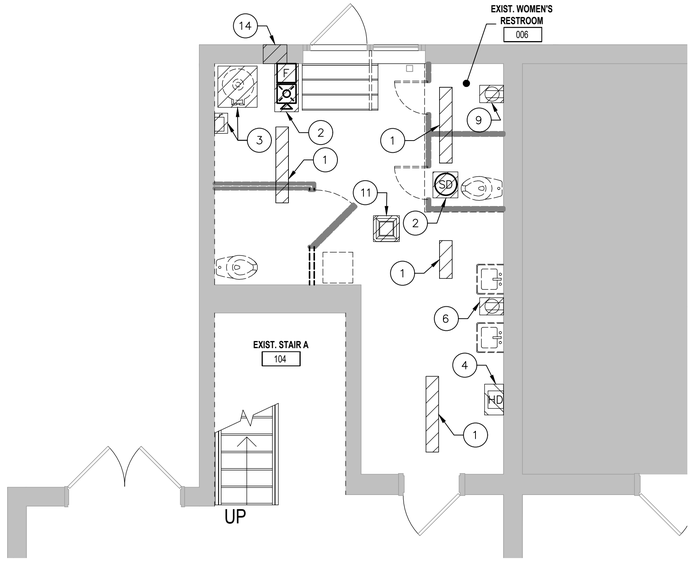


1 ED101 MEN'S RESTROOM ENLARGED PLAN – DEMOLITION
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10

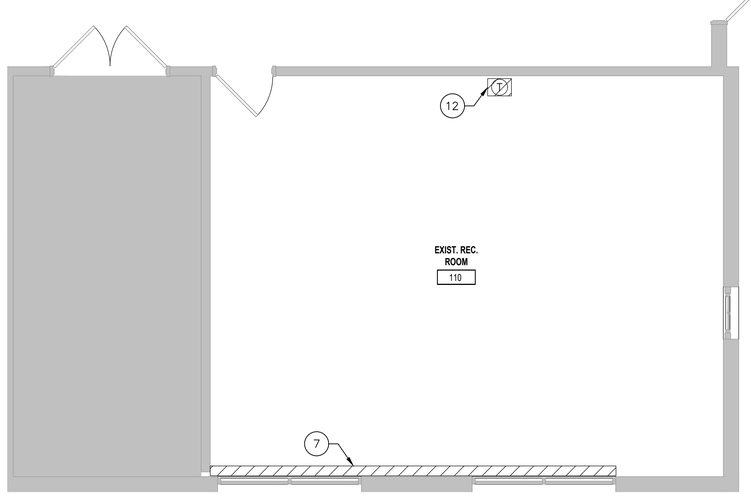
N





2 ED101 WOMEN'S RESTROOM ENLARGED PLAN – DEMOLITION
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10

N



3 ED101 FIRST FLOOR ENLARGED PLAN – DEMOLITION
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10

N

DEMOLITION KEYNOTES:

1. DISCONNECT AND REMOVE LIGHTING FIXTURES. PREPARE BRANCH CIRCUIT TO SERVE NEW LIGHTING FIXTURES.
2. FIRE ALARM DEVICE TO BE RELOCATED. FIRE ALARM PROVIDED UNDER SEPARATE CONTRACT.
3. DISCONNECT EXISTING WATER HEATER. REMOVE DISCONNECT AND MC CABLE SERVING WATER HEATER. REMOVE SUPPORT HARDWARE. MAKE ELECTRICALLY SAFE AND PREPARE EXISTING BRANCH CIRCUIT TO SERVE RELOCATED WATER HEATER.
4. DISCONNECT AND REMOVE HAND DRYER. PROVIDE JUNCTION BOX, COVER SUPPORT HARDWARE, FASTENERS, AND SPLICING HARDWARE TO MAKE ELECTRICALLY SAFE FOR FUTURE USE. LABEL CONDUCTORS WITH SERVING PANELBOARD NAME. LABEL CONDUCTORS IN PANELBOARD WITH END POINT.
5. DISCONNECT AND REMOVE TOGGLE SWITCH SERVING STORAGE AREA. PREPARE BRANCH CIRCUIT FOR NEW TOGGLE SWITCH LOCATION. SEE SHEET E–101.
6. DISCONNECT AND REMOVE EXISTING DUPLEX RECEPTACLE. PREPARE BRANCH CIRCUIT FOR NEW RECEPTACLE LOCATION. REFER TO SHEET E–101.
7. DISCONNECT AND REMOVE ELECTRIC BASEBOARD HEAT. PROVIDE JUNCTION BOX WITH COVER, CAP CONDUCTORS, AND MAKE ELECTRICALLY SAFE. PATCH AND PAINT WALL AS REQUIRED.
8. SECURITY CAMERA DEVICE TO BE RELOCATED. SECURITY CAMERA PROVIDED UNDER SEPARATE CONTRACT.
9. DISCONNECT AND REMOVE RECEPTACLE. REMOVE CONDUCTORS, CONDUIT, CONDUIT FITTINGS, OUTLET BOXES, JUNCTION BOXES, FASTENERS, AND SUPPORT HARDWARE BACK TO SOURCE.
10. DISCONNECT AND REMOVE LIGHTING FIXTURES. REMOVE CONDUCTORS, FASTENERS, AND SUPPORT HARDWARE. PROVIDE JUNCTION BOX, COVER, SUPPORT HARDWARE, FASTENERS, AND SPLICING HARDWARE TO MAKE ELECTRICALLY SAFE. LABEL JUNCTION BOX ABOVE CEILING WITH SERVING PANELBOARD NAME AND CIRCUIT NUMBER.
11. DISCONNECT AND DE–ENERGIZE UNIT HEATERS, MAINTENANCE SWITCH, AND THERMOSTAT. PREPARE BRANCH CIRCUIT TO SERVE NEW ELECTRIC UNIT HEATER. REFER TO SHEET E–101.
12. DISCONNECT AND REMOVE THERMOSTAT AND ACCESSORIES. PROVIDE COVER AND MAKE ELECTRICALLY SAFE.
13. DISCONNECT AND REMOVE EXHAUST FAN, THERMOSTAT AND ACCESSORIES. PREPARE BRANCH CIRCUIT TO SERVE NEW EXHAUST FAN.
14. DISCONNECT AND REMOVE EXHAUST FAN, THERMOSTAT, AND MOUNTING HARDWARE. PREPARE BRANCH CIRCUIT TO SERVE NEW EXHAUST FAN IN NEW LOCATION. PATCH OPENING. SEE SHEET E–101.

GENERAL NOTES:

1. REFER TO SHEET E–101 FOR LOCATIONS OF PANELBOARDS.
2. REFER TO ARCHITECTURAL DRAWINGS FOR COMPLETE FLOOR PLANS.

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SEAL:

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10/15/2025

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FACILITY RENOVATIONS
CONTRACT NO.25-01

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DRAWN BY:	JPY
CHECKED BY:	CLJ

DRAWING TITLE:
ENLARGED ELECTRICAL FLOOR PLANS - DEMOLITION

SHEET NUMBER:
ED-101

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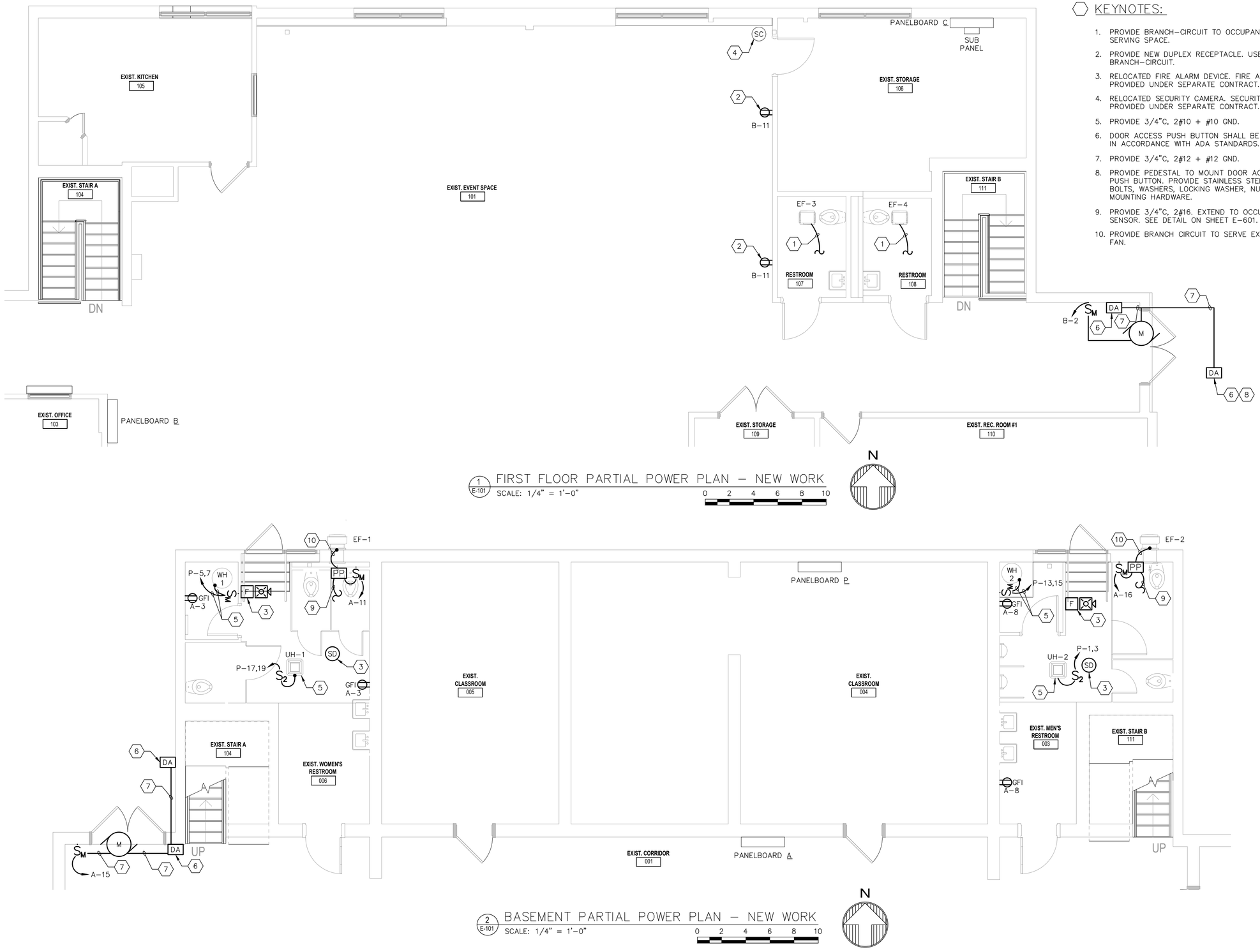

1 E-101 FIRST FLOOR PARTIAL POWER PLAN – NEW WORK
SCALE: 1/4" = 1'-0"

2 E-101 BASEMENT PARTIAL POWER PLAN – NEW WORK
SCALE: 1/4" = 1'-0"

KEYNOTES:

1. PROVIDE BRANCH-CIRCUIT TO OCCUPANCY SENSOR SERVING SPACE.
2. PROVIDE NEW DUPLEX RECEPTACLE. USE EXISTING BRANCH-CIRCUIT.
3. RELOCATED FIRE ALARM DEVICE. FIRE ALARM PROVIDED UNDER SEPARATE CONTRACT.
4. RELOCATED SECURITY CAMERA. SECURITY CAMERA PROVIDED UNDER SEPARATE CONTRACT.
5. PROVIDE 3/4"C, 2#10 + #10 GND.
6. DOOR ACCESS PUSH BUTTON SHALL BE MOUNTED IN ACCORDANCE WITH ADA STANDARDS.
7. PROVIDE 3/4"C, 2#12 + #12 GND.
8. PROVIDE PEDESTAL TO MOUNT DOOR ACCESS PUSH BUTTON. PROVIDE STAINLESS STEEL ANCHOR BOLTS, WASHERS, LOCKING WASHER, NUTS AND MOUNTING HARDWARE.
9. PROVIDE 3/4"C, 2#16. EXTEND TO OCCUPANCY SENSOR. SEE DETAIL ON SHEET E-601.
10. PROVIDE BRANCH CIRCUIT TO SERVE EXHAUST FAN.

