

ADDENDUM NO. 1

to
CONTRACT DOCUMENTS

for
NEW FANWOOD MEMORIAL LIBRARY
5 Forest Road, Fanwood, NJ 07023

for the
BOROUGH OF FANWOOD
FANWOOD, UNION COUNTY, NEW JERSEY

Issued: August 12, 2022

FVHD PROJECT #5292

FRAYTAK VEISZ HOPKINS DUTHIE, P.C.
Architects-Planners
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Trenton, New Jersey 08618
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T&M Associates
Consulting Civil Engineers
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Peter F. Bondar, P.E., No. GE48108

HARRISON - HAMNETT, PC
Consulting Structural Engineers
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Donald M. Hamnett, P.E., No. 17976

JOHNSON & URBAN, LLC
Consulting MEP Engineers
295 Highway 34, Colts Neck, NJ 07722
Mark E. Lonergan, P.E., No. 24GE04074900

INTENT: This Document supersedes all conflicting and contrary information in said Contract Documents. Said documents are hereby amended in certain particulars as described herein after. Unless specifically noted or specified hereinafter all work shall conform to the applicable provisions of the Contract Documents. Bidders shall acknowledge receiving this document on the Bid Proposal Form.

CLARIFICATION:
The Bid Opening date has been changed in the revision to the BID NOTICE:
"SEALED BIDS ARE DUE BY WEDNESDAY, AUGUST 24, 2022"

This Addendum includes fifteen (15) pages and the following:

1. Pre-Bid Meeting Sign-In Sheet, dated 08/02/22, 2-pages.
2. Addendum No. 1, as prepared by Johnson & Urban, LLC, dated 08/10/22, 2-pages.
3. Revised Bid Form: Work Force Questionnaire, 1-page.
4. New Bid Form: Sworn Contractor Certification; Qualifications and Credentials (Contractor & Subcontractors), 1-page.
5. Revised Drawings:
 - a. Civil: C003, C004, C007.
 - b. Architectural: A401, A402, A403, A601.
 - c. Structural: S201, S202.
 - d. Electrical: E201, E202, E302.
6. Revised Specification Sections: 01800, 05731, 08305, 221116, 221119, 221316, 221319.
7. New Specification Sections: 08700, 27-pages; 220517, 5-pages; 220519, 7-pages; 221413, 11-pages; 221423, 7-pages.

REQUEST FOR INFORMATION (RFI'S)

1. Question: Please provide Section 08700 Finish Hardware Specifications. It was missing from Vol. 1 of the Specifications.
Response: Enclosed in this Addendum is Section 08700.
2. Question: Is ProPress acceptable for the above slab domestic water?
Response: ProPress is acceptable for above slab domestic water joints. Refer to Sections 221116 and 221119 attached to this Addendum
3. Question: Sanitary W&V Specs call for service weight cast iron with neoprene gaskets for the above slab waste & vent. Please confirm.
Response: W&V above slab to be no hub cast iron with shielded couplings. Refer to revised Specification Section 221316 and 221319, attached to this Addendum.
4. Question: There are no storm water specs. Please advise what type of material is required
Response: Refer to Specification Sections 221413 and 221423 attached to this Addendum. Also refer to Section 334200 in the Specification manual.
5. Question: We respectfully request that the time for the receipt of bids be changed to 1 or 2 pm. Pricing from HVAC equipment suppliers and Electrical Supply houses are sent to the Mechanical & Electrical Subcontractors on the day of the bid opening. A 10 am bid opening does not allow sufficient time for them to review & prepare their quotes and get them to the GC's.
Response: The Owner advised FVHD to keep the bid opening at 10:00 AM.

6. Question: Is a separate site trailer for the architect/owner required for this project? If so, please provide the requirements as Section 01505 does not list any.
- Response: No separate Owner / Architect trailer is required.
7. Question: The document set includes duplicate specifications (numbers and descriptions) for 260519, 260533, and 260923, however each duplicate spec. contains different information. Please advise and/or reissue the correct specifications with notations on what work they cover.
- Response: There is no mistake in the specification manual. As identified in the Table of Contents and separate specification Volumes, the above identified sections belong to:
- 1) Volume 1: Site related work,
 - 2) Volume 2: Building related work.
8. Question: Table of Contents lists the HVAC Instrumentation and Controls spec number as 230923, however the actual specification number included in the document set is 230913.
- Table of Contents listed the Ceiling Mounted Recessed Front Projection Screen as 11132, however the actual specification number included in the document set is 11133.
- Please update the Table of Contents accordingly.
- Response: Refer to revisions to the Table of Contents (indicated below)
9. Question: Is Asbestos Abatement part of this contract or by owner? If part of this contract, please provide specifications and quantities of the materials to be abated.
- Response: Hazardous material abatement and legal disposal is part of the Contract if the Alternate Bid is awarded. Please refer to Section 024116 and the Hazardous Material Survey which is located after Section 024116.
10. Question: Is the GC required to provide a Builder's Risk Policy? Referenced in Supplemental General Conditions.
- Response: Yes.
11. Question: Is the GC required to provide Railroad Protective Insurance Policy? Referenced in Supplemental General Conditions.
- Response: No.
12. Question: Please provide Landscaping Specifications.
- Response: Refer to Drawing C016
13. Question: Please provide size of the existing waterline at Tillotson Road indicated on C-005 or provide size of the wet tap required for 6" Dia. and 2" Dia. new waterline connection to include in the bid.
- Response: The existing water main is a 6" diameter pipe.

14. Question: Dwg C-005 indicates new Gas line coming from Tillotson Road to building. Please confirm utility company is providing this gas line up to gas meter including excavation and backfill and the GC needs to coordinate only.
- Response: Yes. Confirmed.
15. Question: Dwg. C-003 indicates remove and salvage 6 pcs. of existing light poles while Dwg C-007 indicates 5 pcs. of reinstalls light pole and 1 existing pole TO REMAIN. Please confirm the quantity of light pole to be reinstalled with new concrete pole bases.
- Response: See revised drawings C-003 and C-007. All six (6) light poles are to be salvaged and reinstalled with new concrete bases.
16. Question: Note # 6 on C-008 indicates off duty police traffic director by GC. Please reconsider to be paid thru Allowances as cost is unknown and not predictable.
- Response: The Police Department Traffic Directors shall be paid directly through the Borough of Fanwood and coordinated by the General Contractor.
17. Question: Dwg. C-015 indicate flag pole details with note signed and sealed NJPE for foundation design. As far as existing flag pole to be reinstalled and only new sleeve, lightening spike and concrete foundation already provided, please consider eliminating this Requirement.
- Response: No change in the plan.
18. Question: Dwg. C-004, at Tillotson Road indicates milling and paving. Please confirm new curb approximately 95 LF is required at between Asphalt and walkway which are not called out on the drawing. Also, if it is new curb, it is Belgium block curb or concrete curb required? Please clarify.
- Response: Existing curb to remain next to the proposed milling and paving. If the curb is damaged during construction, belgian block to be installed.
19. Question: In Community Room 129 Cross section marked as 15A/A-304 not found on A-304. Please provide, if applicable.
- Response: Wall Section 15A is located in the upper left corner of the drawing.
20. Question: Please confirm that Window Shades are not required for this project. None found.
- Response: Correct. Window shades are Not in Contract.
21. Question: Dwg A402 calls out 2 locations of Book Security Gates which is specified in Section 11028 Book Security System. The Basis of Design is Bibliotheca. In the Circulation Desk Rm 111 there is a Bibliotheca Machine tagged as NIC. Please clarify.
- Response: The "Bibliotheca Machine - N.I.C." in room #111, is an existing piece of the book detection system in the current library that will be salvaged and relocated to the new building.

22. Question: Dwg A402, Community Rm Storage Area; are the Carts for High Density Stacking Chairs and Nesting Tables part of this contract? If so, please provide the Manufacturer and Model #'s of these items.
- Response: The "Carts for High Density Stacking Chairs" located in Storage Room #134 are N.I.C.
23. Question: The Bid Documents provide forms for Performance and Payment Bonds. However, Article A3.4 of the Document A101-2017 Exhibit A states that Payment and Performance Bonds shall be AIA Document A312. Please confirm which are required.
- Response: Use the Guaranty and Performance Bond included in the specification manual.
24. Question: Please provide pre-bid meeting sign-in sheet and minutes of meeting held on Aug 3rd, 2022.
- Response: The Pre-Bid sign-in sheet is attached to this Addendum. FVHD does not provide meeting minutes of Pre-Bid Meetings. Anything which involves changes to or clarifications to the bid documents are addressed in this Addendum.
25. Question: The Demolition of the existing Library is NIC as far as the Base Bid is concerned. If the demo is by owner will the footprint of the former Library be filled to grade level?
- Response: Yes. Filled to grade indicated on Grading Plan for new Building Pad.
26. Question: Please confirm that the owner will remove all existing Library FF&E. If not, please provide a list of items to be removed should Alternate # 1 be selected.
- Response: It is the intention the Borough of Fanwood Library will remove as much of the existing moveable furniture and shelving as possible. However, some items will remain in the building which cannot be quantified at this time. Any remaining moveable furniture and shelving left in the building shall be removed and disposed of by the General Contractor. Reimbursement for the GC's labor and disposal costs shall be from the project Allowance. The GC shall submit the necessary paperwork which documents items removed, labor and disposal costs to the Architect for review and processing.
27. Question: The civil drawings show one detail for "Concrete Pads" (dwg. CSD-2/C015). Should we assume this detail is typical for all pads (switchgear, trash enclosure, transformer) or will there be details for each in the addendum?
- Response: Yes. There is one detail for the above indicated conditions.
28. Question: For Alternate # 01, Please provide Basement area SF and clear height from finish floor to floor deck to calculate clean fill material.
- Response: Basement floor area is 3,234 sf. Existing floor elevations are indicated on drawing C002 - Existing Conditions.
29. Question: Allowances spec 01020-2 (2-A-1-b) and (2-A-1) both indicates 10 additional dual jack data outlets. Please clarify total requirement are 10 or 20 with total 150 LF of cable.
- Response: 01020-2, 2,A,1.b specifically is for 10 additional dual jack data outlets; 01020-2, 2,A,2.a.1) indicates 10 additional outlets (which is further defined in

subparagraphs: a), b) and c) to be electrical outlets, or light control switches. FVHD will clarify in the Addendum Section 01020 (below) to indicate 150 ft. of cable.

30. Question: Dwg C007 (Lighting & Landscaping Plan), the drawings call out a strip in the northwest corner across from the parking lot as being a proposed rain garden; however, the symbol used in the area is the same as that used for the milling & topping asphalt on C004 (Construction Plan) and there is no indication on that drawing that it should be a proposed rain garden. Please clarify.

Response: The hatch has been modified to differentiate the rain garden from the milling and paving.

31. Question: Will the construction Allowance cover the manufacturer cost increase during the construction duration?

Response: No.

32. Question: Will the construction Allowance cover the extended OH&P when manufacturer delays, supply change delays occur?

Response: No.

33. Question: A Request to Change: (Applies to All Substitution requests Pre-Award)

We would like to install Johnson Controls FX80 Jace Controller in lieu of the Honeywell Niagara 4 Jace specified. Please submit to engineer as an RFI for approval. Spec calls for approval.

Response: In accordance with Specification Section 00800-8, 8.8.1.7, .1:

“Unless otherwise indicated in the Contract Documents, substitutions may be considered after the award of Contracts.”

34. Question: Drawings M002 under Testing and Balancing calls for our company to have a licensed engineer on staff. None of the Balancers have them on Staff. They are all NEBB and AABC certified. Is this sufficient?

Response: NEBB and/or AABC certified TAB firms are acceptable.

35. Question: We respectfully request that the Workforce Questionnaire be removed as a required bid submission item. This type of questionnaire should be a Post Bid Item Submission by the Awarded General Contractor. In addition, this form will be a source for Bid Protests.

Response: The “Work Force Questionnaire” document is required to be submitted with the bid proposal. Please refer to the revised Work Force Questionnaire attached to this Addendum.

36. Question: The Bidder’s Checklist lists a “Sworn Contractor Certification; Qualifications and Credentials (Contractor & Subcontractors)” as a required bid submission item. This form was not included with the Spec Book. Please provide.

Response: Attached please find the indicated form.

37. Question: Spec Per 01010-4 (1.5-A) indicates Bldg demo may be performed under State Contract Services and this contract have ADD alternate # 01. Please clarify following:
- Scope of work under State service Contract?
 - Time duration allotted for this Bldg. demo in days?
 - If alternate # 01 not accepted for this contract, provide anticipated date of site possession for GC.
 - Does GC get 444 days' time duration to complete this contract after site occupied by GC?
- Response:
- The services for the Demolition of the existing library building (Separate Contract) are the same documents indicated in the drawings and Part 2 - Site specifications in the contract documents.
 - Refer to the revised Specification Section 01800, attached to this Addendum.
 - Refer to the revised Specification Section 01800, attached to this Addendum.
 - Refer to the revised Specification Section 01800, attached to this Addendum.
38. Question: Spec Per 01010-5 (1.8-D) call for Contractor's personnel and Subcontractors will be required to wear identification badges at all the time on the site. Please confirm who is responsible for issuing ID badges to all?
- Response: The General Contractor shall provide ID badges.
39. Question: Please confirm any hazardous material like asbestos, fluorescent light bulb (170 light tubes as indicated in Spec 02087) etc. if any required will be handled by owner?
- Response: The General Contractor is responsible for removal as identified in the report included in the project manual.
40. Question: Please provide specs for:
- Flagpole (To be Relocated)
 - Automatic Door Opener as indicated on Dwg A-402
- Response:
- There is no spec for the re-installation of an existing item. Refer to the Civil drawings.
 - Refer to Section 08700, attached to this Addendum.
41. Question: Spec 05731-5 (2.4) & pg 8 (2.10-C) call for Aluminum Decorative railing system which applies at Stair # 01, Dwg A-406 calls for Stainless steel materials, please confirm the requirements.
- Response: Delete Section 05731 in its entirety and substitute with the enclosed revised document.
42. Question: Spec 05120-7 (3.3) calls for Steel allowances for 4 Ton @ \$6,000 per Ton, which are not found in the allowances section or bid form. Please confirm this \$24,000 is on top of Allowances # 01 \$140,000 listed.
- Response: Delete the Steel Allowance identified in Section 05120.

43. Question: There is no detail concerning the installation of the Neelepoint BiPolar Ionization systems. Normally they are installed in AHUs and clip to the Coil. They are specified to be somehow connected to the VAV boxes. Please ask the engineer to provide a mounting detail.

Response: Refer to the manufacturer's I.O.M. manual.

44. Question: We usually just use our Series 200 Sand carved exterior material. (Is this acceptable for exterior sign).

Response: In accordance with Specification Section 00800-8, 8.8.1.7, .1:

"Unless otherwise indicated in the Contract Documents, substitutions may be considered after the award of Contracts."

45. Question: The bid form contains a "Work Force Questionnaire" wherein there is a requirement for the GC to "perform at least twenty percent (20%) in the dollar value of the work, not including contract administration, with its own work forces." In addition there are additional questions relating to the compliance with this requirement.

This 20% labor requirement for the GC to perform the work with their own forces is not a State of N.J. statute nor is it a requirement of the PLA. Surrounding towns such as Roselle, Union, etc. also have recently bid new libraries or currently have them out for bid and do not have this requirement. The Union Township Library currently out for bid has just waived this requirement in an addendum because it severely limits the amount of contractors that can participate in the bid process. If enforced, how will it be enforced?

- a. Will the owner demand that 20% of the contract amount (1.4 million dollars based on 7 million budget) be shown on certified payroll records from the general contractor?
- b. Will the contractor only be permitted to have 5.6 million in subcontracts? Please clarify if this 20% requirement to have the GC perform work with their own forces will truly be required.

Response: The 20% labor requirement is deleted from the "Work Force Questionnaire". Please refer to the revised Work Force Questionnaire attached to this Addendum.

46. Question: Due to the limited area of staging, will job trailers be permitted along the curb line on the library side of the road on Tillotson Road?

Response: Staging of trailers on the side of the road shall be coordinated with the Borough of Fanwood and Fanwood Police Department after the project is awarded.

47. Question: Please confirm that all utility company charges required for the permanent services for the new building will be paid for by the owner.

Response: In accordance with Section 00860-1, para. 1.3, A.1.a:

"Utility Connection Fees: Contractors shall pay utility connection fees and shall be reimbursed by Owner upon presentation of receipt for same."

48. Question: Please confirm that all building permit fees will be paid for by the owner. AIA Paragraph 3.7.1 indicates that permit fees are to be paid by GC, but it was indicated at the pre-bid meeting that permit fees will be waived by the Town. Please confirm.
- Response: Correct. The Borough of Fanwood is waiving building permit fees.
49. Question: Please confirm that all 3rd party testing and inspection services for earthwork, concrete and steel will be paid for by the owner.
- Response: In accordance with Section 01400-1, para. 1.2, A.1:
"International Construction Code (ICC) requires Special Inspections - Material Testing shall be engaged and performed through Owner's Testing Inspection Agency which will be paid for by the Owner by means of an Allowance which is indicated in Section 01020."
Special Inspections required for the project are located on drawing A101.
50. Question: Under the base bid, the owner is demolishing the existing library. If the alternate is not taken and the owner does in fact demolish the building, we assume the building pad area will be left at Elevation 163.67 (Proposed Finished Floor is 164.50 minus 4" concrete, 6" stone = 163.67) with structural fill that will be sufficient to support building footings and concrete slab (structural fill). Please confirm as all bidding contractors must know the elevation the building pad will be left at if the owner demolishes the building.
- Response: Filled to grade indicated on Grading Plan for new Building Pad.
51. Question: For Building Directory Signage 1B, the project manual asks for these to be carved. Please indicate whether this is an acrylic or aluminum sign. Building directories are typically not subject to ADA codes as far as braille characters are concerned. If the intent is to make this sign compliant to those standards then the braille would be have to placed directly under the copy, and the copy would have to be raised, not carved. Please confirm the direction to proceed.
- Response: Per Detail 1b/A502, Note 1, all text is raised characters. The sign is acrylic, not aluminum. The Braille is shown located under the copy (i.e.) The bottom line would have Braille characters for "FAMILY RESTROOM SECOND FLOOR".
52. Question: For maximum occupancy sign type 25 it asks for integral, tactile copy. These typically are screen or direct-printed, but can accommodate raised characters. One manufacturer's thermoforming process has a dimension limit of 19", while the drawing asks for 20" wide. Is a 19" wide sign acceptable?
- Response: Provide per detail on Drawing A601.
53. Question: For Sign Type 31 to be ADA compliant, the copy can not be silkscreened as is requested in the manual. One method is to reverse-engage the aluminum so the copy is integral and won't come off over time under the sun. Is this acceptable?
- Response: Yes.

54. Question: PLA: Some trades which have only 1 or 2 union vendors who are not bidding is okay to use few non vendors who are not PLA?
- Response: According to N.J.S.A. 52:38-4, not all subcontractors on this project need to be parties to the PLA, but the terms of the PLA shall be binding on all subcontractors.
55. Question: Are monthly job photographs required? If so, please provide the requirements.
- Response: In accordance with Section 01700-6, 1.8, A.5 for Submittal Requirements - Substantial Completion:
- “Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.”
56. Question: The documents required a one-year warranty period and a one year maintenance bond, yet states that the payment and performance bonds shall remain in effect for two years. Is this correct?
- Response: Change the reference in 00800, to read one year.
57. Question: The Structural Dwg. S401 Foundation Note 5 states "See soils report for requirements concerning preparation of soil for foundations." The RMP Geotechnical Report Section 7.6 Foundation Construction states "Foundation subgrades shall be compacted using a walk behind roller or similar compaction equipment to provide proper support for the proposed foundations." The Excavation Specification Section 312316-3.2 A states "Vibro-compact substrates below footing bearing surfaces for footings before excavating the site." Please confirm that the foundation subgrades shall be compacted using a walk-behind roller as noted in the RMP Geotechnical Report Section 7.6.
- Response: Follow the Geotechnical Report.
58. Question: The Site Utility Plan Dwg. C005 shows the proposed gas service connection located at the northwest corner of the Building. The Plumbing Dwg. P101 shows the gas meter set & regulator mounted along the Building wall at this location. The Architectural Dwgs. A102 and A201 shows two 6' x 6' windows at this same location. Please confirm the location of the proposed gas service connection and meter.
- Response: Locations shown on C005 and P101 are correct. Windows referenced do not have transparent glass, so the gas meter will not be visible from the interior of the building
59. Question: The Elec Power Plan Dwg. E201 shows the proposed electric service connection located at the northwest corner of the Building. The Site Utility Plan Dwg. C005 shows the gas connection and meter set at this same Building location. Please confirm the location of the proposed electric service Building connection.
- Response: Location shown on E201 is correct. Exact routing must be coordinated as described in the drawing notes.

60. Question: Is Moderco an acceptable equal for the operable partition?
Response: Substitutions are reviewed after the project is awarded as answered in a question above. However, Moderco is a Canadian manufactured product and does not comply with 40A:11-18. "American goods and products to be used where possible".
61. Question: What if all union people in certain trade will not bid then is okay to have one trade that is not union (Or am okay as long meet the threshold of 85% of labor being union)?
Response: All subcontractors, at every tier, on PLA-designated projects, performing PLA regulated work are contractually bound by the PLA.
 These subcontractors must sign and submit the Letter of Assent to their General Contractor prior to the start of PLA-regulated work.
 Non-Union Subcontractors are to recruit from the local union hiring halls for each trade as 88% of the workforce must be union labor.
 Non-Union Contractors and Subcontractors may retain 12% of their own staff.
62. Question: What is the symbol AP in a circle on drawings E201 & E202?
Response: Symbol is defined on the Electrical Symbol (Communications) Legend on drawing E001.
63. Question: Do we have to provide tamper proof devices for this project?
Response: Yes. See General Note #8 on E-201.
64. Question: Do we have anything to do with the demo of the existing building?
Response: Please refer to Specification Section 01030 - Alternate Bids for Alternate Bid No. 1.
65. Question: What is the symbol IS in a square on drawing E202?
Response: Drawing revised to change symbol for the Call Station, from IS to read IC. Refer to the Electrical Legend on E001 and detailed on drawing E-301.

REFER TO DRAWINGS

The following Drawings and/or Sketches are attached to this Addendum:

DRAWING NO. TITLE

C003	DEMOLITION PLAN
C004	CONSTRUCTION PLAN
C007	LIGHTING AND LANDSCAPING PLAN
A401	EQUIPMENT DETAILS, NOTES & MILLWORK DETAILS
A402	ROOM LAYOUTS - FIRST FLOOR
A403	ROOM LAYOUTS - SECOND FLOOR & EQUIPMENT SCHEDULE
A601	ROOM FINISH AND DOOR SCHEDULES, DETAILS AND NOTES

S201	2 ND FLOOR FRAMING PLAN / LOW ROOF FRAMING PLAN
S202	ROOF FRAMING PLAN
E201	ELECTRICAL FIRST FLOOR POWER PLAN
E202	ELECTRICAL SECOND FLOOR POWER PLAN
E302	ELECTRICAL PANEL AND LIGHTING FIXTURE SCHEDULES

The following Drawings to be revised or corrected as follows:

DRAWING NO. CHANGES AND CORRECTIONS

C003, C004, C007	Delete the referenced drawings in their entirety and substitute with the enclosed revised drawings.
C008	NOTES: In Note 6, delete the second sentence and substitute with the following: "The Police Department Traffic Directors shall be paid directly through the Borough of Fanwood and coordinated by the General Contractor."
A401, A402, A403, A601	Delete the referenced drawings in their entirety and substitute with the enclosed revised drawings.
S201, S202	Delete the referenced drawings in their entirety and substitute with the enclosed revised drawings.
E201, E202, E302	Delete the referenced drawings in their entirety and substitute with the enclosed revised drawings

BID FORMS

Delete the "Work Force Questionnaire" in its entirety and substitute with the enclosed revised form.

New Bid Form: Sworn Contractor Certification; Qualifications and Credentials (Contractor & Subcontractors).

REFER TO SPECIFICATIONS

TABLE OF CONTENTS

Under Bidding Information, add the following form:

Sworn Contractor Certification; Qualifications and Credentials (Contractor & Subcontractors)

Under Part - 2 General Construction Work, add the following section:

08700 Finish Hardware 27-pages

Under Part - 2 General Construction Work, revise the following section reference:

- 05731 Glazed Decorative Metal Railing, 5-pages.
- 11133 Ceiling Mounted Recessed Front Projection Screen

Under Part - 4 Plumbing, add the following new sections:

- 220517 Sleeves and Sleeve Seals for Plumbing Piping, 5-pages.
- 220519 Meters and Gages for Plumbing Piping, 7-pages.
- 221413 Facility Storm Drainage Piping, 11-pages.
- 221423 Storm Drainage Piping Specialties, 7-pages.