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PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	JPY
DRAWN BY:	JPY
CHECKED BY:	CLJ

DRAWING TITLE:
FLOOR PLANS - POWER - ELECTRICAL NEW WORK

SHEET NUMBER:
E-101

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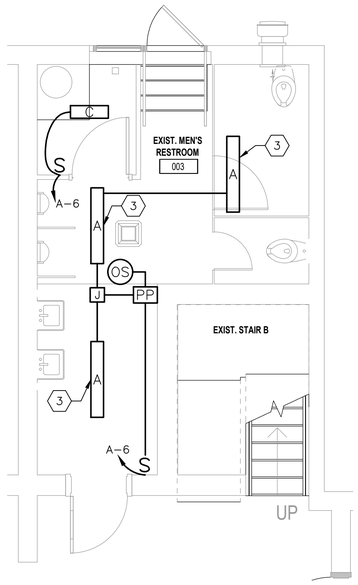
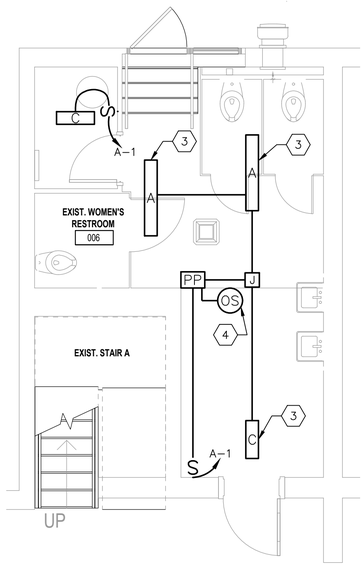
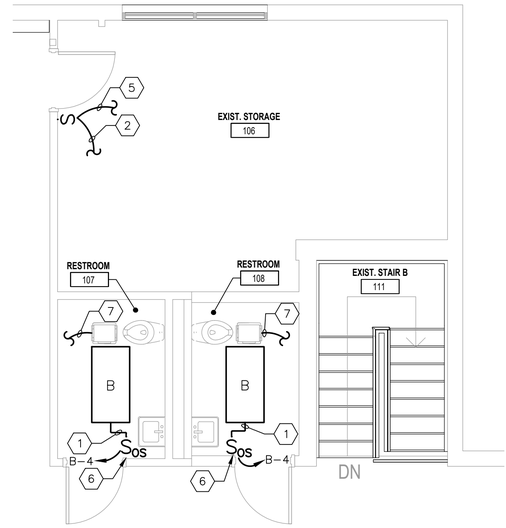


1 E-102 MEN'S RESTROOM ENLARGED LIGHTING PLAN – NEW WORK
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10



2 E-102 WOMEN'S RESTROOM ENLARGED LIGHTING PLAN – NEW WORK
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10



3 E-102 STORAGE AND RESTROOM ENLARGED LIGHTING PLAN – NEW WORK
SCALE: 1/4" = 1'-0"
0 2 4 6 8 10

KEYNOTES:

1. PROVIDE NEW CONDUCTORS FROM OCCUPANCY SENSOR TO NEW LIGHTING FIXTURES AND EXHAUST FANS.
2. PROVIDE NEW CONDUCTORS TO NEW LIGHTING SWITCH IN STORAGE ROOM.
3. COORDINATE LIGHTING FIXTURES WITH PLUMBING AND OTHER OBSTRUCTIONS.
4. INSTALL OCCUPANCY SENSOR ON BULKHEAD. SEE DETAIL ON SHEET E-601.
5. PROVIDE NEW CONDUCTORS TO EXISTING LIGHTING FIXTURES. RE-WORK LIGHTING FIXTURE CIRCUITING AS REQUIRED.
6. INTERCEPT EXISTING BRANCH-CIRCUIT TO SERVE NEW OCCUPANCY SENSOR. DIVISION 26 CONTRACTOR TO VERIFY.
7. EXTEND CONDUCTORS TO EXHAUST FAN.

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CONTRACT NO.25-01

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PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	JPY
DRAWN BY:	JPY
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DRAWING TITLE:
FLOOR PLANS - LIGHTING - ELECTRICAL NEW WORK

SHEET NUMBER:
E-102

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PANELBOARD: C

VOLTS: 208Y/120
PHASE/WIRE: 3 PHASE, 4 WIRE
SERVED BY: DISTRIBUTION PANEL

MOUNTING: SURFACE
ENCLOSURE: TYPE 1
EQUIPMENT: ---

A.I.C. RATING: ---
MAINS TYPE: MAIN LUG ONLY (MLO)
MAINS RATING: ---
MCB RATING: ---

ROOM DESIGNATION: STORAGE 105
LOCATION: FIRST FLOOR

CKT NO.	CKT. BKR. P	CKT. BKR. TRIP	CIRCUIT DESCRIPTION	KVA PER PHASE A	KVA PER PHASE B	KVA PER PHASE C	CIRCUIT DESCRIPTION	CKT. BKR. TRIP	CKT. BKR. P	CKT NO.
1	2	40A	KILN ROOM HEATER	--- ---			NOTE 1	20A	1	2
3					--- ---		NOTE 1	20A	1	4
5	1	20A	BATHROOM & HALL RCPT			--- ---	NOTE 1	20A	1	6
7	1	20A	NOTE 1	--- ---			NOTE 1	20A	1	8
9	1	20A	NOTE 1		--- ---		SPARE	20A	2	10
11	2	20A	NOTE 1			--- ---				12
13				--- ---			AC KILN ROOM	15A	2	14
15	2	20A	WEST HEAT		--- ---					16
17						--- ---	KILN	60A	2	18
19	2	20A	WEST HEAT	--- ---						20
21					--- ---		HEATER CONTROLLER	15A	1	22
23	2	20A	WEST HEAT			--- ---	EAST STORAGE HEAT	20A	2	24
25				--- ---						26
27	2	20A	WEST MASTER HEAT		--- ---		EAST HEAT	20A	2	28
29						--- ---				30
31	1	20A	ELECTRIC SCREEN	--- ---			EAST HEAT	20A	2	32
33	1	20A	VENT OVER KILN		--- ---					34
35	2	15A	AC DANCE STUDIO			--- ---	EAST HEAT	20A	2	36
37				--- ---						38
39	2	60A	SUB PANEL		--- ---		EAST MASTER HEAT	20A	2	40
41						--- ---				42

NOTES:
1. NO CIRCUIT DESCRIPTION INDICATED.
2. CIRCUIT BREAKER SIZES AND DESCRIPTIONS BASED ON OBSERVATIONS. CONFIRM CIRCUITING AND EQUIPMENT SERVED PRIOR TO STARTING WORK.
3. RELABEL PANELBOARD AS PANELBOARD "C".

PANELBOARD: SUB PANEL

VOLTS: 208Y/120
PHASE/WIRE: 3 PHASE, 3 WIRE
SERVED BY: KILN ROOM PANEL

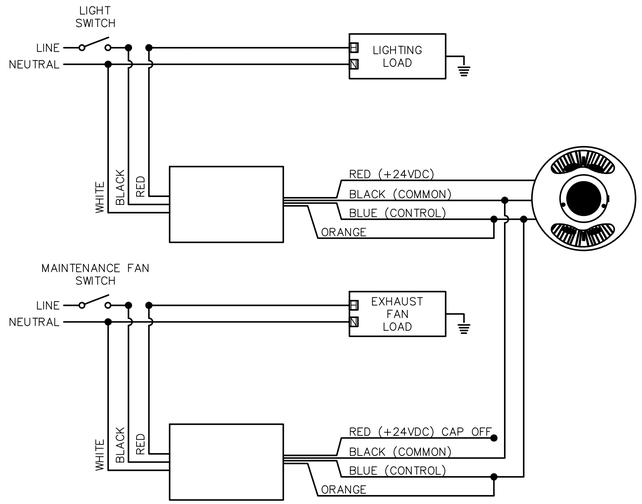
MOUNTING: SURFACE
ENCLOSURE: TYPE 1
EQUIPMENT: ---

A.I.C. RATING: 10K
MAINS TYPE: MAIN LUG ONLY (MLO)
MAINS RATING: ---
MCB RATING: ---

ROOM DESIGNATION: STORAGE 106
LOCATION: FIRST FLOOR

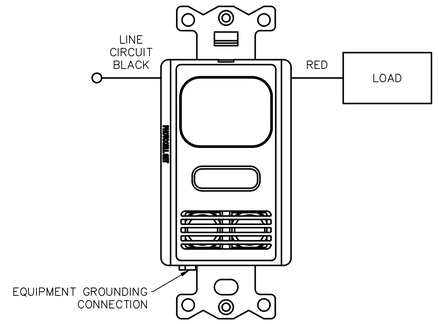
CKT NO.	CKT. BKR. P	CKT. BKR. TRIP	CIRCUIT DESCRIPTION	KVA PER PHASE A	KVA PER PHASE B	KVA PER PHASE C	CIRCUIT DESCRIPTION	CKT. BKR. TRIP	CKT. BKR. P	CKT NO.
1	1	20A	NOTE 1	--- ---			NOTE 1	20A	2	2
3	1	20A	NOTE 1		--- ---					4
5	1	20A	NOTE 1			--- ---	NOTE 1	20A	2	6
7	1	20A	NOTE 1	--- ---						8

NOTES:
1. NO CIRCUIT DESCRIPTION INDICATED.
2. CIRCUIT BREAKER SIZES AND DESCRIPTIONS BASED ON OBSERVATIONS. CONFIRM CIRCUITING AND EQUIPMENT SERVED PRIOR TO STARTING WORK.
3. SQUARE D SUB PANEL.



NOTES:
1. POWER PACK CONTACTS RATED FOR 20 AMPS.
2. POWER PACK PROVIDES 250 MA OUTPUT.
3. PROVIDE JUNCTION BOX, COVER, FASTENERS, AND MOUNTING HARDWARE.
4. COORDINATE OCCUPANCY SENSOR LOCATION TO PROVIDE MAXIMUM COVERAGE.

1 E-601 BASEMENT RESTROOM OCCUPANCY SENSOR – DIAGRAM
SCALE: NONE



2 E-601 FIRST FLOOR RESTROOM OCCUPANCY SENSOR – DIAGRAM
SCALE: NONE

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN SERIES	ACCEPTABLE MANFACTURERS	LIGHT SOURCE	LIGHT SOURCE PERFORMANCE LUMENS	CCT	CRI	L-RATING	DRIVER CHARACTERISTICS	INPUT VOLTAGE	INPUT WATTS	MOUNTING	FINISH	COMMENTS
A	4' LED WRAPAROUND. HEAVY GAUGE STEEL HOUSING WITH END PLATES. HIGH REFLECTANCE BAKED ENAMEL. ACRYLIC PRISMATIC LENS WITH INTERIOR OVERLAY. DAMP LOCATION RATED.	COLUMBIA LIGHTING	LAW4	LITHONIA RAB	LED	4,984	4000	80	L80	CONSTANT	120	43	SURFACE	WHITE	---
B	2X4 LED BACK-LIT TROFFER. DIE FORMED CODE-GAUGE STEEL WITH ALUMINUM LENS FRAME. WHITE ANTIMICROBIAL FINISH. SMOOTH FROSTED LENS. LOW PROFILE CONSTRUCTION.	COLUMBIA LIGHTING	NBT24	LITHONIA RAB	LED	4,900	4000	80	L80	CONSTANT	120	35	RECESSED	WHITE	NOTE 1
C	2' LED WRAPAROUND. HEAVY GAUGE STEEL HOUSING WITH END PLATES. HIGH REFLECTANCE BAKED ENAMEL. ACRYLIC PRISMATIC LENS WITH INTERIOR OVERLAY. DAMP LOCATION RATED.	COLUMBIA LIGHTING	LAW2	LITHONIA RAB	LED	4,793	4000	80	L80	CONSTANT	120	38	SURFACE	WHITE	---

NOTES:
1. PROVIDE INDEPENDENT WIRE SUPPORTS. GAUGE TO MATCH SUSPENDED CEILING WIRE SUPPORTS. SECURE LIGHTING FIXTURE TO GRID USING INTERNAL CLIPS.

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DRAWING TITLE:
SCHEDULES - ELECTRICAL NEW WORK

SHEET NUMBER:
E-601

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PANELBOARD: B

VOLTS: 208Y/120
PHASE/WIRE: 3 PHASE, 4 WIRE
SERVED BY: DISTRIBUTION PANEL

MOUNTING: SURFACE
ENCLOSURE: TYPE 1
EQUIPMENT: ---

A.I.C. RATING: 10K
MAINS TYPE: MAIN LUG ONLY (MLO)
MAINS RATING: 100A
MCB RATING: 100A

ROOM DESIGNATION: EVENT SPACE 101
LOCATION: FIRST FLOOR

CKT NO.	CKT. BKR. P	CKT. BKR. TRIP	CIRCUIT DESCRIPTION	KVA PER PHASE A	KVA PER PHASE B	KVA PER PHASE C	CIRCUIT DESCRIPTION	CKT. BKR. TRIP	CKT. BKR. P	CKT NO.
1	1	20A	LTG - 1ST ROW	1.10	0.16		**DOOR OPERATOR - EVENT SPACE**	20A	1	2
3	1	20A	LTG - 2ND ROW		1.10	1.20	**LTG - 5TH & 6TH ROW & BR & EF 3,4**	20A	1	4
5	1	20A	LTG - 3RD ROW			1.10 1.20	LTG - 6TH & 7TH ROW	20A	1	6
7	1	20A	LTG - OFFICE	0.80	0.24		RCPT - OFFICE	20A	1	8
9	1	20A	LTG - OUTSIDE		0.80	0.30	EMERGENCY LIGHT UNITS (3)	20A	1	10
11	1	20A	RCPT - MAIN HALL			0.48 ---	LTG - 4TH ROW & N. FLOOD LTG	20A	1	12
13	1	20A	WATER COOLER	---	---		RCPT #2 - OFFICE	20A	1	14
15	1	20A	S. FLOOD LTG		---	---	RCPT - OFFICE AC	20A	1	16
17	1	20A	LTG - OUTSIDE #2			--- ---	OFFICE AC	20A	1	18
19	1	20A	SPARE	---	---		LTG - KILN ROOM	20A	1	20
21	1	20A	HEATER IN OFFICE		---	---	HALL HEATER	20A	1	22
23	1	20A	SPARE			--- ---	SPARE	20A	1	24
			TOTAL KVA PER PHASE:	2.3	3.4	2.8				
			TOTAL KVA:			8.5				
			TOTAL AMPS PER PHASE:	19.1	28.3	23.2				
			TOTAL AMPS:			23.5				

NOTES:
1. BREAKER SIZES AND DESCRIPTIONS BASED ON OBSERVATIONS. CONFIRM CIRCUITING AND EQUIPMENT SERVED PRIOR TO STARTING WORK.
2. DESCRIPTIONS IN **BOLD** INDICATE NEW WORK.
3. PROVIDE MACHINE GENERATED PANELBOARD DIRECTORY AFTER COMPLETING WORK.
4. SQUARE D, TYPE NQOB PANELBOARD, CATALOG # QBL-42429.

DISTRIBUTION PANELBOARD: P

VOLTS: 208Y/120
PHASE/WIRE: 3 PHASE, 4 WIRE
SERVED BY: ATS

MOUNTING: SURFACE
ENCLOSURE: TYPE 1
EQUIPMENT: ---

A.I.C. RATING: 65K
MAINS TYPE: MAIN LUG ONLY (MLO)
MAINS RATING: 400A
MCB RATING: 400A

ROOM DESIGNATION: CLASSROOM 004
LOCATION: BASEMENT

CKT NO.	CKT. BKR. P	CKT. BKR. TRIP	CIRCUIT DESCRIPTION	KVA PER PHASE A	KVA PER PHASE B	KVA PER PHASE C	CIRCUIT DESCRIPTION	CKT. BKR. TRIP	CKT. BKR. P	CKT NO.
1	2	20A	**UH-2 - MENS RESTROOM 003**	1.65	---					2
3					1.65	---	PANEL A	60A	3	4
5	2	30A	**WH-1 - WOMENS RESTROOM 006**			--- ---				6
7				---	---					8
9	1	20A	PARKING LOT LIGHTING		---	---	CONDENSER DISCONNECT ROOF	50A	2	10
11	1	20A	AC UNIT POTTERY ROOM			--- ---	SPACE	---	---	12
13	2	30A	**WH-2 - MENS RESTROOM 003**	---	---		RTU	125A	2	14
15					---	---				16
17	2	20A	**UH-1 - WOMENS RESTROOM 006**			1.65 ---	RTU	125A	2	18
19				1.65	---					20
21	1	20A	POOL LIGHTS		---	---	RTU	125A	2	22
23	1	20A	SWIMMING POOL			--- ---				24
25	2	60A	PUMP HOUSE	---	---		SPACE	---	---	26
27					---	---	KITCHEN PANEL	125A	2	28
29	1	20A	OUTSIDE WALL PACK			--- ---				30
31	1	20A	REC UNDER PANEL	---	---		KITCHEN PANEL	125A	2	32
33	3	60A	PANEL B		---	---				34
35						--- ---	KITCHEN PANEL	125A	2	36
37				---	---					38
39	---	---	SPACE		---	---	SPACE	---	---	40
41	---	---	SPACE			--- ---	SPACE	---	---	42
			TOTAL KVA PER PHASE:	3.3	1.7	1.7				
			TOTAL KVA:			6.6				
			TOTAL AMPS PER PHASE:	27.5	13.7	13.7				
			TOTAL AMPS:			18.3				

NOTES:
1. CIRCUIT BREAKER SIZES AND DESCRIPTIONS BASED ON OBSERVATIONS. CONFIRM CIRCUITING AND EQUIPMENT SERVED PRIOR TO STARTING WORK.
2. DESCRIPTIONS IN **BOLD** INDICATE NEW WORK.
3. PROVIDE MACHINE GENERATED PANELBOARD DIRECTORY AFTER COMPLETING WORK.
4. SQUARE D, TYPE NQOB PANELBOARD, CATALOG # 1100B-44-16704.

PANELBOARD: A

VOLTS: 208Y/120
PHASE/WIRE: 3 PHASE, 4 WIRE
SERVED BY: DISTRIBUTION PANEL

MOUNTING: SURFACE
ENCLOSURE: TYPE 1
EQUIPMENT: 100% RATED NEUTRAL

A.I.C. RATING: 10K
MAINS TYPE: MAIN LUG ONLY (MLO)
MAINS RATING: 100A
MCB RATING: ---

ROOM DESIGNATION: CORRIDOR 001
LOCATION: BASEMENT

CKT NO.	CKT. BKR. P	CKT. BKR. TRIP	CIRCUIT DESCRIPTION	KVA PER PHASE A	KVA PER PHASE B	KVA PER PHASE C	CIRCUIT DESCRIPTION	CKT. BKR. TRIP	CKT. BKR. P	CKT NO.
1	1	20A	**LTG - WOMENS RR, REC. RM**	0.16	0.90		LTG - POTTERY STUDIO	20A	1	2
3	1	20A	**RCPT - WOMENS RR 006**		0.18	0.20	EMERGENCY LIGHTS	20A	1	4
5	1	20A	LTG - LOWER STORAGE ROOM			0.55 0.17	**LTG - MENS RESTROOM 003**	20A	1	6
7	1	20A	SPARE CIRCUIT PIPE TO MDP BOARD	---	0.18		**RCPT - MENS RESTROOM 003**	20A	1	8
9	1	20A	LTG - HALLWAY		0.50	---	SPARE	20A	1	10
11	1	15A	**EF-1 - WOMENS RESTROOM 006**			0.10 ---	SPARE	20A	1	12
13	1	20A	RCPT - HALLWAY	0.18	---		SPACE	---	---	14
15	1	20A	**DOOR OPERATOR - CORRIDOR 001**		0.16	0.10	**EF-2 - MENS RESTROOM 003**	15A	1	16
17	1	20A	**SPARE (NOTE 2)**			--- ---	HEATER - REC ROOM #2	20A	1	18
19	2	20A	CONVECTOR STG RM #2	1.40	3.34		**HEATER - WOMENS & MENS RR**	20A	1	20
21					1.40	---	SPACE	---	---	22
23	---	---	SPACE			--- ---	SPACE	---	---	24
			TOTAL KVA PER PHASE:	6.2	2.5	0.8				
			TOTAL KVA:			9.5				
			TOTAL AMPS PER PHASE:	51.3	21.1	6.8				
			TOTAL AMPS:			26.4				

NOTES:
1. CIRCUIT BREAKER SIZES AND DESCRIPTIONS BASED ON OBSERVATIONS. CONFIRM CIRCUITING AND EQUIPMENT SERVED PRIOR TO STARTING WORK.
2. DISCONNECT CONDUCTORS AND LABEL AS SPARE.
3. DESCRIPTIONS IN **BOLD** INDICATE NEW WORK.
4. PROVIDE MACHINE GENERATED PANELBOARD DIRECTORY AFTER COMPLETING WORK.
5. SQUARE D, TYPE NQOB PANELBOARD, CATALOG # QBL-42429.

JMT
JOHNSON, MIRMIRAN & THOMPSON, INC.
121 CONTINENTAL DR #300, NEWARK, DELAWARE 19713
302.266.9600
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SEAFORD, DELAWARE
(302) 291-9093
KEGI.NET
Keystone ENGINEERING GROUP

SEAL:

CURTIS L. JAMES LICENSE NO. 19096 STATE OF DELAWARE PROFESSIONAL ENGINEER
10/15/2025

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF DELAWARE. LICENSE NUM: 19096, EXP DATE: 06/30/2026.

PROJECT:
GEORGE WILSON CENTER IMPROVEMENTS
FACILITY RENOVATIONS
CONTRACT NO.25-01

303 NEW LONDON ROAD, NEWARK DE 19711

PREPARED FOR:

CITY OF NEWARK
220 S MAIN ST, NEWARK, DE 19711
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PROJECT NO:	20-03026-049
DATE:	10/15/2025
SCALE:	AS INDICATED
DESIGNED BY:	JPY
DRAWN BY:	JPY
CHECKED BY:	CLJ

DRAWING TITLE:
SCHEDULES - ELECTRICAL NEW WORK

SHEET NUMBER:
E-602

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Autodesk Docs://20-03026-049_George Wilson Center Improvements/20-03026-049_George Wilson Center Improvements_Arch.rvt
8/19/2025 10:01:20 AM

CITY OF NEWARK
DELAWARE

ATTACHMENT 2
Pre-Renovation Environmental Assessment Report

Pre-Renovation Environmental Assessment Report

George Wilson Community Center
303 New London Road
Newark, Delaware

September 2023

Prepared For:

Mr. Jeff Martindale
Chief Purchasing Officer
City of Newark
220 South Main Street
Newark, DE 19711

Prepared and Submitted by:

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BrightFields, Inc.
Environmental Services

BrightFields 1401.25.51

BrightFields, Inc.
Environmental Services

INTERNAL QUALITY CONTROL SHEET

This Pre-Renovation Environmental Assessment Report was prepared by BrightFields, Inc. following the United States Environmental Protection Agency (US EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR Part 61.145) and industry standard practices for testing of lead-based paint and coatings and inventory of hazardous, universal, and environmentally sensitive wastes. This report represents BrightFields' knowledge of conditions on the subject site at the time of preparation.

This document was prepared and reviewed by the following BrightFields personnel:

Prepared by:

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&

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Project Manager
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1.0 INTRODUCTION

BrightFields, Inc. (BrightFields) performed an environmental assessment in preparation for slated renovation of the following property:

GEORGE WILSON COMMUNITY CENTER
303 NEW LONDON ROAD
NEWARK, DELAWARE 19711

The following tasks were performed at the property:

- Destructive NESHAP asbestos survey of suspected asbestos-containing materials (ACM), collected samples of suspected ACM for laboratory analysis, and estimated quantities of each type of suspected ACM;
- Lead-based paint testing of painted building components; and
- Inventory of hazardous and environmentally sensitive wastes.

2.0 ASBESTOS ASSESSMENT

2.1 SAMPLING AND ANALYTICAL METHODS

On August 31, 2023, BrightFields, Inc. (BrightFields) performed a destructive NESHAP asbestos survey of suspected asbestos-containing materials (ACM), collected samples of suspected ACM for laboratory analysis, and estimated quantities of each type of laboratory confirmed ACM. Information was collected on suspect ACM, including material type, location, and condition. The asbestos survey was performed in accordance with EPA sampling protocols.

During the inspection BrightFields collected 60 samples of suspect ACM associated with the structure on the property. Of those samples, 54 were physically analyzed by the laboratory utilizing the EPA 600/R-93/116 method for the determination of asbestos in bulk building materials using polarized light microscopy (PLM).

The intent of the Survey was to locate regulated ACM pursuant to the requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61.145, which requires removal and disposal of friable asbestos containing building materials of Category I & II, and materials that will become friable as a result of demolition and/or renovation activities.

The survey was conducted by BrightFields US EPA-certified inspectors who have successfully completed EPA approved training classes.

The collected bulk samples were submitted to the following EPA Certified and Delaware-approved laboratory for asbestos analysis:

EMSL Analytical, Inc.
18369 Petroleum Drive
Baton Rouge, LA 70809

At the laboratory, the samples were first examined using a stereo–binocular microscope, and then using a Polarized Light Microscope (PLM) with dispersion staining lens, as recommended in the EPA "*Method for The Determination of Asbestos in Bulk Building Materials*" (July 1993, EPA/600/R-93/116).

EMSL Analytical, Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) established by the National Institute for Standards and Testing (NIST), and by the

American Industrial Hygiene Association (AIHA). EMSL Analytical, Inc. is an approved State of Delaware PLM laboratory.

Analytical results for this asbestos survey are reported and discussed in the following sections of this report. Raw analytical data results and chain-of-custody documentation are included as **Appendix A**. Site Photographs are included in **Appendix B**.

2.2 ASBESTOS ASSESSMENT RESULTS AND DISCUSSION

The U.S. Environmental Protection Agency (EPA) considers materials containing greater than 1% asbestos to be "asbestos-containing." Materials containing 1% or less asbestos are not currently regulated.

Table 1 contains BrightFields' sample numbers, material types, quantities of laboratory-confirmed ACM, friability and condition of materials, and the percentage of asbestos (as reported by the analytical laboratory).

The following materials were found to contain asbestos:

- HA10 – 12"x12" floor tile (tan) as flooring within south storage closet – estimated 135 square feet (5% Chrysotile)
- HA11 – Flooring mastic (black) associated with 12"x12" floor tile within south storage closet – estimated 135 square feet (8% Chrysotile)
- HA13 – Flooring mastic (black) associated with 12"x12" floor tile within gym equipment storage room – estimated 150 square feet (6% Chrysotile)
- HA26 – Window caulk (white) associated with older, double hung window exterior – estimated 8 linear feet (4% Chrysotile)

Please note that the floor tile mastic (HA13) is inseparable from the associated floor tile (HA12); therefore, non-asbestos floor tile (HA12) must be removed and disposed of as asbestos-contaminated material.

The State of Delaware Asbestos Inspection Form is included in **Appendix C**. Applicable Certifications are included in **Appendix D**.

3.0 LEAD-PAINT TESTING

3.1 REGULATORY BACKGROUND

Lead is a toxic metal known to be harmful to human health if inhaled or ingested into the body. In 1978, the federal government banned the use of lead as an additive to paint for residential use. Children ages six and under and women who are pregnant or plan to become pregnant are the most susceptible to health effects from lead exposure. Adults may also experience a variety of harmful effects from lead exposure. To combat lead's adverse health effects and the sources and pathways of lead exposure, federal and state governments have developed regulations and guidelines to assess the hazards.

The regulations and guidelines defined by 40 CFR part 745 (United States Environmental Protection Agency (EPA) regulations) were followed in the preparation of this lead-paint testing.

The EPA and the State of Delaware define "lead-based paint" (LBP) as any paint or surface coating that contains lead equal to or exceeding **one milligram per square centimeter (1.0 mg/cm^2) or 0.5% lead by weight**. All layers of paint, including older layers that have been covered by new layers of paint, are evaluated when sampling for LBP. In other words, the sample results presented in this report represent all layers of paint on a component, not just the surface layer.

3.2 PAINT SAMPLING METHODOLOGY

BrightFields used an Innov-X Systems XRF lead paint analyzer to sample paint in the selected locations. The serial number for the Innov-X XRF is 6800. The XRF uses a cathode ray tube to generate a low-power x-ray and does not contain a radioactive source. **All layers of paint, including older layers that have been covered by new layers of paint, are evaluated when sampling for LBP with the XRF. In other words, the sample results presented in this report represent all layers of paint on a component, not just the surface layer.** The instrument was checked for calibration at the beginning and end of the project. Applicable certifications are included in **Appendix D**.