Under Part - 5 Heating, Ventilating and Air Conditioning (HVAC), revise the following section reference(s):

- 230913 Instrumentation and Control for HVAC Equipment

BID NOTICE

Delete and replace paragraph four with the following:

Sealed Bids are due by **Wednesday, August 24, 2022, 10:00 AM**, to the Borough of Fanwood, Attn.: Patricia Hoynes, Purchasing Agent, 75 North Martine Avenue, Fanwood, NJ 07023, and will be publicly opened and read immediately thereafter in the Carriage House. Any Bid received after that time shall be rejected. The Owner and the Architect assume no responsibility for bids mailed or misdirected in delivery.

BIDDERS CHECKLIST / BID FORMS

Attached is the indicated "Sworn Contractor Certification; Qualifications and Credentials (Contractor & Subcontractors)".

AIA DOCUMENT A101® - 2017 EXHIBIT A

<u>Page</u>	<u>Paragraph</u>	
7	A.3.4	In the 7 th & 8th lines, Change: "Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement", to read "Payment and Performance Bonds shall be in accordance with the 'GUARANTY AND PERFORMANCE BOND (CONSTRUCTION)' document enclosed in the Specification manual.

PART 1 - SECTION 00100 - INSTRUCTIONS TO BIDDERS

<u>Page</u>	<u>Paragraph</u>	
00100-3	1.4, B	In the 3 rd line, change "May 31, 2022", to read "August 9, 2022".

PART 1 - SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

Page Paragraph

- 00800-4 1.2, A, 5.3.3, 9) Delete subparagraph “c)” in its entirety.
 1.2, B, 5.6.1, .2 In the 7th line, change two years, to read one year.

PART 1 - SECTION 01020 - ALLOWANCES

Page Paragraph

- 01020-2 2, A,1 Delete subparagraph “a” in its entirety and substitute with the following:
- a. A sum of **\$250,000.00** for additional general construction work, special inspections and the demolition of miscellaneous moveable furniture which is left in the building, shall be performed as directed in the field.
- 2, A,2.a.1) After “**10** additional outlets,”, add: “and 150 ft. of cable”.

PART 1 - SECTION 01200 - PROJECT MEETINGS

Page Paragraph

- 01200-3 1.6, A Delete subparagraph “1.” in its entirety and substitute with the following:
- 1. Weekly meetings with the Prime Contractor and Prime Subcontractors.

PART 1 - SECTION 01505 - TEMPORARY FACILITIES

Page Paragraph

- 01505-2 1.1, C Delete subparagraph “1.” in its entirety and substitute with the following:
- 1. The Prime General Contractor shall provide a construction trailer field office with necessary furniture and utilities for the their use and can be used by the Owner and Architect when they are on-site.

PART 1 - SECTION 01800 - TIME OF COMPLETION AND LIQUIDATED DAMAGES

Delete Section 01800 in its entirety and substitute with the enclosed revised document.

PART 2 - SECTION 05731 - GLAZED DECORATIVE METAL RAILING

Delete Section 05731 in its entirety and substitute with the enclosed revised document.

PART 2 - SECTION 08305 - ACCESS DOORS

Delete Section 08305 in its entirety and substitute with the enclosed revised document.

PART 2 - SECTION 08520 - ALUMINUM WINDOWS

Change the bottom center footer "2:085113", to read "2:08520".

PART 2 - SECTION 08700 - FINISH HARDWARE

Add Section 08700 attached to this Addendum.

PART 3 - SECTION 05120 - STRUCTURAL STEEL FRAMING

Page Paragraph

05120-7 3.3 Delete paragraph 3.3 in its entirety.

PART 4 - SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

Add Section 220517 attached to this Addendum.

PART 4 - SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

Add Section 220519 attached to this Addendum.

PART 4 - SECTION 221413 - FACILITY STORM DRAINAGE PIPING

Add Section 221413 attached to this Addendum.

PART 4 - SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES

Add Section 221423 attached to this Addendum.

END OF ADDENDUM NO. 1



GFVHHD
EST. 1978
 architects
 planners
 Fraytak Veisz Hopkins Duthie, P.C.

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PROJECT NAME: New Fanwood Memorial Library
For the Borough of Fanwood

DATE: Tuesday, August 2, 2022 at 10:00 AM
 FVHD PROJECT#: 5292

PRE-BID MEETING SIGN-IN SHEET

REPRESENTATIVE NAME (Please Print)	COMPANY NAME & ADDRESS	CONTRACT NUMBER	TELEPHONE#	FAX#	E-MAIL
DAN SULLIVAN	FALUD	7292	732 291 5017	609.933.2694	dsullivan@fvhdpcc.com
AUGUSTOS PAMAGIOLAKIS	FANWOOD		732-241-3076	-	APRANA CADONL@FANWOOD.NJ.GOV
FRANK MELHUS	BROOKVIEW CONSTRUCTION 1 COMONS CT TOWACO NJ 07082		973-237-1222	973-237-1223	fmelhus@brockview.com
NICHOLAS DANCE/16	TERMINAL CONSTRUCTION 215 STATE HIGH 17 WEEK-BIDGE, NJ 07028	201 939 9196	<u>S</u>	<u>X</u>	JZakubatec@terminalconstruction.com wdance16@
LUKE MORAHAN	ATC SYSTEMS 207 BLACKBURN AVE MIDDLESEX NJ	908 930 7086	<u>→</u>	<u>X</u>	lmorahan@atcsystems.net
DEAN HATHAWAY	NORDIC CONSTRUCTION CO., INC. 95 N. BELL AVE., KENIL NJ 07017		973-574-2000 X 144	<u>X</u>	dhathaway@nordicconstruction.com

F# Town Stamp	TQM ASSOCIATES	7/2/22	801-233-9046	fscard@fundmassociates.com
Jack Vellella	John O'Hara Co.	7/7	973-673-4672	Jack@johnoharaco.com
SHASHI PATEL	BRACKWELL & CARRINGTON	"	973-237-1222	SPatel@Brackwell.com carri@brackwell.com
Steven Vanas	Vanas Construction Co		801-883-1944	Steven@vanasconstruction.com
Saver Grigoriu	Shorelands Const.		732-330-2012	Saver@shorelandsmb.com
Pat Higgins	Pat Higgins P/A			

Addendum #1

Date: August 10, 2022
To: FVHD
From: Johnson Urban
Project #: FVHD 5292, JU 21-022

Addendum No. 1 dated August 10, 2022, is issued as part of the Contract Documents, to inform and/or specify changes, which take precedence over information contained in the original Contract Documents. Unless otherwise specifically noted or specified hereinafter, or shown on drawings or schedules accompanying this Addendum, all work required by this Addendum shall conform to the applicable provisions of the Contract Documents. It shall be the responsibility of the Bidder to include in his bid any cost implications of this Addendum. All Bidders are to indicate on the form of proposal submitted by them, acknowledgment of receipt and compliance with the contents of this change to the Contract Documents.

Any provision in any of the Contract Documents which may be in conflict or be inconsistent with the contents of this Addendum, shall be void to the extent of such conflict or inconsistency.

1. Plumbing
 - a. Specifications:
 - i. 220517 – Sleeves and Sleeve Seals for Plumbing Piping
Specification added reference for other specifications.
 - ii. 220519 – Meters and Gages for Plumbing Piping
Specification added reference for other specifications.
 - iii. 221116 – Domestic Water Piping
Amended to include press type fittings
 - iv. 221119 – Domestic Water Piping Specialties
Amended to include press type fittings
 - v. 221316 – Sanitary Waste and Vent Piping
Amended to include hubless cast iron with shielded couplings
 - vi. 221319 – Sanitary Waste Piping Specialties
Amended to include hubless cast iron with shielded couplings
 - vii. 221413 – Facility Storm Drainage Piping
Specification added, missing from documents
 - viii. 221423 – Storm Drainage Piping Specialties
Specification added, missing from documents

- b. Drawings:
 - i. N/A
- 2. Electrical
 - a. Specifications:
 - i. N/A
 - b. Drawings: E-201, E-202, E-302. Devices and circuits added.



WORK FORCE QUESTIONNAIRE

Please complete this questionnaire and submit it with your Bid Proposal. Attach additional pages if necessary.

1. Using the table of contents for the Project Manual as a guide, identify the portions or aspects of the work that will be performed with your own work forces. Designate the dollar value of each portion of the work. Indicate whether this work will be performed by current employees or employees hired for this specific project.

2. A. Provide the number of workers currently employed by your firm by the type of skill or trade.

B. Indicate the number of full time, year round employees and the number of seasonal or job related employees or employees hired out of a union hall.

3. How do you intend to staff this project? Provide the resume of your proposed job site superintendent and the resume of the foreman who will supervise each category of the work to be performed with your own work force as set forth in your answer to 1 above.

4. List three similar projects where you have performed similar work with your own forces. Provide names, addresses and telephone numbers of the Owners, Architects and Construction Managers, if any, the date the Project was completed and the dollar value of the Project.

The undersigned, on behalf of _____ (the Contractor), warrants and represents that the information provided in this Questionnaire and any attachment is true and accurate to then best of the undersigned's knowledge and belief.

Name: _____

Title: _____

Date: _____

Sworn Contractor Certification; Qualifications and Credentials

A pre-qualified contractor seeking to bid the project, and any subcontractors, shall, as a condition of bidding, submit this Sworn Contractor Certification regarding qualifications and credentials.

I, _____, the principal owner or officer of the Bidder (or, the "Company"), certify that the forging statements are true and the firm has the following qualifications and credentials:

1. A current, valid certificate of registration issued pursuant to "The Public Works Contractor Registration Act," a copy of which is submitted with this bid;
2. If a corporation or LLC formed under the laws of a state other than New Jersey, a current, valid "Certificate of Authority to perform work in New Jersey", a copy of which is submitted with this bid;
3. A current, valid, contractor or trade license required under applicable New Jersey Law for any specialty trade or specialty area in which the firm seeks to perform work, a copy of which is submitted with this bid;

I further certify that, during the term of the, the Company will have in place a suitable quality control and quality assurance program and an appropriate safety and health plan.

I further certify that, at the time of bidding, the amount of the bid proposal and value of all of its outstanding incomplete contracts does not exceed the Company's existing aggregate rating limit.

Name of Company _____

Name of Owner or Officer _____

Signature of Owner or Officer _____

Notarized before me this _____ day of _____, _____
Month Year

NOTARY PUBLIC SIGNATURE

Print Name of Notary Public

My commission expires _____, _____
Month Day Year

-SEAL-

To be completed, signed, notarized and returned with bid.

SECTION 01800 - TIME OF COMPLETION AND LIQUIDATED DAMAGES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes the requirements for completion of interim milestone events and final completion of all work required by the contract documents.
- B. Related Sections:
 - 1. Items of Work attached to the "Certificate of Substantial Completion" and establishing "Final Completion Time" as per Section 00800.
- C. This section also establishes the relation of liquidated damages for failure to complete the interim milestone events or final completion requirements within the time requirements stated herein.

1.2 TIME FOR COMPLETION

- A. It is understood that the Prime General Contractor has mutual responsibility to complete its work in sequence with the work of the other Contractor(s) and to allow the other Contractor(s) access to the work site so that it may complete its work within the times established.
- B. Completion of the Contract Work by the Contractor shall be time of the essence.
- C. The Contractor shall work overtime, additional shifts, weekends or holidays to complete the work on time with no additional cost to the Owner.
 - 1. Scarce resources will be no excuse for not completing the work on time.
 - 2. **Base Bid: Work may take place during regular shift and second shift (7:00 AM - 7:00 PM) after November 30, 2022 until February 7, 2024; however, the Contractor is required to review and coordinate all work activities with the Architect and Borough of Fanwood prior to commencing with the work.**
 - a. **Contractor to review permitted work hours to comply with the local "Noise Ordinance".**
 - 3. **Alternate Bid (w/ Building Demolition): Work may take place during regular shift and second shift (7:00 AM - 7:00 PM) after November 30, 2022 until March 11, 2024; however, the Contractor is required to review and coordinate all work activities with the Architect and Borough of Fanwood prior to commencing with the work.**
 - a. **Contractor to review permitted work hours to comply with the local "Noise Ordinance".**

4. **Contractor is required to include the cost of any premium time, second shift and weekend work which may be required in their bid to complete the work within the indicated milestone dates.**
 5. **If work is to be done on weekends or holidays, the contractor shall notify the Borough in advance of scheduling the work.**
- D. Substantial and final completion of the Work shall include, but is not limited to, final inspection and acceptance by the Local Building Official(s).

1.3 BUILDING ENCLOSURE

- A. The building shall be considered "enclosed" when:
1. The exterior walls have been constructed;
 2. A permanent roofing and flashing is installed and in watertight condition;
 3. Temporary or permanent doors are hung and window openings are closed with either permanent or temporary weather-tight enclosures; any impervious transparent material is acceptable.

1.4 SEQUENCE OF CONSTRUCTION

- A. In order to allow the Prime General Contractor and Subcontractors to understand the requirements of the Project, the following general sequence of construction Work will be followed:
1. Generally, the General Construction Contractor is to schedule, sequence and coordinate the Work with Prime Subcontractors, as required, to logically progress the Work, meeting the overall design intent, construction quality and time of completion. **Schedule inspections and obtain required approvals of all stages of the Work as required by the Local Construction Official(s).**
 2. Proper scheduling of the Work includes timely sequencing, preparation, review and approval by the Prime Contractor and **submission of requisite technical and other project submittals and shop drawings** to the Architect/Engineers for approval to advance the proper, logical progression of the Work.
 3. After mobilization and securing the work site, the General Construction Work Contractor is to perform selective demolition of existing general building construction, layout and coordinate the proposed new building construction, as noted on the Construction Drawings.
 - a. Apply for and obtain demolition permit to allow commencement of the Work while permit applications for new Construction are under review by the Construction Official.

4. Progress the Work of all trades to achieve completion of underground utilities and preparation of subgrades for construction of new footings and foundations. After completion of Structural Steel Work, Plumbing, Drainage & Gas Fittings, HVAC and Electrical Subcontractors will commence with interior “rough-ins” and related Work in sequence to the steel erection completion.
5. Sequentially Work to achieve **weather-tight building enclosure** with completed roof construction and utilizing temporary partitions and barriers, as required, to facilitate interior Work including, but not limited to, interior partitions, insulation and building finishes.
6. The Prime Contractor is mutually responsible to coordinate their Work with the construction for installation of Plumbing, Drainage & Gas Fittings, HVAC and Electrical **rough-in construction Work below and in floor slabs, interior and exterior walls.**
7. Progress the Work of all Trades towards completion, as required, by the Contract Documents to obtain **Substantial Completion** including, inspection and testing by local construction officials, commissioning, testing and balancing of the HVAC, Automatic Temperature Controls, Plumbing and Electrical Work to obtain the Certificate of Occupancy.
8. Provide written formal notification of **Substantial Completion** to the Architect / Engineer and request Punch-List Observations.
9. Complete proper preparation, review and approval by the Prime Contractor and submission of all Close-out Documents, Operation and Maintenance Manuals, As-built surveys and drawings to the Architect / Engineers within contract time required to achieve **Final Completion**.

1.5 PROJECT CONTRACT MILESTONE DATES

A. TIME OF COMPLETION

1. **Milestone No. 1**
 - a. Sign Contract, no later than **fourteen (14)** calendar days, Sundays and Holiday’s excepted, from **Resolution of Award**; on or about **October 18, 2022.**
 - b. Contractor submits Bonds and Insurance **ten (10) calendar days from Notice of Award, Sundays and holidays excepted.**
 - c. **Notice to Proceed** shall be within **three (3) business days** of date of signing Contract; on or about **November 7, 2022.**
2. **Milestone No. 2**
 - a. **Time Critical submittals** for special equipment, fixtures, etc. shall be submitted within **twenty (20) calendar days from Resolution of Award.**

3. **Milestone No. 3**
 - a. Submission of all remaining technical shop drawing submittals shall be submitted within **sixty (60) calendar days from Resolution of Award.**

4. **Milestone No. 4 (Demolition Package - By Owner)**
 - a. Physical work at the site shall commence on or about **October 1, 2022.**
 - b. Substantial Completion of the separate bid package - Demolition Work shall be on or before **46 Calendar Days, November 15, 2022.**
 - 1) Liquidated Damages - \$500.00 / Calendar day of delay.

5. **Milestone No. 5 (Base Bid Work including Alternate Bid Building Demolition Work)**
 - a. Physical work at the site shall commence on or about **November 15, 2022.**

6. **Milestone No. 6 - Substantial Completion**
 - a. **Milestone 6A (Demolition Package - By Owner)**
 - 1) Substantial Completion of the entire project (including separate contract building demolition) shall be on or before **459 Calendar Days from the Resolution of Award, February 7, 2024.**
 - 2) Liquidated Damages - \$500.00 / Calendar day of delay.
 - b. **Milestone 6B (Base Bid Work including Alternate Bid Building Demolition Work)**
 - 1) Substantial Completion of the entire project (including separate contract building demolition) shall be on or before **491 Calendar Days from the Resolution of Award, March 11, 2024.**
 - 2) Liquidated Damages - \$500.00 / Calendar day of delay.

8. **Milestone No. 7 - Final Completion**
 - a. **Milestone 7A (Base Bid Work)**
 - 1) Final Completion of all Work including punch list items and closeout documents, no later than **30 Calendar Days from Substantial Completion - Milestone No. 6A, March 8, 2024.**
 - 2) Liquidated Damages - \$500.00 / Calendar day of delay.
 - b. **Milestone 7B (Base Bid Work including Alternate Bid Building Demolition Work)**
 - 1) Final Completion of all Work including punch list items and closeout documents, no later than **31 Calendar Days from Substantial Completion - Milestone No. 6B, April 24, 2024.**
 - 2) Liquidated Damages - \$500.00 / Calendar day of delay.

1.6 LIQUIDATED AND OTHER DAMAGES

- A. By bidding the Project, the Contractors are accepting that the time allotted for the completion of Work is reasonable. Completion of Work on or about these milestones are prerequisites for the coordinated Work of all Contractors. When the Owner will suffer financial loss and/or extra cost if a milestone task is not completed within the allotted time, the Contractor responsible for the delay in achievement of each

milestone, as determined by the Owner's Project Manager and the Architect, shall pay to the Owner a fixed, agreed sum as liquidated damages for each calendar day of delay until the milestone task is substantially completed.

- B. The Liquidated Damages set for above shall be in addition to other consequential losses or damages the Owner may incur by reason of such delay, such as, but not limited to, the cost of additional architectural and engineering, independent third party inspection and other services resulting from the delay, additional costs to the Owner for payments to other Contractors resulting from delay.
- C. Liquidated Damages are fixed and agreed upon by and between the Contractor and the Owner because of the impracticality and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amounts shall be retained from time to time by the Owner for the current periodical payments.
 - 1. The Liquidated Damages set for above are intended to compensate Owner for loss of use during the period of delay, for other delay during construction which may result further delay in substantial and/or final completion dates and for any acceleration costs by other contractors to recover the defaulting contractor's delay.
 - 2. In no way shall costs of Liquidated Damages be construed as a penalty to the Contractor.
- D. The Owner shall have the right to deduct the total amount any Liquidated Damages for which the Contractor may be liable from any monies otherwise due the Contractor, including any retainage under control of the Owner.
- E. The Surety providing the Performance Bond, furnished by the Contractor, will be liable for Liquidated Damages assessed against the Contractor, to the extent that the Contractor shall not make settlement thereof with the Owner.
- F. The Contractor agrees that in the event the Owner is required to incur or advance any additional necessary and reasonable costs (including but not limited to Architect, Attorney or other fees related expenses), as a result of the failure of the Contractor to perform any obligation of this Contract or to perform its obligations in a timely manner as required by the Contract Documents, the Contractor agrees that such additional necessary and reasonable costs shall be borne by the Contractor and may be deducted by the Owner from any payment due the Contractor.
- G. In accordance with N.J.S.A. 40A:11-19, the Owner shall deduct from the Contract Price, for any wages paid by the Owner to any inspector or inspectors necessarily employed by for the work of this project, for any number of days in excess of the number of days or indicated dates allowed in milestones above. Such sums shall be part of the Liquidated Damages indicated herein after.

END OF SECTION 01800

FVHD-5292

1:01800-5

ADDENDUM NO. 1

SECTION 05731 – GLAZED DECORATIVE METAL RAILING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Monolithic Tempered Glass Dry Glazed Railing Assemblies.

1.2 RELATED SECTIONS

- A. Section 03300 – Concrete Work,
- B. Section 05120 – Structural Steel,
- C. Section 05400 – Miscellaneous Structural Steel,
- D. Section 05500 - Metal Fabrications,
- E. Section 08800 – Glass and Glazing,
- F. Section 09250 – Gypsum Drywall.

1.3 REFERENCES

- A. ESR-3269 ICC-ES Evaluation Report, International Code Council Standards for Glass Balustrade Guard Rail Applications
- B. ASTM C 1048 – Standard Specification for Heat Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass
- C. NAAMM Metal Finishes Manual; national Association of Architectural Metal Manufacturers

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements for Handrail Assembly:
 - 1. Support distributed load of 50 pounds per linear foot (0.73kN/M), applied horizontally at right angles in any direction to the handrail.
 - 2. Support concentrated horizontal load of 200 pounds (0.89kN), applied in any direction at any point along handrail system.
 - 3. 50 lbs (0.22kN) on 1 sf (0.093m²) perpendicular to guard at any location
 - 4. Distributed loads and concentrated loads not to be applied simultaneously.

1.5 SUBMITTALS

- A. Submit under provisions of AIA A201 and Section 00800.
- B. Product Data: Submit Manufacturer's technical product data for railing components and accessories.

C. Shop Drawings: Dimensioned drawings of railing assemblies indicating the following:

1. Elevations; include joint locations, transitions, and terminations.
2. Manufacturer's installation and maintenance instructions.

D. Samples of manufacturer's finishes (As selected by Architect.)

1.6 QUALITY ASSURANCE

- A. Components and installation are to be in accordance with state and local building codes.
- B. All components and fittings are furnished by the same manufacturer.

1.7 COORDINATION AND SCHEDULING

- 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 items to Project site in time for installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials properly protected against damage to finished surfaces during transit.
- B. Inspect materials upon delivery for damage. Unless minor defects can be made to meet the Architect's specifications and satisfaction, damaged parts should be removed and replaced.
- C. Store materials at building site under cover in dry location

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Manufacturer: C.R. Laurence Co., Inc. (CRL); or approved equal.
 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to the following:
 - a. HDI Railing Systems North America.
 - b. Livers Bronze Co.
 - c. Or Approved Equal.
- B. Source Limitations for Laminated Glass: Obtain from single source from single manufacturer.
- C. Source Limitations for Decorative Metal Railing Components: Obtain from single source from single manufacturer for each component and installation method.
- D. Product Options: Information on Drawings and in the Specifications establishes requirements for railing system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

2.2 PERFORMANCE REQUIREMENTS

- A Delegated Design: Engage a qualified professional engineer, as defined in Section 01400 "Quality Requirements," to design glazed decorative metal railings, including attachment to building construction.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 1. Aluminum: The lesser of minimum yield strength divided by 1.65, or minimum ultimate tensile strength divided by 1.95.
 2. Glass: 25 percent of mean modulus of rupture (50 percent probability of breakage), as listed in "Mechanical Properties" in AAMA CW-12, "Structural Properties of Glass."
- C. 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. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2 Structural Glass Railings:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
 - b. Infill load and other loads need not be assumed to act concurrently.
 3. Structural Glass Railings: Support each section of top rail and handrail by a minimum of three glass panels or by other means so railings will remain in place if any one glass panel fails.
 - a. Support top rail and handrail ends such that railings remains in place if end glass panel fails.

2.2 MATERIALS

- A. Stainless Steel Components: Conforming to ASTM A 666, Type 304

2.3 COMPONENTS

- A. Laminated Glass Handrails and Guards: ASTM C1172, Type II with two plies of glass bonded together by an interlayer.
 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 2. Interlayer Thickness: 0.090 inch (2.29 mm).
 3. Kind: Laminated heat strengthened.
 4. Glass Color: Inner-ply clear; outer-ply clear.
 5. Glass Plies for Structural Glass Balusters: Thickness required by structural loads, but not less than 8.0 mm thick each.

- B. Internal Handrail Cap Connection Sleeves: Metal tube, material compatible with handrail cap material.