Certain building components that were adjacent to each other and/or not likely to have different painting histories were grouped together into a single testing combination, as follows:

- Interior window casings, stops, jambs, and aprons.
- Interior window mullions and window sashes.
- Exterior window mullions and window sashes.
- Exterior window casings, jambs, stops, and sills.
- Window jambs, parting beads and stops.
- Door jambs, stops, transoms, casings, and other door frame parts.
- Door stiles, rails, panels, mullions, and other door parts.
- Baseboards and associated trim (such as quarter-round or other caps).
- Painted electrical sockets, switches, or plates were grouped with walls.

For example, if a window jamb was sampled, the apron, casing, and interior stop are assumed to have the same result, unless otherwise sampled and noted in the Lead Paint Sampling Forms included in **Appendix E**. If the interior side of a window or door was found to be coated with LBP, the exterior components of the windows or doors in that room are assumed to be positive for LBP as well.

When identifying locations to sample, BrightFields targets surfaces that are representative of the paint within a given "room equivalent." Unless otherwise stated, the sample result for a component should be assumed to be representative of all similar components within the room. For example, if the windows in a room appeared to have a similar maintenance history, then the components of one of the windows were sampled and all window components in the room were assumed to have the same lead content. Diagrams identifying different types of building components are provided as **Appendix F**.

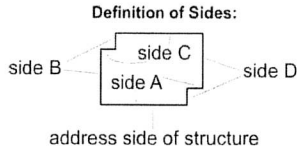
The XRF paint testing identifies the lead content of painted components inside and outside the building. The lead content, location, component type, and paint color of the sampled painted surfaces are identified in the data tables. The side of the room (or building exterior) in which each sample was collected is also noted with an A, B, C, or D. Side A of each room is the side closest to the front/address side of the building. Sides B, C, and D are the sides progressing from A in a clockwise direction. A diagram with this notation is included at the top of each data table and in Section 3.3.

3.3 LEAD-PAINT TESTING RESULTS AND DISCUSSION

Based on the findings of the XRF sampling, lead-based paint was identified at the building on exterior window components, as noted in **Appendix E**. LBP-coated components are listed below:

Location/Room	Component	Side	Color	Sub-strate	Result (mg/cm^2)
Exterior	Window Casing	A	White	W	1.25

NOTES:
Paint condition is not recorded for Inspections or targeted paint testing.
Substrate Abbreviations: W = wood, D = drywall/plaster, M = metal, C = concrete, B = brick, PL = plastic/vinyl



If present, lead painted surfaces that are damaged by future activities, including abatement, renovation, repair, remodeling, and maintenance could create hazardous levels of lead dust within the structures. Any activity that disturbs paint in this building that was not sampled for this report must be conducted by a Delaware-licensed Renovation, Repair, and Repainting (RRP) contractor.

4.0 INVENTORY OF HAZARDOUS, UNIVERSAL, AND ENVIRONMENTALLY SENSITIVE WASTES

On August 31, 2023, BrightFields performed a hazardous material (HM) and universal waste (UW) survey of the interior of the George Wilson Community Center site. BrightFields personnel walked through and around the entire facility and inspected all accessible spaces. Some areas were not inspected due to safety/access concerns; these areas included the plenum spaces above drop ceilings.

Throughout the survey, Brightfields made an inventory of all HM/UW encountered, as well as other environmentally sensitive materials or conditions (such as fire extinguishers). A complete inventory is included as **Appendix G.** Based on discussions with facility occupants, materials associated with the pottery studio such as paints/glazes along with general purpose electronics and refrigeration equipment would likely be retained and have therefore been excluded from the inventory. This inventory is limited to the interior of the main building only, and does not include any outbuildings, HVAC equipment, or structures/equipment associated with the swimming pool.

BrightFields subsequently reviewed the inventory to determine generalized waste types and quantities for all HM and UW encountered. The following types and quantities of waste were identified at the Site:

Quantity	Waste Type	Waste Code/Class	Notes
Hazardous Materials			
(1) 30-gal Drums	Flammable Liquids, N.O.S, (Lab Pack)	D001	Overpack of various flammable liquids.
(1) 30-gal drum	Flammable Liquids, N.O.S., (Lab Pack)	D002	Overpack of mixed (acidic) corrosive liquids
(1) 30-gal drum	Corrosive Liquids, N.O.S., (Lab Pack)	D002	Overpack of mixed (basic) corrosive liquids
Universal Wastes			
6	2-foot fluorescent lamps	Lamps	Throughout structures
220	4-foot fluorescent lamps	Lamps	Throughout structures
42 Pounds	Sealed lead-acid batteries	Batteries	Distributed throughout building
(1) 5-gallon pail	Miscellaneous spray paint/lubricant/etc. cans	Aerosols	Distributed throughout building

Quantity	Waste Type	Waste Code/Class	Notes
Environmentally Sensitive Items or Conditions			
(1) 55-gal Drum	Lamp Ballasts	PCBs	Potentially PCB-containing equipment
1 Units	Wall mounted Water Fountain	Refrigerants	1st Floor
6 Units	Fire extinguishers	Compressed Gas Cylinders	Distributed throughout building
(1) 5-gal Drum	Non-hazardous liquids (latex paint)	Non-Haz Liquids	Distributed throughout building
(1) 55-gal Drum	Non-hazardous liquids (cleaners, detergents, etc.)	Non-Haz Liquids	Distributed throughout building

In addition to the waste streams identified above, two containers (averaging five gallons or less in volume) of an unknown liquid and unknown solid were identified across the Site. Further analysis is required to fully characterize these materials for disposal.

5.0 RECOMMENDATIONS

Survey results determined that asbestos-containing materials, lead-based paint, and hazardous/universal and environmentally sensitive wastes are present at the subject Site. Based upon the laboratory analysis, and observations made during the site assessment, BrightFields recommends the following:

- In accordance with Federal, State, and local asbestos regulations, a Delaware certified/licensed asbestos contractor must properly remove the ACM prior to any demolition or renovation activities that would disturb the identified ACM.
- All demolition or renovation contractors must be made aware of the identified asbestos materials prior to any work at the subject property to prevent accidental disruption of the identified asbestos materials and subsequent exposure prior to their removal.
- If asbestos debris is disturbed and/or observed on the floor prior to the commencement of abatement activities, it should never be dry swept, but instead cleaned up by trained/certified personnel using either an approved asbestos high efficiency particulate air (HEPA) vacuum or wet-cleaning methods.
- Any abatement, renovation, and/or demolition activities performed at the Site must adhere to City of Newark and applicable State and Federal regulations.
- Contractors performing renovation or demolition activities at the Site should adhere to the OSHA Lead in Construction Standard (**Appendix H**) and have EPA Renovation-Repair-Painting (RRP) certification when disturbing materials coated with lead-based paint.
- Whole fixtures/materials such as high-bay lights, fire extinguishers, and select chemical products may be salvaged and re-used in lieu of disposal as waste.
- Prior to the start of renovation or demolition activities, retain an environmental contractor with 40-hour OSHA HAZWOPER-trained personnel to segregate, remove, and package all HM/UW.
- The demolition contractor should contact the waste disposal site they intend to use to dispose of C&D waste generated during the demolition activities to inquire if the waste disposal site requires any additional testing to comply with site-specific requirements.

6.0 STUDY LIMITATIONS

BrightFields asserts that properly trained and certified personnel have performed the destructive NESHAP asbestos survey, lead-paint screening, and waste inventory within each portion of the property, and they have conducted this evaluation in accordance with generally accepted industry practices to produce the testing data contained within this report. Please note that roofing materials associated with the building were recently replaced, and per the Owners' representative, was not within the scope of this assessment. The inventory of HM/UW was limited to the interior of the main community center building and does not include any outbuildings, HVAC equipment, or structures/equipment associated with the swimming pool. Plenum areas above drop ceilings were not inspected for HM/UW.

TABLES

TABLE 1: Suspect Asbestos-Containing Materials
George Wilson Community Center
303 New London Road
Newark, Delaware

HA Area No.	Bulk Sample ID No.	Material Description	Color	Condition	Suspect ACM Locations	Est. Quantity	Friability	% Asbestos
HA01	B01A	Sheetrock	Gray	G	Throughout as walls	TBD	F	NAD
	B01B							NAD
	B01C							NAD
HA02	B02A	Joint compound	White	G	Associated with HA02	TBD	F	NAD
	B02B							NAD
	B02C							NAD
HA03	B03A	2'x4' Ceiling tile	Beige	G	Throughout as drop ceiling	TBD	F	NAD
	B03B							NAD
	B03C							NAD
HA04	B04A	Cove base	Black	G	Throughout along walls	TBD	NF	NAD
	B04B							NAD
	B04C							NAD
HA05	B05A	Cove base adhesive	Tan	G	Associated with HA04	TBD	NF	NAD
	B05B							NAD
	B05C							NAD
HA06	B06A	12"x12" floor tile	Beige	D	Throughout first floor as original flooring (main activity room, bathroom entrance and kiln room)	3,930 SF	NF	NAD
	B06B							NAD
	B06C							NAD

HA= Homogeneous Area
NAD= No Asbestos Detected
TBD= To Be Determined
SNA= Sample Not Analyzed

Friability:
F= Friable
NF= Non-Friable

Condition:
G= Good
D= Damaged
SD= Significantly Damaged

TABLE 1: Suspect Asbestos-Containing Materials
George Wilson Community Center
303 New London Road
Newark, Delaware

HA Area No.	Bulk Sample ID No.	Material Description	Color	Condition	Suspect ACM Locations	Est. Quantity	Friability	% Asbestos
HA07	B07A	Flooring mastic	Tan	D	Associated with HA06	3,930 SF	NF	Insufficient Material
	B07B							Insufficient Material
	B07C							NAD
HA08	B08A	Poured rubber flooring	Blue/ tan	G	Over HA06 and throughout rec room 1 (except bathroom entrance)	TBD	NF	NAD
	B08B							NAD
	B08C							NAD
HA09	B09A	Glue adhesive	Yellow	G	Associated with HA08	TBD	NF	NAD
	B09B							NAD
	B09C							NAD
HA10	B10A	12"x12" floor tile	Tan	G	As flooring within south storage closet	135 SF	NF	5% Chrysotile
	B10B							SNA
HA11	B11A	Flooring mastic	Black	G	Associated with HA10	135 SF	NF	8% Chrysotile
	B11B							SNA
HA12	B12A	12"x12" floor tile	White	G	As flooring within gym equipment storage room	150 SF	NF	NAD
	B12B							NAD

HA= Homogeneous Area
NAD= No Asbestos Detected
TBD= To Be Determined
SNA= Sample Not Analyzed

Friability:
F= Friable
NF= Non-Friable

Condition:
G= Good
D= Damaged
SD= Significantly Damaged

TABLE 1: Suspect Asbestos-Containing Materials
George Wilson Community Center
303 New London Road
Newark, Delaware

HA Area No.	Bulk Sample ID No.	Material Description	Color	Condition	Suspect ACM Locations	Est. Quantity	Friability	% Asbestos
HA13	B13A	Flooring mastic	Black	G	Associated with HA12	150 SF	NF	6% Chrysotile
	B13B							SNA
HA14	B14A	Unknown size floor tile	Gray	G	As original flooring within kitchen	210 SF	NF	NAD
	B14B							NAD
HA15	B15A	Flooring mastic	Black	G	Associated with HA14	210 SF	NF	NAD
	B15B							NAD
HA16	B16A	12"x12" floor tile	Beige	G	Over HA14	210 SF	NF	NAD
	B16B							NAD
HA17	B17A	Flooring mastic	Tan/ yellow	G	Associated with HA16	210 SF	NF	NAD
	B17B							NAD
HA18	B18A	12"x12" floor tile	White	G	As flooring in 1st floor bathroom	50 SF	NF	NAD

HA= Homogeneous Area
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SNA= Sample Not Analyzed

Friability:
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Condition:
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D= Damaged
SD= Significantly Damaged

TABLE 1: Suspect Asbestos-Containing Materials
George Wilson Community Center
303 New London Road
Newark, Delaware

HA Area No.	Bulk Sample ID No.	Material Description	Color	Condition	Suspect ACM Locations	Est. Quantity	Friability	% Asbestos
HA19	B19A	Flooring mastic	Yellow	G	Associated with HA18	50 SF	NF	NAD
HA20	B20A	12"x12" floor tile	Gray/ white	G	As flooring throughout basement	TBD	NF	NAD
	B20B							NAD
	B20C							NAD
HA21	B21A	Flooring mastic	Yellow/ brown	G	Associated with HA20	TBD	NF	NAD
	B21B							NAD
	B21C							NAD
HA22	B22A	Caulking/putties	White	D	Associated with entry exterior stairs	TBD	NF	NAD
	B22B							NAD
HA23	B23A	Door caulk	White	D	Associated with rear exterior door	8 LF	NF	NAD
HA24	B24A	Exhaust vent caulk	White	D	Associated with rear exhaust fan	3 LF	NF	NAD

HA= Homogeneous Area
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Condition:
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TABLE 1: Suspect Asbestos-Containing Materials
George Wilson Community Center
303 New London Road
Newark, Delaware

HA Area No.	Bulk Sample ID No.	Material Description	Color	Condition	Suspect ACM Locations	Est. Quantity	Friability	% Asbestos
HA25	B25A	Vent caulk	White	D	Associated with vent door exterior	3 LF	NF	NAD
HA26	B26A	Window caulk	White	D	Associated with older, double hung window exterior	8 LF	NF	4% Chrysotile
HA27	B27A	Glazing	White	D	SA HA26	1 unit	NF	NAD
HA28	B28A	Seam tar	Black	D	Exterior perimeter of building at building to sidewalk interface	TBD	NF	NAD
	B28B							NAD
END OF SURVEY NO OTHER ASBESTOS-CONTAINING MATERIALS IDENTIFIED BY THE LABORATORY								