- C. TAPER-LOC® Dry Glazing System: Each TAPER-LOC® Set consists of two Tapers, and one L-Setting Block. Designed for B5A, Shoe Bases. Patent Pending.

- D. Shoe Base:
 - 1. Profile: **CRL Part # B5A**; 2-1/2 inches (63.5 mm) wide by 4-1/4 inches (106.4 mm) high rectangular cross-section. Designed to work with CRL's TAPER- LOC® Dry Glazed System with 1/2" (12 mm) monolithic tempered glass.
 - a. Finish: 304 Brushed Stainless.

- E. Metal Cap Railing:
 - 1. Profile: **Part # GR15**, round 1-1/2 inches (38.1 mm) diameter.
 - 2. Material: Stainless Steel.
 - 3. Finish: Brushed Stainless Steel

- F. Handrail Brackets:
 - 1. Material: Stainless Steel

- G. Metal Handrail Tubing:
 - 1. Profile: **Part # HRH15**, heavy-wall round 1-1/2 inches (38.1 mm) diameter
 - 2. Material: Stainless Steel.
 - 3. Finish: Brushed Stainless Steel.

- H. Fasteners: Types and sizes indicated in shop drawings.
 - 1. For concrete attachment, hole size in base shoe is to be 9/16" (14.3 mm), counter bore 7/8" (22.2 mm) x depth 1/2" (12.7 mm), center-to-center spacing of holes is 12" (304.8mm). Use Hilti HSL3 Expansion Anchors 3-3/4" (95 mm) long **CRL Part # EBA334**, Washer is included.
 - 2. For steel attachment, hole size in base shoe is to be 9/16" (14.3 mm), counter bore 7/8" (22.2 mm) x depth 1/2" (12.7 mm), center-to-center spacing of holes is 12" (304.8mm). Use 1/2" - 13 x 1 stainless steel socket head cap screw **CRL Part # SHCS12X1**.

- I. Sill Angles for Tempered Glass Railing Assemblies: Steel angle profiles conforming to ASTM A 36, with anchoring devices, sizes indicated in shop drawing of Sections 05400 and 05500, drilled and tapped for fastener types, sizes, and spacing indicated.

2.4 FABRICATION

- A. Fabricate handrail assembly components to lengths and configurations complying with shop drawings.

- B. Machine joint edges smooth and plane to produce hairline seams when site assembled; supply concealed sleeve connectors for joints.

- C. Isolate dissimilar metals to prevent electrolytic action by applying primer to concealed surfaces of metal components.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install handrails in accordance with manufacturer's recommended installation instructions and approved shop drawings.

3.2 CLEANING

- A. Clean glazing surfaces after installation, complying with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.
- B. Remove protective films from metal surfaces.
- C. Clean railing surfaces with clean water and mild detergent. Do not use abrasive chemicals, detergents, or other implements that may mar or gouge the material.

3.3 PROTECTION

- A. Institute protective measures required throughout the remainder of the construction period to ensure that all the materials do not incur any damage or deterioration.
- B. Repair components damaged by subsequent construction activities in accordance with manufacturer's recommendations; replace damaged components that cannot be repaired to Architect's acceptance.

END OF SECTION 07531

SECTION 08305 - ACCESS DOORS

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. Wall access doors.
- B. Types of construction in which access doors are installed include:
 - 1. Gypsum board.
- C. Exact locations and sizes of access doors may not be indicated on the drawings. Obtain specific locations and sizes for access doors from trades requiring access to concealed equipment.
- D. Related Sections:
 - 1. Section 09250 - Gypsum Drywall.
 - 2. Section 09300 - Tile.
 - 3. General requirements for access doors: Plumbing Work.
 - 4. General requirements for access doors: Mechanical Work.
 - 5. General requirements for access doors: Electrical Work.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.
 - 1. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
- B. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.
- C. Special Size Access Doors: Use where required or requested; indicate on schedule.
- D. Shop Drawings: Submit shop drawings for fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.
- E. Samples: 3" x 5" minimum size, of each panel face material showing factory-finished color and texture.

1.4 QUALITY ASSURANCE

- A. Test Reports: Submit manufacturer's test reports which demonstrate that products comply with required fire ratings.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which are different than actual opening size necessary for access.
- C. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

1.5 WARRANTY

- A. Manufacturer's standard **five (5) year** warranty against defects in material and workmanship from date of purchase

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering access doors which may be incorporated in the work include, but are not limited to, the following:
 - 1. Bilco Company.
 - 2. J. L. Industries.
 - 3. Milcor/Lima Register.
 - 4. Bar-Co., Inc.
 - 5. Nystrom.
 - 6. Or approved equal.

2.2 MANUFACTURED UNITS

- A. Access Door Assembly 4:
 - 1. Location: Wall.
 - 2. Type: Flush door panel with concealed frame.
 - 3. Substrate: Gypsum board.
 - 4. Frame: 16 gage steel.
 - 5. Door: 14 gage steel flush panel.
 - 6. Hinge: Double-acting concealed spring hinges allowing door to open a minimum of 165 degrees.
 - 7. Locking device: Keyed cylinder lock.
 - 8. Finish: Baked-on rust-inhibitive prime coat.

2.3 ACCESSORIES

- A. Locking Devices:
 - 1. Where locking devices are indicated, provide one lock per access door.

2. Supply four (4) keys with each lock.
3. Key access door locks alike.

2.4 MATERIALS AND FABRICATION

- A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
- B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
- C. Frames: Fabricate from 16 gauge steel.
- D. Fabricate frame with exposed flange nominal 1" wide around perimeter of frame for units installed in the following construction:
 1. Drywall finish.
 2. Ceramic tile finish.
- E. For gypsum drywall, furnish perforated frames with drywall bead.
- F. Flush Panel Doors: Fabricate from not less than 14 gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.
- G. Provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise scheduled.
- H. Where shown or scheduled, provide one cylinder lock per access door. Furnish four (4) keys per lock. Key all locks alike, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Coordinate installation with work of other trades.
- C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- D. Where the Plumbing, Mechanical, or Electrical (MEP) Prime Subcontractor(s) require an access door to be installed to provide access to valves, etc., the MEP Subcontractor shall provide the access door and the General Contractor shall install the access door.

3.2 ADJUST AND CLEAN

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

END OF SECTION 08305

SECTION 08700 - FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
 - 3. Automatic operators.
 - 4. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Section 08110 - Hollow Metalwork.
 - 2. Section 08141 - Attack Resistant Flush Wood Doors.
 - 3. Section 08211 - Wood Doors.
 - 4. Section 08410 - Aluminum/FRP Doors and Aluminum Framing Systems.
- 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. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
 - 8. 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 294 - Access Control System Units.
4. UL 305 - Panic Hardware.

1.3 SUBMITTALS

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

- a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a recommended 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 recommended 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 recommended 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 demonstrating compliance with the referenced 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 to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: **One (1) year** from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. **Ten (10) years** for mortise locks and latches.
 - 2. **Five (5) years** for exit hardware.
 - 3. **Twenty-five (25) years** for manual overhead door closer bodies.
 - 4. **Two (2) years** for electromechanical door hardware, unless noted otherwise.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

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

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles 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" heavy weight.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
- a. Non-removable Pins: 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. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
 - b. Or approved equal.
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Manufacturers:
- a. Pemko (PE).
 - b. Or approve equal.
- C. Sliding and Folding Door Hardware: Hardware is to be of type and design as specified and should comply with ANSI/BHMA A156.14.
1. Bi-folding Door Hardware: Rated for door panels weighing up to 125 lb.
2. Manufacturers:
- a. Pemko (PE).
 - b. Or approved equal.

2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
- a. Pemko (PE) - EL-CEPT Series.
 - b. Securitron (SU) - EL-CEPT Series.
 - c. Or approved equal.

- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
 2. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC-C Series.
 - b. Or approved equal.

2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and UL listed for labeled fire doors and UL listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.), as required, for appropriate installation and operation.
 5. Manufacturers:
 - a. Rockwood (RO).
 - b. Or approved equal.
- B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls 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. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2-1/2 inches from face of door unless otherwise indicated.

3. 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.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
5. Manufacturers:
 - a. Rockwood (RO).
 - b. Or approved equal

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have a recommended minimum (10) years' experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
 1. Manufacturers:
 - a. Corbin Russwin Hardware (RU).
 - b. Or approved equal.
- C. 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: Manufacturer's Standard.
- D. Removable Cores: Provide removable cores as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
- E. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.
 1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
 2. Manufacturers:

- a. Corbin Russwin (RU) - Access 3 AP.
 - b. Sargent (SA) - Degree DG1.
 - c. Or approved equal.
- F. 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.
- G. Key Quantity: Provide the following minimum number of keys:
- 1. Change Keys per Cylinder: Two (2)
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
 - 4. Construction Control Keys (where required): Two (2).
 - 5. Permanent Control Keys (where required): Two (2).
- H. Construction Keying: Provide construction master keyed cylinders.
- I. Construction Keying: Provide temporary keyed construction cores.
- J. 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).
 - d. Or approved equal.

2.7 MECHANICAL LOCKS AND LATCHING DEVICES

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

1. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 14 million cycles or greater.
2. Where specified, provide status indicators with highly reflective color and wording for "locked/unlocked" or "vacant/occupied" with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1" x 0.6" with a curved design allowing a 180 degree viewing angle with protective covering to prevent tampering.
3. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ML2000 Series.
 - b. Sargent Manufacturing (SA) - 8200 Series.
 - c. Or approved equal.

2.8 AUXILIARY LOCKS

- A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.
 1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DL4000 Series.
 - b. Sargent Manufacturing (SA) - 4870 Series.
 - c. Or approved equal.

2.9 LOCK AND LATCH STRIKES

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

2.10 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with keyed cylinder dogging device to hold the pushbar and latch in a retracted position.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 10. Extended cycle test: Devices to have been cycle tested to 9 million cycles.
 11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the

functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Or approved equal.

2.11 ELECTROMECHANICAL EXIT DEVICES

- A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
 1. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
 2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED5000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Or approved equal.

2.12 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 UL listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper

installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

- B. Door Closers, Surface Mounted (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. Manufacturers:

- a. Norton Rixson (NO) - 7500 Series.
- b. Sargent Manufacturing (SA) - 351 Series.
- c. Or approved equal.

- C. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

- 1. Manufacturers:

- a. Corbin Russwin Hardware (RU) - Unitrol Series.
- b. Norton Rixson (NO) - Unitrol Series.
- c. Or approved equal.

2.13 ELECTROHYDRAULIC DOOR OPERATORS

- A. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.

- 1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.

- B. Standard: Certified ANSI/BHMA A156.19.

- C. Performance Requirements:

- 1. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
- 2. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.

- D. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.

- E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19. When not in automatic mode, door operator to function as manual door closer with fully adjustable opening and closing forces, with or without electrical power.
- F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.
- G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.
- H. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.
- I. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Norton Rixson (NO) - 6000 Series.

2.14 SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.
 - 1. Manufacturers:
 - a. Norton Rixson (RF) - 980/990 Series.
 - b. Sargent Manufacturing (SA) - 1560 Series.
 - c. Or approved equal.

2.15 ARCHITECTURAL TRIM

- A. Door Protective Trim
 - 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 - 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Rockwood (RO).
 - b. Or approved equal.

2.16 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Rockwood (RO).
 - b. Or approved equal.
- 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. Norton Rixson (RF).
 - b. Sargent Manufacturing (SA).
 - c. Or approved equal.

2.17 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on

exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko (PE).
 - 2. Or approved equal.

2.18 STAND ALONE ACCESS CONTROL LOCKING DEVICES

- A. Stand Alone Locksets: ANSI A156.2, Series 4000, Grade 1 locking mechanism complete with integrated touchscreen or keypad as specified for access and programming. Voice-guided programming with 12-digit PIN code selection and up to 1000 user option. Locks to accept standard, small format interchangeable core, security and patented cylinders. Battery-operated, with low power indicator, or hard-wired (9 Volt external power supply) option.
 - 1. Manufacturers:
 - a. Yale Commercial(YA) - nexTouch Series.
 - b. Or Approved Equal

2.19 ELECTRONIC ACCESSORIES

- A. Digital Keypads: Digital keypad designed for high volume use controlling entry of electrified locking devices. Fully weather proof, vandal resistant with wall type gang box or mullion mounting applications. Digital keypad system circuit board is remote mounted in a metal enclosure and provides for multiple users and digit codes, and variable programmable release times. Operates on either 12 or 24 volts AC or DC.
 - 1. Manufacturers:

- a. Securitron (SU) - DK Series.
 - b. Or approved equal
- B. Key Switches: Key switches furnished standard with stainless steel single gang face plate with a 12/24VDC bi-color LED indicator. Integral backing bracket permits integration with any 1-1/4" or 1-1/2" mortise type cylinder. Key switches available as momentary or maintained action and in narrow face plate options.
- 1. Manufacturers:
 - a. Securitron (SU) - MK Series.
 - b. Or approved equal.
- C. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
- 1. Manufacturers:
 - a. Securitron (SU) - DPS Series.
 - b. Or approved equal.
- D. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.
- 1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
 - 2. Manufacturers:
 - a. Securitron (SU) - AQL Series.
 - b. Or approved equal.