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NAD= No Asbestos Detected
TBD= To Be Determined
SNA= Sample Not Analyzed

Friability:
F= Friable
NF= Non-Friable

Condition:
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BrightFields, Inc.
Environmental Services

APPENDICES

BrightFields, Inc.
Environmental Services

Appendix A

Asbestos Laboratory Analytical Results & Chain of Custody Documentation

EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042321657
Customer ID:	WIK50
Customer PO:	18347
Project ID:	

Attention:	Kelli Beeson	**Phone:**	(302) 985-1890
	BrightFields, Inc.	**Fax:**	
	801 Industrial Street	**Received Date:**	09/01/2023 11:55 AM
	Suite 1	**Analysis Date:**	09/06/2023
	Wilmington, DE 19801	**Collected Date:**	08/31/2023
Project:	1401.25.51/George Wilson Community Center		

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B01A *042321657-0001*	Throughout as walls - Sheetrock	White Non-Fibrous Homogeneous	HA: 001	100% Non-fibrous (Other)	None Detected
B01B *042321657-0002*	Throughout as walls - Sheetrock	White Non-Fibrous Homogeneous	HA: 001	100% Non-fibrous (Other)	None Detected
B01C *042321657-0003*	Throughout as walls - Sheetrock	White Non-Fibrous Homogeneous	HA: 001	100% Non-fibrous (Other)	None Detected
B02A *042321657-0004*	Associated with HA02 - Joint Compound	White Non-Fibrous Homogeneous	HA: 002	100% Non-fibrous (Other)	None Detected
B02B *042321657-0005*	Associated with HA02 - Joint Compound	White Non-Fibrous Homogeneous	HA: 002	100% Non-fibrous (Other)	None Detected
B02C *042321657-0006*	Associated with HA02 - Joint Compound	White Non-Fibrous Homogeneous	HA: 002	100% Non-fibrous (Other)	None Detected
B03A *042321657-0007*	Throughout as drop ceiling - 2 x 4 Ceiling Tile	Tan/White Non-Fibrous Homogeneous	40% Cellulose HA: 003	60% Non-fibrous (Other)	None Detected
B03B *042321657-0008*	Throughout as drop ceiling - 2 x 4 Ceiling Tile	Tan/White Non-Fibrous Homogeneous	40% Cellulose 8% Glass HA: 003	52% Non-fibrous (Other)	None Detected
B03C *042321657-0009*	Throughout as drop ceiling - 2 x 4 Ceiling Tile	Gray/White Non-Fibrous Heterogeneous	50% Cellulose HA: 003	50% Non-fibrous (Other)	None Detected
B04A *042321657-0010*	Throughout along walls - Cove base	Black Non-Fibrous Homogeneous	HA: 004	100% Non-fibrous (Other)	None Detected
B04B *042321657-0011*	Throughout along walls - Cove base	Black Non-Fibrous Homogeneous	HA: 004	100% Non-fibrous (Other)	None Detected
B04C *042321657-0012*	Throughout along walls - Cove base	Black Non-Fibrous Homogeneous	HA: 004	100% Non-fibrous (Other)	None Detected

Initial report from: 09/07/2023 10:45:22

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042321657
Customer ID:	WIK50
Customer PO:	18347
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B05A *042321657-0013*	Associated with HA04 - Cove base adhesive	Yellow Non-Fibrous Homogeneous	HA: 005	100% Non-fibrous (Other)	None Detected
B05B *042321657-0014*	Associated with HA04 - Cove base adhesive	Yellow Non-Fibrous Homogeneous	HA: 005	100% Non-fibrous (Other)	None Detected
B05C *042321657-0015*	Associated with HA04 - Cove base adhesive	Yellow Non-Fibrous Homogeneous	HA: 005	100% Non-fibrous (Other)	None Detected
B06A *042321657-0016*	Throughout first floor as original flooring (main activity room, bathroom entrance, and kiln room) - 12 x 12 Floor Tile	Tan Non-Fibrous Homogeneous	HA: 006	100% Non-fibrous (Other)	None Detected
B06B *042321657-0017*	Throughout first floor as original flooring (main activity room, bathroom entrance, and kiln room) - 12 x 12 Floor Tile	Tan Non-Fibrous Homogeneous	HA: 006	100% Non-fibrous (Other)	None Detected
B06C *042321657-0018*	Throughout first floor as original flooring (main activity room, bathroom entrance, and kiln room) - 12 x 12 Floor Tile	Beige Non-Fibrous Homogeneous	HA: 006	100% Non-fibrous (Other)	None Detected
B07A *042321657-0019*	Associated with HA06 - Flooring Mastic		HA: 007		Insufficient Material
B07B *042321657-0020*	Associated with HA06 - Flooring Mastic		HA: 007		Insufficient Material
B07C *042321657-0021*	Associated with HA06 - Flooring Mastic	Yellow Non-Fibrous Homogeneous	HA: 007	100% Non-fibrous (Other)	None Detected
B08A *042321657-0022*	Over HA06 and throughout rec room 1 - Poured rubber flooring	Tan/Blue Non-Fibrous Homogeneous	HA: 008	100% Non-fibrous (Other)	None Detected
B08B *042321657-0023*	Over HA06 and throughout rec room 1 - Poured rubber flooring	Tan/Blue Non-Fibrous Homogeneous	HA: 008	100% Non-fibrous (Other)	None Detected
B08C *042321657-0024*	Over HA06 and throughout rec room 1 - Poured rubber flooring	Yellow Non-Fibrous Homogeneous	HA: 008	100% Non-fibrous (Other)	None Detected

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EMSL Order:	042321657
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Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B09A *042321657-0025*	Associated woth HA08 - Glue Adhesive	Yellow Non-Fibrous Homogeneous	HA: 009	100% Non-fibrous (Other)	None Detected
B09B *042321657-0026*	Associated woth HA08 - Glue Adhesive		HA: 009		Insufficient Material
B09C *042321657-0027*	Associated woth HA08 - Glue Adhesive	Clear Non-Fibrous Homogeneous	HA: 009	100% Non-fibrous (Other)	None Detected
B10A *042321657-0028*	As flooring with south storage closet - 12 x 12 Floor Tile	Tan Non-Fibrous Homogeneous	HA: 010	95% Non-fibrous (Other)	5% Chrysotile
B10B *042321657-0029*	As flooring with south storage closet - 12 x 12 Floor Tile		HA: 010		Positive Stop (Not Analyzed)
B11A *042321657-0030*	Associated with HA10 - Flooring Mastic	Black Non-Fibrous Homogeneous	HA: 011	92% Non-fibrous (Other)	8% Chrysotile
B11B *042321657-0031*	Associated with HA10 - Flooring Mastic		HA: 011		Positive Stop (Not Analyzed)
B12A *042321657-0032*	As flooring within gym equipment storage room - 12 x 12 Floor Tile	White Non-Fibrous Homogeneous	HA: 012	100% Non-fibrous (Other)	None Detected
B12B *042321657-0033*	As flooring within gym equipment storage room - 12 x 12 Floor Tile	White Non-Fibrous Homogeneous	HA: 012	100% Non-fibrous (Other)	None Detected
B13A *042321657-0034*	Associated woth HA12 - Flooring Mastic	Black Non-Fibrous Homogeneous	HA: 013	94% Non-fibrous (Other)	6% Chrysotile
B13B *042321657-0035*	Associated woth HA12 - Flooring Mastic		HA: 013		Positive Stop (Not Analyzed)
B14A *042321657-0036*	As original flooring with kitchen - Unknown size floor tile	Tan Non-Fibrous Homogeneous	HA: 014	100% Non-fibrous (Other)	None Detected
B14B *042321657-0037*	As original flooring with kitchen - Unknown size floor tile	Tan Non-Fibrous Homogeneous	HA: 014	100% Non-fibrous (Other)	None Detected
B15A *042321657-0038*	Associated with HA14 - Flooring Mastic	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

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EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order: 042321657
Customer ID: WIK50
Customer PO: 18347
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
			HA: 015		
B15B *042321657-0039*	Associated with HA14 - Flooring Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 015		
B16A *042321657-0040*	Over HA14 - 12 x 12 Floor Tile	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 016		
B16B *042321657-0041*	Over HA14 - 12 x 12 Floor Tile	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 016		
B17A *042321657-0042*	Associated with HA16 - Flooring Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 017		
B17B *042321657-0043*	Associated with HA16 - Flooring Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 017		
B18A *042321657-0044*	As flooring in 1st floor bathroom - 12 x 12 Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 018		
B19A *042321657-0045*	Associated with HA18 - Flooring Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 019		
B20A *042321657-0046*	As flooring throughout basement - 12 x 12 Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 020		
B20B *042321657-0047*	As flooring throughout basement - 12 x 12 Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 020		
B20C *042321657-0048*	As flooring throughout basement - 12 x 12 Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 020		
B21A *042321657-0049*	Associated with HA20 - Flooring Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 021		
B21B *042321657-0050*	Associated with HA20 - Flooring Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 021		
B21C *042321657-0051*	Associated with HA20 - Flooring Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 021		
B22A *042321657-0052*	Associated with entry exterior stairs - Caulking/Putties	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 022		

Initial report from: 09/07/2023 10:45:22

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B22B *042321657-0053*	Associated with entry exterior stairs - Caulking/Putties	White Non-Fibrous Homogeneous	HA: 022	100% Non-fibrous (Other)	None Detected
B23A *042321657-0054*	Associated wth rear exterior door - Door caulk	Brown/White Non-Fibrous Homogeneous	HA: 023	100% Non-fibrous (Other)	None Detected
B24A *042321657-0055*	Associated with rear exhaust fan - Exhaust vent caulk	White Non-Fibrous Homogeneous	HA: 024	100% Non-fibrous (Other)	None Detected
B25A *042321657-0056*	Associated with vent door exterior - Vent caulk.	White Non-Fibrous Homogeneous	HA: 025	100% Non-fibrous (Other)	None Detected
B26A *042321657-0057*	Associated with older, double hung window exterior - Window caulk	White Non-Fibrous Homogeneous	HA: 026	96% Non-fibrous (Other)	4% Chrysotile
B27A *042321657-0058*	SA HA26 - Glazing	White Non-Fibrous Homogeneous	HA: 027	100% Non-fibrous (Other)	None Detected
B28A *042321657-0059*	Exterior perimeter of building at building to sidewalk interface - Seam tar	Black Non-Fibrous Homogeneous	HA: 028	100% Non-fibrous (Other)	None Detected
B28B *042321657-0060*	Exterior perimeter of building at building to sidewalk interface - Seam tar	Black Non-Fibrous Homogeneous	HA: 028	100% Non-fibrous (Other)	None Detected

Analyst(s)
Ericka Blackwell-Boyden (34)
Outhina Siripanyo (20)

Samantha Rundstrom, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA LAP, LLC-IHLAP Lab 100194, NJ DEP 03036, PA ID# 68-00367, LA #04127

Initial report from: 09/07/2023 10:45:22

042321657

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CINNAMINSON, NJ
2023 SEP -1 A 11:54

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

7TDW-72AR-4A6F

OrderID: 042321657

Client Information
BrightFields, Inc.
Wilmington, DE
WIK50

Project Overview

Client	
PO Number	18347
Project Name	George Wilson Community Center
Project ID	1401.25.51
Bill To	WIK50
Report To Contact	Kelli Beeson
Report To Email	kbeeson@brightfieldsinc.com
Special Instructions	**POSITIVE STOP**

Project Site

Building Type	Commercial
Address	303 New London Road
City	Newark
State	DE
Zip	

Testing Laboratory
Cinnaminson Asbestos
Cinnaminson, NJ 08077

Asbestos Bulk

HA	Sample ID	Material	Location	Date/Time Collected	Test Method	TAT	Notes
001	B01A	Sheetrock	Throughout as walls	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
001	B01B	Sheetrock	Throughout as walls	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
001	B01C	Sheetrock	Throughout as walls	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
002	B02A	Joint Compound	Associated with HA02	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
002	B02B	Joint Compound	Associated with HA02	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
002	B02C	Joint Compound	Associated with HA02	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
003	B03A	2 x 4 Ceiling Tile	Throughout as drop ceiling	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
003	B03B	2 x 4 Ceiling Tile	Throughout as drop ceiling	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
003	B03C	2 x 4 Ceiling Tile	Throughout as drop ceiling	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
004	B04A	Cove base	Throughout along walls	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
004	B04B	Cove base	Throughout along walls	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
004	B04C	Cove base	Throughout along walls	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
005	B05A	Cove base adhesive	Associated with HA04	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
005	B05B	Cove base adhesive	Associated with HA04	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
005	B05C	Cove base adhesive	Associated with HA04	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	

042321657

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7TDW-72AR-4A6F

OrderID: 042321657

HA	Sample ID	Material	Location	Date/Time Collected	Test Method	TAT	Notes
006	B06A	12 x 12 Floor Tile	Throughout first floor as original flooring (main activity room, bathroom entrance, and kiln room)	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
006	B06B	12 x 12 Floor Tile	Throughout first floor as original flooring (main activity room, bathroom entrance, and kiln room)	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
006	B06C	12 x 12 Floor Tile	Throughout first floor as original flooring (main activity room, bathroom entrance, and kiln room)	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
007	B07A	Flooring Mastic	Associated with HA06	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
007	B07B	Flooring Mastic	Associated with HA06	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
007	B07C	Flooring Mastic	Associated with HA06	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
008	B08A	Poured rubber flooring	Over HA06 and throughout rec room 1	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
008	B08B	Poured rubber flooring	Over HA06 and throughout rec room 1	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
008	B08C	Poured rubber flooring	Over HA06 and throughout rec room 1	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
009	B09A	Glue Adhesive	Associated woth HA08	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
009	B09B	Glue Adhesive	Associated woth HA08	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
009	B09C	Glue Adhesive	Associated woth HA08	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
010	B10A	12 x 12 Floor Tile	As flooring with south storage closet	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
010	B10B	12 x 12 Floor Tile	As flooring with south storage closet	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
011	B11A	Flooring Mastic	Associated with HA10	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
011	B11B	Flooring Mastic	Associated with HA10	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
012	B12A	12 x 12 Floor Tile	As flooring within gym equipment storage room	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
012	B12B	12 x 12 Floor Tile	As flooring within gym equipment storage room	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
013	B13A	Flooring Mastic	Associated woth HA12	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
013	B13B	Flooring Mastic	Associated woth HA12	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	

Page 2 Of 4

042321657

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

7TDW-72AR-4A6F

OrderID: 042321657

HA	Sample ID	Material	Location	Date/Time Collected	Test Method	TAT	Notes
014	B14A	Unknown size floor tile	As original flooring with kitchen	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
014	B14B	Unknown size floor tile	As original flooring with kitchen	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
015	B15A	Flooring Mastic	Associated with HA14	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
015	B15B	Flooring Mastic	Associated with HA14	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
016	B16A	12 x 12 Floor Tile	Over HA14	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
016	B16B	12 x 12 Floor Tile	Over HA14	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
017	B17A	Flooring Mastic	Associated with HA16	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
017	B17B	Flooring Mastic	Associated with HA16	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
018	B18A	12 x 12 Floor Tile	As flooring in 1st floor bathroom	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
019	B19A	Flooring Mastic	Associated with HA18	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
020	B20A	12 x 12 Floor Tile	As flooring throughout basement	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
020	B20B	12 x 12 Floor Tile	As flooring throughout basement	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
020	B20C	12 x 12 Floor Tile	As flooring throughout basement	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
021	B21A	Flooring Mastic	Associated with HA20	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
021	B21B	Flooring Mastic	Associated with HA20	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
021	B21C	Flooring Mastic	Associated with HA20	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
022	B22A	Caulking/Putties	Associated with entry exterior stairs	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
022	B22B	Caulking/Putties	Associated with entry exterior stairs	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
023	B23A	Door caulk	Associated wth rear exterior door	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
024	B24A	Exhaust vent caulk	Associated with rear exhaust fan	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
025	B25A	Vent caulk.	Associated with vent door exterior	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	

Page 3 of 4

042321657

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

RECEIVED
EMSL
CINNAMINSON, NJ
2023 SEP -1 A 11:54

7TDW-72AR-4A6F

OrderID: 042321657

HA	Sample ID	Material	Location	Date/Time Collected	Test Method	TAT	Notes
026	B26A	Window caulk	Associated with older, double hung window exterior	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
027	B27A	Glazing	SA HA26	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
028	B28A	Seam tar	Exterior perimeter of building at building to sidewalk interface	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	
028	B28B	Seam tar	Exterior perimeter of building at building to sidewalk interface	Aug 31, 2023 2:03 PM	PLM EPA 600	1 Week	

KEB Aug 31, 2023
Sampled By / Date

KEB Aug 31, 2023
Relinquished By / Date

GBZ 9/1/23 1155a
Received (Lab) / Date

Page 4 Of 4

BrightFields, Inc.
Environmental Services

Appendix B

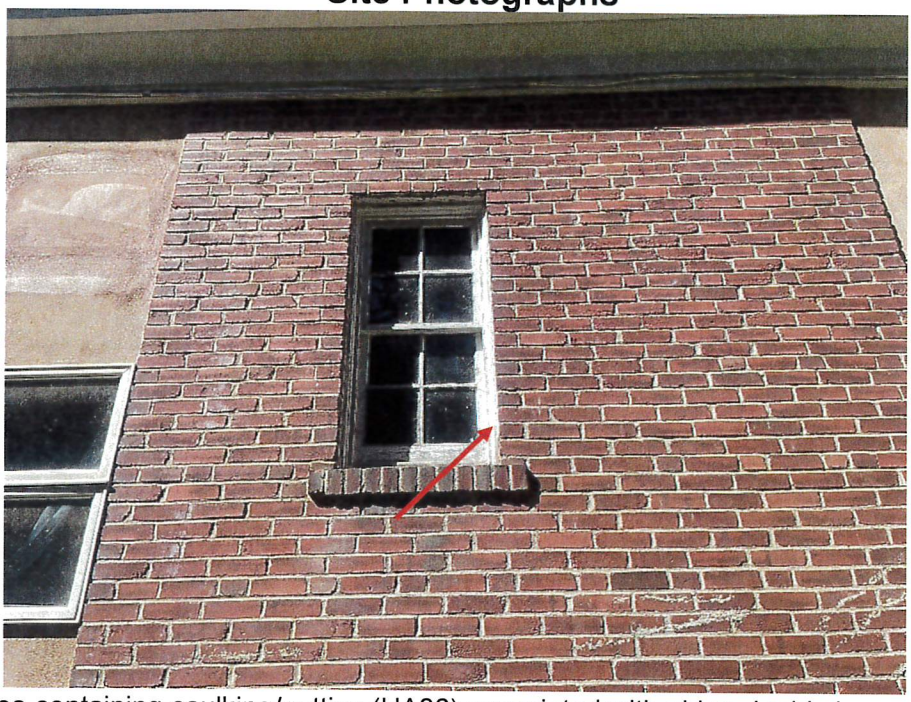
Site Photographs

Site Photographs

Asbestos-containing floor tile (HA10) and associated mastic (HA11) located within south storage closet.

Asbestos-containing flooring mastic (HA13) associated with floor tile located within gym equipment storage room.

Site Photographs



Asbestos-containing caulking/putties (HA26) associated with older, double hung window exterior. Window exterior casing positive for lead-based paint.

Appendix C

State of Delaware Asbestos Inspection Forms

STATE OF DELAWARE
ASBESTOS INSPECTION FORM

FACILITY NAME: George Wilson Community Center			
ADDRESS: 303 New London Road		TAX PARCEL: 1801300042	
CITY: Newark	COUNTY: New Castle	STATE: DE	ZIP: 19711
SITE CONTACT NAME: Jeff Martindale		CONTACT PHONE: 302.366.7000	
OWNER NAME: City of Newark			
OWNER ADDRESS: 220 S. Main St.			
CITY: Newark	COUNTY: New Castle	STATE: DE	ZIP: 19711
OWNER CONTACT: Jeff Martindale		OWNER PHONE: 302.366.7000	

FACILITY DESCRIPTION: G Agricultural X Commercial G Industrial G Institutional G Public G Residential

BUILDING DESCRIPTION (describe structure and size): Approx. 5,200 SF commercial building currently used as a community and meeting center. Flat membrane roof.

NOTE: This Survey Form was designed to be used for ONE Building/Structure only. Use additional forms for additional structures.

PROFESSIONAL SERVICE FIRM: BrightFields, Inc			
ADDRESS: 801 Industrial St.			
CITY: Wilmington	COUNTY: New Castle	STATE: DE	ZIP: 19801
INSPECTOR'S NAME: Kelli Beeson		PHONE NUMBER: 302.656.9600	
INSPECTOR'S CERTIFICATION: VAIREF11102022-1 PM# - 773		PROFESSIONAL SERVICE FIRM CERTIFICATION: PS# - 125	
TYPE OF INSPECTION: X RENOVATION G DEMOLITION		DATE OF INSPECTION: 8/31/2023	

IS ASBESTOS CONTAINING MATERIAL PRESENT? X YES G NO *See summary results on page 2.*

I hereby certify, that I am a Delaware Licensed inspector employed by a Delaware Licensed Professional Service Firm and that the building and/or contents therein located at the property identified above have been inspected for asbestos containing materials in accordance with the State of Delaware Regulations Governing the Control of Air Pollution, Regulation #21 Section 10

Name: Kelli Beeson

Title: Environmental Analyst

Signature: Kelli E. Beeson

Date: 9/13/2023

If ACM is present and will be disturbed, removed or abated: **TBD**

Name of Abatement Company (Print Company Name)_____

Phone #_____ Asbestos Abatement Contractor License #_____

The State of Delaware requires a licensed asbestos abatement contractor for all abatement projects except for work performed in an owner-occupied single family dwelling.

Asbestos Abatement & Demolition/Renovation Notification Form submitted to DNREC/USEPA

Region 3 on _____ (insert date) _____ (insert DOANS #)

The Notification must be submitted a minimum of 10-days prior to beginning the abatement project (see 40 CFR 61 Subpart M).

SUMMARY OF ABESTOS SURVEY/INSPECTION					
Material/Product Surveyed[1]	**Sampled? – Yes/No[2]**	**ACM Present (%)[3]**	**Condition of ACM/ Suspected ACM** (e.g. good, damaged)	**Qty ACM Present** (lf, sf, cf)	**Friable? – Yes/No**
ROOFING & SIDING					
o Roof felt shingles	❑ Yes X No				❑ Yes ❑ No
o Roofing shingles	❑ Yes X No				❑ Yes ❑ No
o Roofing Tiles	❑ Yes X No				❑ Yes ❑ No
o Siding shingles	❑ Yes X No				❑ Yes ❑ No
o Clapboards	❑ Yes X No				❑ Yes ❑ No
o Other– describe _____	❑ Yes X No				❑ Yes ❑ No
WALLS & CEILINGS					
o Ceiling Tiles	X Yes ❑ No				❑ Yes ❑ No
o Ceiling Tile Mastic	❑ Yes X No				❑ Yes ❑ No
o Sprayed/Troweled coating	❑ Yes X No				❑ Yes ❑ No
o Asbestos-cement sheet	❑ Yes X No				❑ Yes ❑ No
o Paneling, Tile, Baseboard Mastic	X Yes ❑ No				❑ Yes ❑ No
o Spackle/Joint compounds	X Yes ❑ No				❑ Yes ❑ No
o Textured paints	❑ Yes X No				❑ Yes ❑ No
o Millboard, rollboard	❑ Yes X No				❑ Yes ❑ No
o Vinyl wallpaper	❑ Yes X No				❑ Yes ❑ No
o Insulation board	❑ Yes X No				❑ Yes ❑ No
o Other– Drywall	X Yes ❑ No				❑ Yes ❑ No
o Other– Cove Base	X Yes ❑ No				❑ Yes ❑ No
FLOORS					
o Vinyl-asbestos tile	X Yes ❑ No	5%	Good	135 SF	❑ Yes X No
o Asphalt-asbestos tile	❑ Yes X No				❑ Yes ❑ No
o Resilient sheet flooring	❑ Yes X No				❑ Yes ❑ No
o Mastic adhesives	X Yes ❑ No	6-8%	Good	285 SF	❑ Yes X No
o Other– Poured Rubber Flooring	X Yes ❑ No				❑ Yes ❑ No
PIPES & BOILERS					
o Cement pipe and fittings	❑ Yes X No				❑ Yes ❑ No
o Block insulation	❑ Yes X No				❑ Yes ❑ No
o Preformed pipe wrap	❑ Yes X No				❑ Yes ❑ No
o Corrugated asbestos paper	❑ Yes X No				❑ Yes ❑ No
o Paper tape	❑ Yes X No				❑ Yes ❑ No
o Putty (mudding)	❑ Yes X No				❑ Yes ❑ No
o Other– describe _____	❑ Yes X No				❑ Yes ❑ No
OTHER PRODUCTS					
o Window Glazing Putty	X Yes ❑ No				❑ Yes ❑ No
o Building Caulk	X Yes ❑ No	4%	Damaged	8 LF	❑ Yes X No
o Gaskets/Packing	❑ Yes X No				❑ Yes ❑ No
o Clothing/Cloth/Blankets	❑ Yes X No				❑ Yes ❑ No
o Cement/mortar	❑ Yes X No				❑ Yes ❑ No
o Metal-clad firebrick	❑ Yes X No				❑ Yes ❑ No
o Gunnite/fire-proofing spray	❑ Yes X No				❑ Yes ❑ No
o Hot-tops (ingot mold covers and inserts)	❑ Yes X No				❑ Yes ❑ No
o Other – Seam Tar_____	X Yes ❑ No				❑ Yes ❑ No

[1]This list is not an exclusive list of potential materials containing asbestos and the inspector should use it only as a minimal reference of potential asbestos containing materials present.

[2]No sampling is required if the inspector suspects that the materials are ACM and treats them as ACM. For a suspect material to be classified as non-ACM, a minimum number of samples must be collected and analyzed as required by AHERA/ASHARA regulations.

[3]All materials identified as having an asbestos content greater than 1% are considered to be regulated asbestos containing materials (RACM).

NOTE: If this structure is to be demolished by intentional burning by a Delaware Fire Company. This form must be provided to the Fire Company in order for DNREC-AQM to process the Fire Fighting Instruction by intentional burning application.