2.20 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.

2.21 FINISHES

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. 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. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Section 07900 - Joint Sealer Assemblies.
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 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.

3.5 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.

3.6 DEMONSTRATION

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

3.7 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.
- B. Manufacturer's Abbreviations:
1. MK - McKinney
 2. PE - Pemko
 3. SU - Securitron
 4. RO - Rockwood
 5. RU - Corbin Russwin
 6. OT - Other
 7. RF - Rixson
 8. NO - Norton

HARDWARE SETS

Set: 1.0

Description: Exterior Alum Pair - Auto

2 Continuous Hinge	CFM-HD1 Series		PE
2 Concealed Vert Rod Exit, Storeroom	ED5800 103959ET M52 ACP	630	RU
1 Bldg Standard Cylinder	To suit device	626	RU
1 Surface Closer (top jamb)	UNIJ7500	689	NO
1 Automatic Opener	6061; 6071 D	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Keyswitch	MK		SU
1 Vestibule Switch (dual)	504 (2-gang elec box)		NO
1 Door Switch	501		NO
1 Weather Seals	Supplied with door/frame assembly		
1 Wiring Diagram (as required)	Elevation; Point-to-Point		

Notes: Exit devices must be dogged manually for auto operator to function. Key switch turns operator on/off.

Set: 2.0

Description: Lobby / Vestibule Alum Pair - Auto; Classroom

2 Continuous Hinge	CFM-HD1 Series		PE
2 Concealed Vert Rod Exit, Classroom	ED5800 103955ET M52 ACP	630	RU
1 Bldg Standard Cylinder	To suit device	626	RU
1 Surface Closer (top jamb)	UNI7500	689	NO
1 Automatic Opener	6061; 6071 D	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Keyswitch	MK		SU
1 Door Switch	501		NO
1 Weather Seals	Supplied with door/frame assembly		
1 Wiring Diagram (as required)	Elevation; Point-to-Point		

Notes: Exit devices must be dogged manually for auto operator to function. Key switch turns operator on/off.

Set: 3.0

Description: Exterior Alum Pair - Hold Open

2 Continuous Hinge	CFM-HD1 Series		PE
2 Concealed Vert Rod Exit, Storeroom	ED5800 103959ET M52 ACP	630	RU
2 Surface Closer (top jamb, hold open)	UNI7500H	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Weather Seals	Supplied with door/frame assembly		

Set: 4.0

Description: Exterior Alum

1 Continuous Hinge	CFM-HD1 Series		PE
1 Rim Exit Device, Storeroom	ED5200 103959ET M52 ACP	630	RU
1 Surface Closer (top jamb)	UNI7500	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Weather Seals	Supplied with door/frame assembly		

Set: 5.0

Description: Exterior FRP - Pull x Key

1 Continuous Hinge	CFM-HD1 Series		PE
1 Rim Exit Device, Nightlatch	ED5200 K157ET M52 ACP	630	RU
1 Flush Pull	Supplied by FRP Door Mfr		OT
1 Surface Closer (top jamb)	UNI7500	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Weather Seals	Supplied with door/frame assembly		

Set: 6.0

Description: Exterior FRP - Bldg Services

1 Continuous Hinge	CFM-HD1 Series		PE
1 Storeroom Lock (less os lever)	ML2057 103X M30 ACP	626	RU
1 Flush Pull	Supplied by FRP Door Mfr		OT
1 Surface Closer (top jamb)	UNIJ7500	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Weather Seals	Supplied with door/frame assembly		

Set: 7.0

Description: Alum Vest

1 Continuous Hinge	CFM-HD1 Series		PE
1 Push Bar & Pull	BF15847	US32D	RO
1 Surface Closer (top jamb)	UNIJ7500	689	NO
1 Threshold (coord w/ details)	27_A FHSL14SS		PE
1 Weather Seals	Supplied with door/frame assembly		

Set: 8.0

Description: Exterior FRP - Keypad Access

1 Continuous Hinge	CFM-HD1 Series		PE
1 Rim Exit Device, Exit Only	ED5200 EO M52 ACP	630	RU
1 Exit Device Trim	LC MO-NTT620-NR	626	YA
2 Bldg Standard Cylinder	To suit device	626	RU
1 Surface Closer	UNI7500	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Sweep	315CN		PE
1 Weather Seals	Supplied with door/frame assembly		

Set: 9.0

Description: Exterior FRP - Alarmed; Keypad (both directions)

1 Continuous Hinge	CFM-HD1 EL-CEPTx32D		PE
1 Rim Exit Device, Exit Only, Alarm	ED5200 EO M61 ACP	630	RU
1 Exit Device Trim	LC MO-NTT620-NR	626	YA
2 Bldg Standard Cylinder	To suit device	626	RU
1 Surface Closer (top jamb)	UNIJ7500	689	NO
1 Threshold (coord w/ details)	273x292AFGPK FHSL14SS		PE
1 Frame Wiring Harness	QC Series (jamb to J-box)		MK
1 Digital Entry Keypad	DK-12		SU
1 Remote Alarm Power Harness	709F989		RU
1 Power Supply	AQL4-R8-E1		SU
1 Power Supply (9V)	784		RU
1 Weather Seals	Supplied with door/frame assembly		
1 Wiring Diagram (as required)	Elevation; Point-to-Point		

Notes:

Operation: Door is normally closed, locked and armed. Valid code at exit trim unlocks outside lever for

momentary access. Valid code at inside keypad bypasses alarm for momentary passage. Depressing pushrail provides free alarmed egress at all times. Key in pushrail turns alarm on/off. Outside key override.

Set: 10.0

Description: Stair - Fail Safe; Alarmed; Keypad (both directions)

3 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Rim Exit, Fail Safe, Alarm	ED5200A 1039903ET M61 ACP	630	RU
2 Bldg Standard Cylinder	To suit device	626	RU
1 Surface Closer	R/PR 7500 Series	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO
1 Head & Jamb Seal (adhesive)	S88BL		PE
1 Door Wiring Harness	QC Series (jamb to device)		MK
1 Frame Wiring Harness	QC Series (jamb to J-box)		MK
2 Digital Entry Keypad	DK-12		SU
1 Remote Alarm Power Harness	709F989		RU
1 Power Supply	AQL4-R8-E1		SU
1 Power Supply (9V)	784		RU
1 Electric Power Transfer	EL-CEPT	630	SU
1 Wiring Diagram (as required)	Elevation; Point-to-Point		

Notes:

Operation: Door is normally closed, locked and armed. Valid code at exit trim unlocks outside lever for momentary access. Valid code at inside keypad bypasses alarm for momentary passage. Free alarmed egress at all times. Outside key override.

Set: 11.0 Not Used

Set: 12.0

Description: Corridor Pair - Hold Open; Alarmed

6 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
2 Surf Vert Rod Exit, Classroom, Alarm	ED5470 103955ET M55 M61 ACP	630	RU
2 Surface Closer	R/PR 7500 Series	689	NO
2 Kick Plate	K1050 10" 4BE CSK	US32D	RO
2 Electromagnetic Holder	998M	689	RF
2 Silencer	608		RO

Notes:-Unauthorized exit will sound local battery-powered alarm. Key in pushrail turns alarm on/off and allows momentary passage.

Set: 13.0

Description: Community Room

3 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Rim Exit Device, Classroom	ED5200 103955ET M52 ACP	630	RU
1 Surface Closer	R/PR 7500 Series	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO

1 Head & Jamb Gasketing	303APK		PE
1 Auto Door Bottom	434ARL		PE

Set: 14.0

Description: Closet Pair

6 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Dust Proof Strike	570	US26D	RO
2 Flush Bolt (manual)	555	US26D	RO
1 Classroom Lock	ML2055 103X ACP	626	RU
1 Half Dummy Trim	ML2050 103X	626	RU
2 Surf Overhead Stop	10-X36	630	RF
2 Silencer	608		RO

Set: 15.0

Description: Storage Pair

6 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Dust Proof Strike	570	US26D	RO
2 Flush Bolt (manual)	555	US26D	RO
1 Storeroom Lock	ML2057 103X ACP	626	RU
2 Surf Overhead Stop	10-X36	630	RF
1 Surface Closer	R/PR 7500 Series	689	NO
2 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Head & Jamb Seal (adhesive)	S88BL		PE
1 Astragal	357SP		PE
1 Astragal Seal	S772BL		PE

Set: 16.0

Description: Tech / Work - Keypad Access

3 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Access Control Mortise Lock	MOR NTM-620-NR	626	YA
1 Bldg Standard Cylinder	To suit device	626	RU
1 Surface Closer	R/PR 7500 Series	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO
1 Threshold (coord w/ details)	27_A FHSL14SS		PE
1 Head & Jamb Seal (adhesive)	S88BL		PE

Set: 17.0

Description: Service; Storage Sgl

3 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Storeroom Lock	ML2057 103X ACP	626	RU
1 Surface Closer	R/PR 7500 Series	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO

1 Threshold (coord w/ details)	27_A FHSL14SS		PE
1 Head & Jamb Seal (adhesive)	S88BL		PE

Set: 18.0

Description: AV Closet; Tech

3 Hinge, Full Mortise	TA2714 (qty, size, nrp per spec)	US26D	MK
1 Storeroom Lock	ML2057 103X ACP	626	RU
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO
3 Silencer	608		RO

Set: 19.0

Description: Break; Teen Space; Storytelling

3 Hinge (heavy weight)	T4A3786 (qty, size, nrp per spec)	US26D	MK
1 Classroom Lock	ML2055 103X ACP	626	RU
1 Surface Closer	R/PR 7500 Series	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO
3 Silencer	608		RO

Set: 20.0

Description: Office; Study

3 Hinge, Full Mortise	TA2714 (qty, size, nrp per spec)	US26D	MK
1 Classroom Intruder Lock	ML2052 103X ACP	626	RU
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO
3 Silencer	608		RO
1 Coat Hook	RM811	US26D	RO

Set: 21.0

Description: Single User Toilet

3 Hinge, Full Mortise	TA2314 (qty, size, nrp per spec)	US32D	MK
1 Privacy Lock	ML2060 103X V20	626	RU
1 Surface Closer	R/PR 7500 Series	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO
3 Silencer	608		RO
1 Coat Hook	RM811	US26D	RO

Set: 22.0

Description: Restroom

3 Hinge (heavy weight)	T4A3386 (qty, size, nrp per spec)	US32D	MK
1 Classroom Deadbolt	DL4117 ACP	626	RU
1 Push Plate	70E CFC	US32D	RO
1 Pull Plate	111x70C CFTT	US32D	RO
1 Surface Closer	R/PR 7500 Series	689	NO
1 Kick Plate	K1050 10" 4BE CSK	US32D	RO
1 Mop Plate	K1050 4" 4BE CSK	US32D	RO

1 Door Stop	404 Wall; 441CU Floor (or per spec)	US26D	RO
3 Silencer	608		RO

Set: 23.0

Description: Closet Bifold

1 Bifold Door Hdwe	HF4/100A		PE
2 Pull	853 4"	US32D	RO

END OF SECTION 08700

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Sleeves.
 2. Sleeve-seal systems.
 3. Grout.
 4. Silicone sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
1. [Product Data](#): For sealants, indicating VOC content.
 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following, or approved equal.
1. [Advance Products & Systems, Inc.](#)
 2. [CALPICO, Inc.](#)
 3. [GPT; an EnPro Industries company.](#)
- B. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop collar.
- C. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, anticorrosion coated or galvanized, with plain ends and integral welded waterstop collar.

- D. Galvanized-Steel Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- E. PVC Pipe Sleeves: ASTM D1785, Schedule 40.