BrightFields, Inc.
Environmental Services

Appendix D

Certifications

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that

KELLI BEESON

has met the attendance requirements and successfully completed the course entitled

4-HOUR EPA ASBESTOS INSPECTOR REFRESHER

For Accreditation Under TSCA Title II

11/10/2022	11/10/2022	11/10/2023	STEVE SIERACKI
Course Date	***Exam Date***	***Expiration Date***	***Principal Instructor***

VAIREF11102022-1	VAVAIREF11102022-1	E. Rush Barnett
Certification No.	***Virginia Certification No.***	***Course Director***

1331 Ashton Road P.O.Box 646 Hanover, MD 21076 P: 410-684-3327 F: 410-684-3724

www.amatraining.com

Certificate of Completion

awarded to

Tanner Schmitt

for successfully completing the prescribed course of study in

Pennsylvania Asbestos Building Inspector Initial Course

under TSCA Title II

presented by

ACCESS TRAINING SERVICES, INC.
7921 River Road, Pennsauken, NJ 08110
(856) 665-3449

3/27-29/23	3/29/23	3/29/24
Course Date	*Exam Date*	*Expiration Date*
Not Provided	ACC-0323-5-002	*Mark K. Schläger*
Social Security Number	*Certificate Number*	*Training Director*

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that

SEAN SCANLON

has met the attendance requirements and successfully completed the course entitled

1-DAY EPA ASBESTOS PROJECT DESIGNER REFRESHER

For Accreditation Under TSCA Title II

12/16/2022	12/16/2022	12/16/2023	STEVE SIERACKI
Course Date	***Exam Date***	***Expiration Date***	***Principal Instructor***

VAPDR12162022-10	VAVAPDR12162022-10	E. Rush Barnett
Certification No.	***Virginia Certification No.***	***Course Director***

1331 Ashton Road *P.O.Box 646* *Hanover, MD 21076* *P: 410-684-3327* *F: 410-684-3724*

www.amatraining.com

DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health
Healthy Homes and Lead Poisoning Prevention

April 4, 2022

Kelli Beeson
12 Stalwart Drive
Newark, DE 19713

Dear Mr./Ms. Beeson,

The Delaware Division of Public Health, Office of Healthy Environments, Healthy Homes and Lead Poisoning Prevention Program (HHLPP) would like to welcome you as a certified individual to the Lead Poisoning Prevention Program. This letter provides information that will help you become familiar with the requirements and resources for certified individuals in Delaware.

The Division of Public Health's mission is to protect and promote the health of all people in Delaware. One way we carry out our mission is by working closely with you to reduce exposure to lead-based paint hazards and prevent lead poisoning in children and adults. The HHLPP oversees enforcement of lead work in Delaware and monitors compliance of the regulated community; including individuals, firms and training providers. Services provided by our office include technical assistance, individual and firm certification, regulatory guidance and general information about lead poisoning prevention resources available throughout the state.

A Web page for contractors is available at www.LeadSafeDelaware.org. The Web pages provide a variety of useful information for individuals that perform work in older residences and buildings. We encourage you to visit the Web site frequently for the latest RRP news.

Our goal is to provide you with assistance and information to help you stay lead safe and comply with all State requirements. Program staff are available to answer any technical questions you may have about the RRP program or regulatory requirements. You may contact the Healthy Homes and Lead Poisoning Prevention Program staff by calling 302-744-4546.

Enclosed, please find a copy of your individual badge that must be available (either hard copy or electronic) on the jobsite for any pre-1978 work in target housing and/or a child occupied facility. The Healthy Homes and Lead Poisoning Prevention staff and I look forward to working with you. If we can be of service to you, please don't hesitate to contact us.

Sincerely,

William Leitzinger
Public Health Treatment Program Administrator
Healthy Homes and Lead Poisoning Prevention Program

JESSE S. COOPER BUILDING • FEDERAL STREET • DOVER • DELAWARE
MAILING ADDRESS: 417 FEDERAL STREET • DOVER • DELAWARE • 19901
TELEPHONE: (302) 744-4811 • FAX: (302) 739-6659

Kelli Beeson

Current Certifications:

Discipline	Expiration
Risk Assessor	02/24/2024

ID #:

000277

Karyl T. Rattay, MD, MS, FAAP, FACP
Director, Division of Public Health
Delaware Health & Social Services

DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

Healthy Homes and
Lead Poisoning Prevention Program
417 Federal Street
Dover, DE 19901
(302) 744-4546

This badge is the property of Division of Public Health. Report loss or theft of this badge immediately to Division of Public Health. Counterfeiting, alteration or misuse of this badge is prohibited. Use or possession by any other person is unlawful and will make the offender liable to penalty under

INSTITUTE OF HAZARDOUS MATERIALS MANAGEMENT

THIS CERTIFIES THAT

Nicholas Bradley

HAS SUCCESSFULLY MET ALL THE REQUIREMENTS OF EDUCATION, EXPERIENCE AND EXAMINATION, AND IS HEREBY DESIGNATED A

CERTIFIED HAZARDOUS MATERIALS MANAGER®

CHMM®

1/26/2018	31472
DATE OF CERTIFICATION	CREDENTIAL NUMBER
1/31/2028	
CERTIFICATION EXPIRES	EUGENE A. GUILFORD, JR. EXECUTIVE DIRECTOR

INSTITUTE OF HAZARDOUS MATERIALS MANAGEMENT
CERTIFIED HAZARDOUS MATERIALS MANAGER
CHMM
IHMM

VERIFIABLE AS AUTHENTIC AT
https://online.ihmm.org/ihmmssa/censsacustlkup.query_page

ANAB
ANSI National Accreditation Board
ACCREDITED
PERSONNEL CERTIFICATION BODY

Accredited by the American National Standards Institute and the Council of Engineering and Scientific Specialty Boards

BrightFields, Inc.
Environmental Services

Appendix E

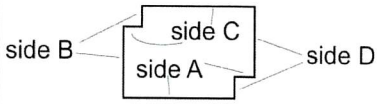
Lead Paint Sampling Forms

BrightFields, Inc.
Environmental Services

Lead Paint Sampling Form

Site Address:	303 New London Road
City, State ZIP:	Newark, Delaware 19711
Date:	8/31/2023
BrightFields file:	1401.25.51

Definition of Sides:



address side of structure

XRF Calibration Check (0.85 – 1.20):
1.02 PASS

Calibration Type: _X_Initial __4-hour __Exit

Job type: __Risk Assess. __Inspection _X_Other

Location/Room	Component	Side	Color	Substrate	Result (mg/cm²)
South Entry	Double Doors	B	Blue	M	0.24
South Entry	Double Door Jamb/Casing	B	Blue	W	0.0
South Entry	Door	A	Blue	W	0.12
South Entry	Door Jamb/Casing	A	Blue	W	0.16
South Entry	Passageway Jamb/Casing	C	Blue	W	0.27
Main Activity Room	Window Interior Sashes	A	Blue	W	0.0
Main Activity Room	Window Interior Casing	A	Blue	W	0.20
Main Activity Room	Window Interior Sill	A	Blue	W	0.0
Main Activity Room	Walls	ALL	Tan	D	0.0
Rec Room 1	Walls	ALL	Tan	D	0.0
Rec Room 1	Shelving Unit	-	Dk. Blue	W	0.0
North Stairwell	Tread	-	Beige	M	0.01
North Stairwell	Stringers	ALL	Beige	M	0.04
North Stairwell	Railing	-	Beige	M	0.0
Basement Hallway	Walls	ALL	White	C	0.0
Basement Hallway	Doors	B, C, D	Blue	W	0.0
Basement Hallway	Door Jambs/Casings	B, C, D	Blue	W	0.0
Room 2	Window Interior Sill	C	White	W	0.0
Room 2	Window Interior Casing	C	White	W	0.22
Room 2	Walls	A, B, D	White	C	0.0
Room 2	Wall	C	White	Br	0.0
Pottery Studio	Window Interior Sill	C	White	W	0.0
Pottery Studio	Window Interior Casing	C	White	W	0.0
Pottery Studio	Walls	A, B, D	White	C	0.0
Pottery Studio	Wall	C	White	Br	0.0
South Stairwell	Tread	-	Beige	M	0.02
South Stairwell	Stringers	ALL	Beige	M	0.02
South Stairwell	Railing	-	Beige	M	0.0
North Entry	Double Doors	D	Blue	M	0.0
North Entry	Double Door Jamb/Casing	D	Blue	W	0.0
Exterior	Window Sashes	A	White	W	0.20
Exterior	Window Casing	A	White	W	1.25

XRF Calibration Check (0.85 – 1.20):
1.02 PASS

Calibration Type: __Initial __4-hour _X_Exit

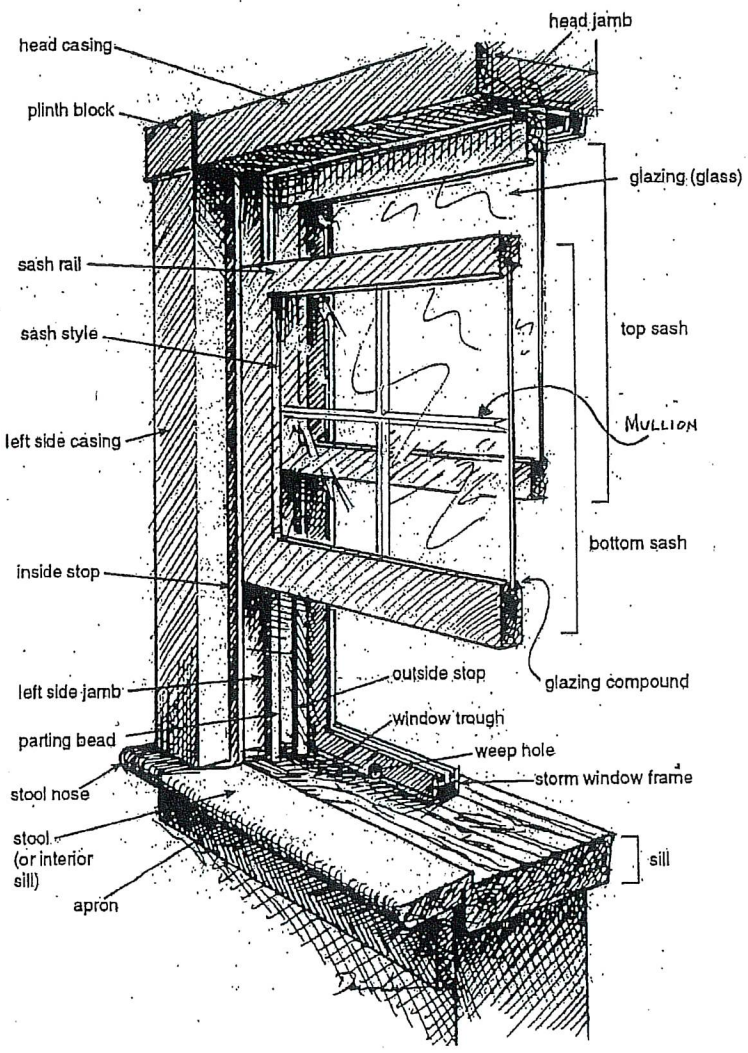
NOTES: ***Result is in the XRF "inconclusive range" and should be considered to be positive.** Paint condition is not recorded for Inspections or targeted paint testing. **Lead Paint:** any paint containing lead at a concentration of **1.0 mg/cm² or greater**
Substrate Abbreviations: W = wood, D = drywall/plaster, M = metal, C = concrete, B = brick, PL = plastic/vinyl
Condition Abbreviations: , DE = deteriorated condition, I = intact condition # = friction surface
Corrective Actions: 1 = Enclosure, 2 = Remove/replace component, 3 = Strip/repaint component, 4 = Stabilize/repaint (use interim controls), 5 = Other

BrightFields, Inc.
Environmental Services

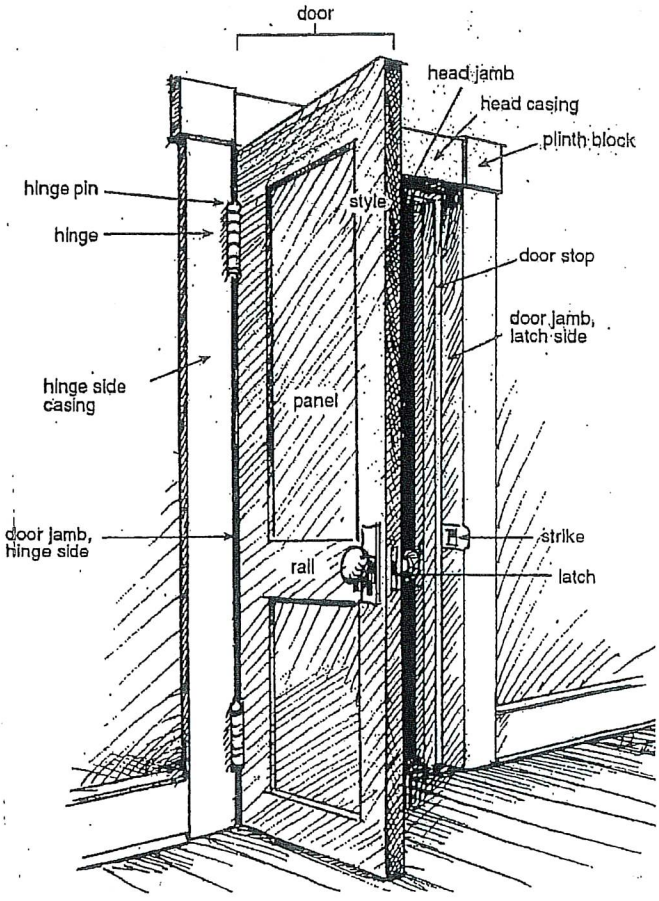
Appendix F

Building Component Diagram

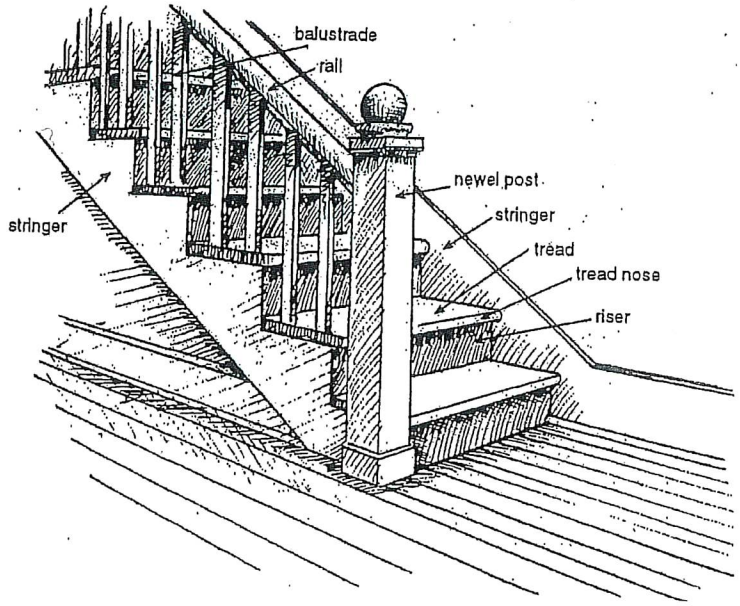
Window components



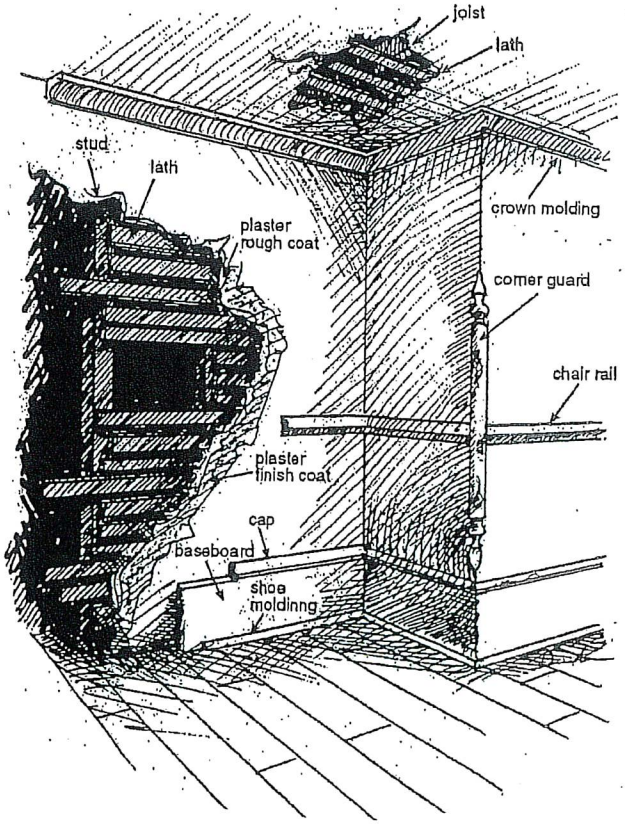
Door components

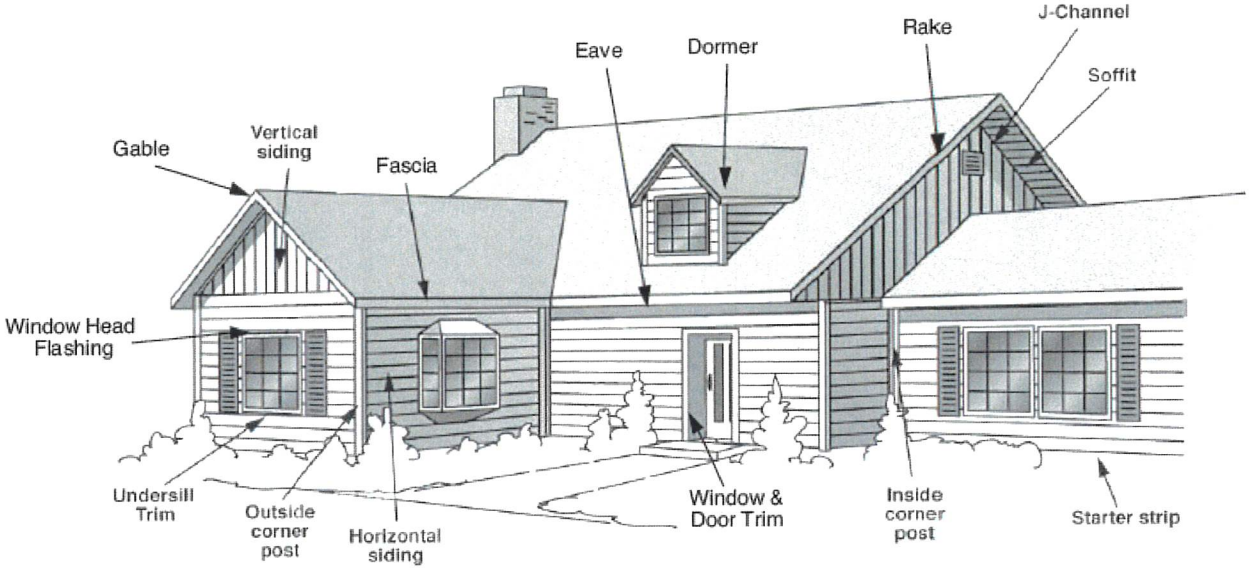


Stair components



Wall/trim components




J-Channel
Rake
Eave
Dormer
Soffit
Gable
Vertical siding
Fascia
Window Head Flashing
Undersill Trim
Outside corner post
Horizontal siding
Window & Door Trim
Inside corner post
Starter strip

BrightFields, Inc.
Environmental Services

Appendix G

Inventory of Hazardous, Universal, and Environmentally Sensitive Waste

Appendix G.1
Summary of Hazardous Materials Inventory
George Wilson Community Center
Newark, Delaware

Material/Item	Location	Quantity	RCRA/TSCA Waste Classification	Primary Waste Code (if applicable)
Unknown Products				
Unknown solid	Ground Floor Closet	25 pounds	Further Analysis Required	
Unknown liquid cleaner	1st Floor	1 quart	Further Analysis Required	
Chemical Products				
Leslie Pool Test Kit	Ground Floor Closet	4 kits (<1 gallon liquid)	Hazardous liquid	D002
Taylor K-2005 Pool Test Kit and spare reagents	Ground Floor Closet	1 kit (<1 quart liquid)	Hazardous liquid	D002
Mold Armor EZ House Wash	Ground Floor Closet	6 gallons	Non-hazardous liquid	
Inopak Style hand soap	Ground Floor Closet	1 gallon	Non-hazardous liquid	
Mighty Tuff Drain Maintainer	Ground Floor Closet	1 gallon	Non-hazardous liquid	
AquaChem Glass Hard Surface Cleaner	Ground Floor Closet	1 pound	Non-hazardous liquid	
DAP Painter's Putty "53"	Ground Floor Closet	16 ounce	Non-hazardous solid	
DRYLOK Latex Bonding Agent	Ground Floor Closet	1/2 gallon	Non-hazardous liquid	
Roberts 2057 VCT Adhesive	Ground Floor Closet	1 gallon	Non-hazardous solid	
Latex Paint	Ground Floor Closet	5 gallons	Non-hazardous liquid	
DAP ReadyMix Concrete Patch	Ground Floor Closet	2 gallons	Non-hazardous solid	
MPC Once-n-Done Floor Finish	Ground Floor Closet	5 gallons	Hazardous liquid	D002
Muriatic Acid	Ground Floor Closet	4 gallons	Hazardous liquid	D002
Home Armor Mildew Blocker	Ground Floor Closet	5 quarts	Non-hazardous liquid	
LA's Totally Awesome Cleaner	Ground Floor Closet	1 quart	Non-hazardous liquid	
Alcohol-based Hand Sanitizer	1st Floor Kitchen	2 gallons	Hazardous liquid	D001
Zep Neutral pH Floor Cleaner	1st Floor Kitchen	1 gallon	Non-hazardous liquid	
Soft Scrub Cleanser	1st Floor Kitchen	1 quart	Non-hazardous liquid	
Hadi Klenz Brite Star	1st Floor Kitchen	1 gallon	Hazardous liquid	D001
Lysol Kitchen Pro	1st Floor Kitchen	1 quart	Non-hazardous liquid	
Starco Low Temp Rinse	1st Floor Kitchen	5 gallons	Non-hazardous liquid	
"Detergent Mixture"	1st Floor Kitchen	5 gallons	Presumed non-hazardous liquid	
TrueKleen Tidy Tim	1st Floor Kitchen	1 quart	Hazardous liquid	D002
NCL Flexi-Sheen	1st Floor Kitchen	1 gallon	Non-hazardous liquid	
Invisible Glass Spray	1st Floor Kitchen	1 quart	Hazardous liquid	D001
Emerald Forest Detergent	1st Floor Closet	5 gallons	Non-hazardous liquid	
Calcium Chloride Ice Melt	1st Floor Closet	50 pounds	Non-hazardous solid	

Notes:
RCRA - Resource Conservation Recovery Act.
TSCA - Toxic Substance Control Act.
Est - Estimated quantity
*Products that are genuinely recycled, such as virgin and uncontaminated used oils, are not subject to hazardous waste regulations under RCRA
Shaded - Product is presumed hazardous under RCRA.

Appendix G.2
Universal and Environmentally-Sensitive Wastes
George Wilson Community Center
Newark, Delaware

RCRA Universal Wastes		
Material/Item	**Quantity**	**Notes**
Lamps		
Fluorescent Lamp Tubes, 2'	6 units	
Fluorescent Lamp Tubes, 4'	220 units	
Batteries		
Sealed Lead Acid batteries	42 lbs	
Mercury Containing Equipment		
No mercury-containing equipment was identified.		
Pesticides		
No recalled or cancelled pesticides were identified.		
Aerosols		
Miscellaneous cleaners	1 5-gallon Pail	

Other Envionmentally-Sensitive Materials		
Material/Item	**Quantity**	**Notes**
Fire extinguishers		
Dry chemical type	6 units	Est. 20 lbs ea.
Lamp Ballasts		
Lamp Ballasts, non-leaking*	110 units	*Assumed PCB, non-leaking.
General Electronic Waste		
No electronics were identified for disposal		
Refrigerant-Containing Equipment		
Water fountain/Bottle filler	1 unit	

CITY OF NEWARK
DELAWARE

ATTACHMENT 3
State of Delaware Prevailing Wages for Building Construction

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 318-2769

Mailing Address:
252 Chapman Road
Suite 210
Newark, DE 19702

Located at:
252 Chapman Road
Suite 210
Newark, DE 19702

PREVAILING WAGES FOR **BUILDING CONSTRUCTION** EFFECTIVE MARCH 14, 2025

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	29.89	36.79	53.56
BOILERMAKERS	89.46	45.39	66.72
BRICKLAYERS	66.79	66.79	66.79
CARPENTERS	62.56	62.56	50.80
CEMENT FINISHERS	94.36	67.11	52.04
ELECTRICAL LINE WORKERS	59.42	50.96	38.85
ELECTRICIANS	83.92	83.92	83.92
ELEVATOR CONSTRUCTORS	117.63	84.30	100.06
GLAZIERS	85.50	85.50	74.04
INSULATORS	69.12	69.12	69.12
IRON WORKERS	77.73	77.73	77.73
LABORERS	57.65	57.65	57.65
MILLWRIGHTS	88.35	88.35	70.97
PAINTERS	59.63	59.63	59.63
PILEDRIVERS	91.12	51.44	41.60
PLASTERERS	39.01	39.01	28.91
PLUMBERS/PIPEFITTERS/STEAMFITTERS	79.55	82.95	73.71
POWER EQUIPMENT OPERATORS	83.29	83.29	83.29
ROOFERS-COMPOSITION	32.40	30.53	32.76
ROOFERS-SHINGLE/SLATE/TILE	24.03	28.59	22.47
SHEET METAL WORKERS	86.84	86.84	86.84
SOFT FLOOR LAYERS	61.68	61.68	47.74
SPRINKLER FITTERS	73.13	73.13	73.13
TERRAZZO/MARBLE/TILE FNRS	70.79	70.79	81.89
TERRAZZO/MARBLE/TILE STRS	78.73	78.73	90.82
TRUCK DRIVERS	56.88	35.86	27.91

CERTIFIED: 10/08/2025

BY: For Fran Chudzik
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 318-2769.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: 25-01 GEORGE WILSON CENTER IMPROVEMENTS, New Castle County

PREVAILING WAGE DEBARMENT LIST

The following contractors have been debarred for violations of the prevailing wage law 29Del.C. §6960 or other applicable State statutes.

Therefore, no public construction contract in this State shall be bid on, awarded to, or received by contractors and individuals on this list for a period of (3) three years from the date of the judgment or as deemed by a court of competent jurisdiction.

Contractor	Address	Date of Debarment
Mullen Brothers, Inc. and Daniel Mullen, individually	3375 Garnett Road, Boothwyn, PA 19060	Indefinite/ Civil Contempt
State Contractors Corporation, and Jose Oscar Rivera, individually	13004 Hathaway Drive Silver Spring, MD 20906	Indefinite/ 19 Del.C. 2374(f)
Green Granite and Jason Green, individually	604 Heatherbrooke Court Avondale, PA 19311	Indefinite/ Civil Contempt
Pro Image Landscaping, Inc. and Owner(s) individually	23 Commerce Street Wilmington, DE 19801 and/or 2 Cameo Road Claymont, DE 19703	Indefinite/19 Del.C. §108 & 10 Del.C. 542(c)
Liberty Mechanical, LLC and Owner(s), individually	2032 Duncan Road Wilmington, DE 19801	Indefinite/ 19 Del.C. 2374(f)
Integrated Mechanical and Fire Systems Inc. and Allison Sheldon, individually	4601 Governor Printz Boulevard Wilmington, DE 19809	Indefinite/19 Del.C. §108 & 10 Del.C. 542(c)
ACH 1, INC.	873 Salem Church Road Newark, DE 19702	Indefinite/19 Del.C.6960

Updated: July 6, 2022