2.2 SLEEVE-SEAL SYSTEMS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - 1. [Advance Products & Systems, Inc.](#)
 - 2. [CALPICO, Inc.](#)
 - 3. [GPT; an EnPro Industries company.](#)
 - 4. [Metraflex Company \(The\).](#)
 - 5. [Proco Products, Inc.](#)
- B. Description:
 - 1. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 - 2. Designed to form a hydrostatic seal of 20 psig (137 kPa) minimum.
 - 3. Sealing Elements: EPDM-rubber, High-temperature-silicone, Nitrile (Buna N) interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 4. Pressure Plates: Carbon steel, Stainless steel, Stainless steel, Type 316.
 - 5. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.4 SILICONE SEALANTS

- A. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant, ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal.

- a. [GE Construction Sealants; Momentive Performance Materials Inc.](#)
 - b. [Polymeric Systems, Inc.](#)
 - c. [The Dow Chemical Company.](#)
2. [Sealant shall have a VOC](#) content of 250 g/L or less.
 3. [Sealant shall comply with the](#) testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT. Grade P Pourable (self-leveling) formulation is for opening in floors and other horizontal surfaces that are not fire rated.
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. [May National Associates, Inc.; a subsidiary of Sika Corporation.](#)
 2. [Sealant shall have a VOC](#) content of 250 g/L or less.
 3. [Sealant shall comply with the](#) testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide **1-inch (25-mm)** annular clear space between piping and concrete slabs and walls.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas **2 inches (50 mm)** above finished floor level.
 2. Using grout or silicone sealant, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 1. Cut sleeves to length for mounting flush with both surfaces.

2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6 (DN 150): Cast-iron pipe sleeves, Steel pipe sleeves.
 - b. Piping NPS 6 (DN 150) and Larger: Cast-iron pipe sleeves, Steel pipe sleeves.
 2. Exterior Concrete Walls below Grade:
 - a. Piping Smaller Than NPS 6 (DN 150): Cast-iron pipe sleeves with sleeve-seal system, Steel pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

- b. Piping **NPS 6 (DN 150)** and Larger: Cast-iron pipe sleeves with sleeve-seal system, Steel pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for **1-inch (25-mm)** annular clear space between piping and sleeve for installing sleeve-seal system.
- 3. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than **NPS 6 (DN 150)**: Cast-iron pipe sleeves with sleeve-seal system, Steel pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for **1-inch (25-mm)** annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping **NPS 6 (DN 150)** and Larger: Cast-iron pipe sleeves with sleeve-seal system, Steel pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for **1-inch (25-mm)** annular clear space between piping and sleeve for installing sleeve-seal system.
- 4. Concrete Slabs above Grade:
 - a. Piping Smaller Than **NPS 6 (DN 150)**: Steel pipe sleeves.
 - b. Piping **NPS 6 (DN 150)** and Larger: Steel pipe sleeves.
- 5. Interior Partitions:
 - a. Piping Smaller Than **NPS 6 (DN 150)**: Steel pipe sleeves.
 - b. Piping **NPS 6 (DN 150)** and Larger: Galvanized-steel sheet sleeves.

END OF SECTION 220517

SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

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. Bimetallic-actuated thermometers.
 - 2. Liquid-in-glass thermometers.
 - 3. Thermowells.
 - 4. Dial-type pressure gages.
 - 5. Gage attachments.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of meter and gage.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 BIMETALLIC-ACTUATED THERMOMETERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - 1. Ashcroft Inc.
 - 2. Ernst Flow Industries.
 - 3. Marsh Bellofram.
 - 4. Miljoco Corporation.

5. [Nanmac Corporation.](#)
6. [Noshok.](#)
7. [Palmer Wahl Instrumentation Group.](#)
8. [REOTEMP Instrument Corporation.](#)
9. [Tel-Tru Manufacturing Company.](#)
10. [Trerice, H. O. Co.](#)
11. [WATTS.](#)
12. [Weiss Instruments, Inc.](#)
13. [Weksler Glass Thermometer Corp.](#)
14. [WIKA Instrument Corporation.](#)

- B. Standard: ASME B40.200.
- C. Case: Liquid-filled and sealed type(s); stainless steel with **3-inch (76-mm)** nominal diameter.
- D. Dial: Nonreflective aluminum with permanently etched scale markings and scales in deg F and deg C.
- E. Connector Type(s): Union joint, adjustable angle, rigid back, and rigid bottom, with unified-inch screw threads.
- F. Connector Size: **1/2 inch (13 mm)**, with ASME B1.1 screw threads.
- G. Stem: **0.25 or 0.375 inch (6.4 or 9.4 mm)** in diameter; stainless steel.
- H. Window: Plain glass.
- I. Ring: Stainless steel.
- J. Element: Bimetal coil.
- K. Pointer: Dark-colored metal.
- L. Accuracy: Plus or minus 1 percent of scale range.

2.2 LIQUID-IN-GLASS THERMOMETERS

- A. Metal-Case, Compact-Style, Liquid-in-Glass Thermometers:
 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
 2. Standard: ASME B40.200.
 3. Case: Cast aluminum; **6-inch (152-mm)** nominal size.
 4. Case Form: Straight unless otherwise indicated.
 5. Tube: Glass with magnifying lens and blue or red organic liquid.
 6. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in **deg F (deg C)**.
 7. Window: Glass or plastic.
 8. Stem: Aluminum or brass and of length to suit installation.
 - a. Design for Thermowell Installation: Bare stem.

9. Connector: **3/4 inch (19 mm)**, with ASME B1.1 screw threads.
10. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

B. Metal-Case, Industrial-Style, Liquid-in-Glass Thermometers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by the following, or approved equal.
 - a. [Palmer Wahl Instrumentation Group.](#)
 - b. [Treice, H. O. Co.](#)
 - c. [Weiss Instruments, Inc.](#)
 - d. [Weksler Glass Thermometer Corp.](#)
2. Standard: ASME B40.200.
3. Case: Cast aluminum; **7-inch (178-mm)** nominal size unless otherwise indicated.
4. Case Form: Straight unless otherwise indicated.
5. Tube: Glass with magnifying lens and blue or red organic liquid.
6. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in **deg F (deg C)**.
7. Window: Glass.
8. Stem: Aluminum and of length to suit installation.
 - a. Design for Thermowell Installation: Bare stem.
9. Connector: **1-1/4 inches (32 mm)**, with ASME B1.1 screw threads.
10. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.3 THERMOWELLS

A. Thermowells:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
3. Material for Use with Copper Tubing: CNR or CUNI.
4. Material for Use with Steel Piping: CRES CSA.
5. Type: Stepped shank unless straight or tapered shank is indicated.
6. External Threads: **NPS 1/2, NPS 3/4, or NPS 1 (DN 15, DN 20, or NPS 25)**, ASME B1.20.1 pipe threads.
7. Internal Threads: **1/2, 3/4, and 1 inch (13, 19, and 25 mm)**, with ASME B1.1 screw threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length required to match thermometer bulb or stem.
10. Lagging Extension: Include on thermowells for insulated piping and tubing.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.4 PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Ametek U.S. Gauge.](#)
 - b. [Ashcroft Inc.](#)
 - c. [Ernst Flow Industries.](#)
 - d. [Marsh Bellofram.](#)
 - e. [Miljoco Corporation.](#)
 - f. [Noshok.](#)
 - g. [Palmer Wahl Instrumentation Group.](#)
 - h. [REOTEMP Instrument Corporation.](#)
 - i. [Trerice, H. O. Co.](#)
 - j. [WATTS.](#)
 - k. [Weiss Instruments, Inc.](#)
 - l. [Weksler Glass Thermometer Corp.](#)
2. Standard: ASME B40.100.
3. Case: Liquid-filled Sealed Open-front, pressure relief Solid-front, pressure relief type(s); cast aluminum or drawn steel; 4-1/2-inch (114-mm) 6-inch (152-mm) nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2 (DN 8 or DN 15), ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi (kPa).
8. Pointer: Dark-colored metal.
9. Window: Glass.
10. Ring: Metal Stainless steel.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

B. Remote-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Ametek U.S. Gauge.](#)
 - b. [Ernst Flow Industries.](#)
 - c. [Flo Fab Inc.](#)
 - d. [Palmer Wahl Instrumentation Group.](#)
 - e. [REOTEMP Instrument Corporation.](#)
 - f. [Tel-Tru Manufacturing Company.](#)
 - g. [WATTS.](#)
 - h. [Weiss Instruments, Inc.](#)
 - i. [WIKA Instrument Corporation.](#)
2. Standard: ASME B40.100.

3. Case: Liquid-filled Sealed type; cast aluminum or drawn steel; 4-1/2-inch (114-mm) 6-inch (152-mm) nominal diameter with back or front flange and holes for panel mounting.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2 (DN 8 or DN 15), ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi (kPa).
8. Pointer: Dark-colored metal.
9. Window: Glass.
10. Ring: Metal Stainless steel.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.5 GAGE ATTACHMENTS

- A. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2 (DN 8 or DN 15), ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.
- B. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2 (DN 8 or DN 15), ASME B1.20.1 pipe threads.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install thermowells with socket extending a minimum of 2 inches (51 mm) into fluid to center of pipe and in vertical position in piping tees.
- B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- C. Install thermowells with extension on insulated piping.
- D. Fill thermowells with heat-transfer medium.
- E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- F. Install remote-mounted thermometer bulbs in thermowells and install cases on panels; connect cases with tubing and support tubing to prevent kinks. Use minimum tubing length.
- G. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
- H. Install remote-mounted pressure gages on panel.
- I. Install valve and snubber in piping for each pressure gage for fluids.
- J. Install thermometers in the following locations:

1. Inlet and outlet of each water heater.
 2. Inlets and outlets of each domestic water heat exchanger.
 3. Inlet and outlet of each domestic hot-water storage tank.
 4. Inlet and outlet of each remote domestic water chiller.
- K. Install pressure gages in the following locations:
1. Building water service entrance into building.
 2. Inlet and outlet of each pressure-reducing valve.
 3. Suction and discharge of each domestic water pump.
- L. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.
- M. Adjust faces of meters and gages to proper angle for best visibility.

3.2 THERMOMETER SCHEDULE

- A. Thermometers at inlet and outlet of each domestic water heater shall be one of the following:
1. Liquid-filled Sealed, bimetallic-actuated type.
 2. Metal case, industrial-style, liquid-in-glass type.
- B. Thermometers at inlets and outlets of each domestic water heat exchanger shall be one of the following:
1. Liquid-filled Sealed, bimetallic-actuated type.
 2. Metal case, industrial-style, liquid-in-glass type.
- C. Thermometers at inlet and outlet of each domestic hot-water storage tank shall be one of the following:
1. Liquid-filled Sealed, bimetallic-actuated type.
 2. Metal case, industrial-style, liquid-in-glass type.
- D. Thermometers at inlet and outlet of each remote domestic water chiller shall be one of the following:
1. Liquid-filled Sealed, bimetallic-actuated type.
 2. Metal case, industrial-style, liquid-in-glass type.
- E. Thermometer stems shall be of length to match thermowell insertion length.

3.3 THERMOMETER SCALE-RANGE SCHEDULE

- A. Scale Range for Domestic Cold-Water Piping: 0 to 100 deg F (Minus 20 to plus 50 deg C).
- B. Scale Range for Domestic Cold-Water Piping: 0 to 150 deg F (Minus 20 to plus 70 deg C).
- C. Scale Range for Domestic Cold-Water Piping: 30 to 240 deg F (0 to plus 115 deg C).

- D. Scale Range for Domestic Hot-Water Piping: 0 to 250 deg F (0 to 150 deg C).
- E. Scale Range for Domestic Hot-Water Piping: 20 to 240 deg F (0 to 150 deg C).
- F. Scale Range for Domestic Hot-Water Piping: 30 to 240 deg F (0 to plus 115 deg C).
- G. Scale Range for Domestic Cooled-Water Piping: 0 to 100 deg F (Minus 20 to plus 50 deg C).
- H. Scale Range for Domestic Cooled-Water Piping: 0 to 150 deg F (Minus 20 to plus 70 deg C).

3.4 PRESSURE-GAGE SCHEDULE

- A. Pressure gages at discharge of each water service into building shall be one of the following:
 - 1. Liquid-filled Sealed Solid-front, pressure-relief, direct or remote-mounted, metal case.
- B. Pressure gages at inlet and outlet of each water pressure-reducing valve shall be one of the following:
 - 1. Liquid-filled Sealed Solid-front, pressure-relief, direct or remote-mounted, metal case.
 - 2. Sealed, direct or remote-mounted, plastic case.
 - 3. Test plug with chlorosulfonated polyethylene synthetic EPDM self-sealing rubber inserts.
- C. Pressure gages at suction and discharge of each domestic water pump shall be one of the following:
 - 1. Liquid-filled Sealed Solid-front, pressure-relief, direct or remote-mounted, metal case.
 - 2. Sealed, direct or remote-mounted, plastic case.
 - 3. Test plug with chlorosulfonated polyethylene synthetic EPDM self-sealing rubber inserts.

3.5 PRESSURE-GAGE SCALE-RANGE SCHEDULE

- A. Scale Range for Water Service Piping: 0 to 100 psi (0 to 600 kPa).
- B. Scale Range for Water Service Piping: 0 to 160 psi (0 to 1100 kPa).
- C. Scale Range for Water Service Piping: 0 to 200 psi (0 to 1400 kPa).
- D. Scale Range for Domestic Water Piping: 0 to 100 psi (0 to 600 kPa).
- E. Scale Range for Domestic Water Piping: 0 to 160 psi (0 to 1100 kPa).
- F. Scale Range for Domestic Water Piping: 0 to 200 psi (0 to 1400 kPa).
- G. Scale Range for Domestic Water Piping: 0 to 300 psi (0 to 2500 kPa).

END OF SECTION 220519

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. PEX tube and fittings.
3. Piping joining materials.
4. Transition fittings.
5. Dielectric fittings.

B. Related Requirements:

1. Section 221113 "Facility Water Distribution Piping" for water-service piping and water meters outside the building from source to the point where water-service piping enters the building.

1.2 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

B. Sustainable Design Submittals:

1. [<Double click to insert sustainable design text for adhesives.>](#)

1.3 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: [ASTM B 88, Type L \(ASTM B 88M, Type B\)](#) and [ASTM B 88, Type M \(ASTM B 88M, Type C\)](#) water tube, drawn temper.
- B. Soft Copper Tube: [ASTM B 88, Type L \(ASTM B 88M, Type B\)](#) water tube, annealed temper.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.
- G. Copper, Brass, or Bronze Pressure-Seal-Joint Fittings:
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - b. [Elkhart Products Corporation.](#)
 - c. [Mueller Industries, Inc.](#)
 - d. [NIBCO INC.](#)
 - e. [Viega LLC.](#)
 - 2. Fittings: Cast-brass, cast-bronze, or wrought-copper with EPDM O-ring seal in each end. Sizes [NPS 2-1/2 \(DN 65\)](#) and larger with [stainless steel grip ring and EPDM O-ring seal.](#)
 - 3. Minimum [200-psig \(1379-kPa\)](#) working-pressure rating at [250 deg F \(121 deg C\)](#).
- H. Copper Push-on-Joint Fittings:
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - b. [Elkhart Products Corporation.](#)
 - c. [NIBCO INC.](#)
 - d. [Victaulic Company.](#)
 - 2. Cast-copper fitting complying with ASME B16.18 or wrought-copper fitting complying with ASME B 16.22.
 - 3. Stainless-steel teeth and EPDM-rubber, O-ring seal in each end instead of solder-joint ends.

2.3 PEX TUBE AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal, or approved equal.
 - 1. Uponor.
- B. Tube Material: PEX plastic according to ASTM F 876 and ASTM F 877.
- C. Fittings: ASTM F 1807, metal insert and copper crimp rings, ASTM F 1960, cold expansion fittings and reinforcing rings.
- D. Fittings: ASSE 1061, push-fit fittings.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal, or approved equal.
 - a. SharkBite, A Division of Reliance Worldwide Corporation.
 - b. Zurn Industries, LLC.
- E. Manifold: Multiple-outlet, plastic or corrosion-resistant-metal assembly complying with ASTM F 876; with plastic or corrosion-resistant-metal valve for each outlet.

2.4 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 - 1. AWWA C110/A21.10, rubber, flat face, **1/8 inch (3.2 mm)** thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.
- E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- F. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.5 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.

- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2.6 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

- B. Dielectric Unions:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Standard: ASSE 1079.
3. Pressure Rating: [**125 psig (860 kPa) minimum at 180 deg F (82 deg C)**] [**150 psig (1035 kPa)**] [**250 psig (1725 kPa)**] <Insert value>.
4. End Connections: Solder-joint copper alloy and threaded ferrous.

- C. Dielectric Flanges:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Standard: ASSE 1079.
3. Factory-fabricated, bolted, companion-flange assembly.
4. Pressure Rating: [**125 psig (860 kPa) minimum at 180 deg F (82 deg C)**] [**150 psig (1035 kPa)**] [**175 psig (1200 kPa)**] [**300 psig (2070 kPa)**] <Insert value>.
5. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

- D. Dielectric-Flange Insulating Kits:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Nonconducting materials for field assembly of companion flanges.
3. Pressure Rating: [**150 psig (1035 kPa)**] <Insert value>.
4. Gasket: Neoprene or phenolic.
5. Bolt Sleeves: Phenolic or polyethylene.
6. Washers: Phenolic with steel backing washers.

- E. Dielectric Nipples:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Standard: IAPMO PS 66.
3. Electroplated steel nipple complying with ASTM F 1545.
4. Pressure Rating and Temperature: [**300 psig (2070 kPa) at 225 deg F (107 deg C)**] <Insert values>.
5. End Connections: Male threaded or grooved.
6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Section 312316 "Excavation " for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."
- E. Install shutoff valve immediately upstream of each dielectric fitting.
- F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."
- G. Install domestic water piping level and plumb.
- H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- I. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- J. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- K. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- L. Install piping to permit valve servicing.
- M. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

- N. Install piping free of sags and bends.
- O. Install fittings for changes in direction and branch connections.
- P. Install PEX tubing with loop at each change of direction of more than 90 degrees.
- Q. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- R. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping."
- S. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."
- T. Install thermometers on[**inlet and**] outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."
- U. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- V. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- W. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Braze Joints" chapter.
- D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
- F. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Joints for PEX Tubing: Join according to ASTM F 1807 for metal insert and copper crimp ring fittings and ASTM F 1960 for cold expansion fittings and reinforcing rings.

- H. Joints for PEX Tubing: Join according to ASSE 1061 for push-fit fittings.
- I. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for **NPS 1-1/2 (DN 40)** and Smaller: Fitting-type coupling.
 - 2. Fittings for **NPS 2 (DN 50)** and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping **NPS 2 (DN 50)** and Smaller: Plastic-to-metal transition [**fittings**] [**or**] [**unions**].

3.5 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for [**NPS 2 (DN 50)**] <Insert pipe size> and Smaller: Use dielectric [**couplings**] [**couplings or nipples**] [**nipples**] [**unions**].
- C. Dielectric Fittings for [**NPS 2-1/2 to NPS 4 (DN 65 to DN 100)**] <Insert pipe size range>: Use dielectric [**flanges**] [**flange kits**] [**nipples**].
- D. Dielectric Fittings for [**NPS 5 (DN 125)**] <Insert pipe size> and Larger: Use dielectric flange kits.

3.6 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for seismic-restraint devices in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. **100 Feet (30 m)** and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than **100 Feet (30 m)**: MSS Type 43, adjustable roller hangers.
 - c. Longer Than **100 Feet (30 m)** if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs **100 Feet (30 m)** or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.

- C. Install hangers for copper piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Install vinyl-coated hangers for PEX tubing, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Support horizontal piping within **12 inches** of each fitting.
- F. Support vertical runs of copper piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- G. Support vertical runs of PEX tubing to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
 2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 3. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 4. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for **NPS 2-1/2 (DN 65)** and larger.

3.8 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. Piping Inspections:

- a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
- b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
- c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
- b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
- c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
- d. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
- e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

- 1. Close drain valves, hydrants, and hose bibbs.
- 2. Open shutoff valves to fully open position.
- 3. Open throttling valves to proper setting.
- 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

- a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least **50 ppm (50 mg/L)** of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least **200 ppm (200 mg/L)** of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

- D. Under-building-slab, domestic water, building-service piping, [NPS 3 (DN 80) and smaller] >, shall be[one of] the following:
1. Soft copper tube [ASTM B 88, Type L (ASTM B 88M, Type B)]; [wrought-copper, solder-joint fittings; and brazed] [copper pressure-seal fittings; and pressure-sealed] joints.
- E. Under-building-slab, domestic water, building-service piping, [NPS 4 to NPS 8 (DN 100 to DN 200) and larger] <Insert pipe size range>, shall be[one of] the following:
1. Soft copper tube, [ASTM B 88, Type K (ASTM B 88M, Type A)] [ASTM B 88, Type L (ASTM B 88M, Type B)]; wrought-copper, solder-joint fittings; and brazed joints.
- F. Under-building-slab, combined domestic water, building-service, and fire-service-main piping, [NPS 6 to NPS 12 (DN 150 to DN 300)] <Insert pipe size range>, shall be[one of] the following:
1. Plain-end, ductile-iron pipe; grooved-joint, ductile-iron-pipe appurtenances; and grooved joints.
- G. Under-building-slab, domestic water piping, [NPS 2 (DN 50) and smaller] <Insert pipe size range>, shall be[one of] the following:
1. [Hard] [or] [soft] copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); [wrought-copper, solder-joint fittings; and brazed] [copper pressure-seal-joint fittings; and pressure-sealed] joints.
- H. Aboveground domestic water piping, [NPS 2 (DN 50) and smaller] <Insert pipe size range>, shall be[one of] the following:
1. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B)] [ASTM B 88, Type M (ASTM B 88M, Type C)]; [cast-] [or] [wrought-]copper, solder-joint fittings; and [brazed] [soldered] joints.
 2. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B)] [or] [ASTM B 88, Type M (ASTM B 88M, Type C)]; copper pressure-seal-joint fittings; and pressure-sealed joints.
 3. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B)] [or] [ASTM B 88, Type M (ASTM B 88M, Type C)]; copper push-on-joint fittings; and push-on joints.
 4. PEX tube, NPS 1 (DN 25) and smaller.
 - a. Fittings for PEX tube:
 - 1) ASTM F 1807, metal insert and copper crimp rings.
 - 2) ASTM F 1960, cold expansion fittings and reinforcing rings.
 - 3) ASSE 1061, push-fit fittings.
- I. Aboveground domestic water piping, [NPS 2-1/2 to NPS 4 (DN 65 to DN 100)] <Insert pipe size range>, shall be[one of] the following:
1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B) or ASTM B 88, Type M (ASTM B 88M, Type C); wrought-copper, solder-joint fittings; and brazed or soldered joints.

2. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B)] [or] [ASTM B 88, Type M (ASTM B 88M, Type C)]; copper pressure-seal-joint fittings; and pressure-sealed joints.
 3. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B)] [or] [ASTM B 88, Type M (ASTM B 88M, Type C)]; grooved-joint, copper-tube appurtenances; and grooved joints.
- J. Aboveground domestic water piping, **NPS 5 to NPS 8 (DN 125 to DN 200)** shall be one of the following:
1. Hard copper tube, **ASTM B 88, Type L (ASTM B 88M, Type B) ASTM B 88, Type M (ASTM B 88M, Type C)**]; wrought-copper, solder-joint fittings; and brazed or soldered joints.
 2. Hard copper tube, **ASTM B 88, Type L (ASTM B 88M, Type B) or ASTM B 88, Type M (ASTM B 88M, Type C)**]; grooved-joint, copper-tube appurtenances; and grooved joints.
 3. Galvanized-steel pipe and nipples; galvanized, gray-iron threaded fittings; and threaded joints.
- K. Aboveground, combined domestic water-service and fire-service-main piping, **NPS 6 to NPS 12 (DN 150 to (DN 300))** shall be one of the following:
1. Plain-end, ductile-iron pipe; grooved-joint, ductile-iron-pipe appurtenances; and grooved joints.
 2. Galvanized-steel pipe and nipples; galvanized, gray-iron threaded fittings; and threaded joints.

END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vacuum breakers.
2. Backflow preventers.
3. Water pressure-reducing valves.
4. Balancing valves.
5. Temperature-actuated, water mixing valves.
6. Strainers for domestic water piping.
7. Hose bibbs.
8. Wall hydrants.
9. Drain valves.
10. Water-hammer arresters.
11. Trap-seal primer device.

B. Related Requirements:

1. Section 211100 "Facility Fire-Suppression Water-Service Piping" for fire water-service backflow prevention devices.
2. Section 220519 "Meters and Gauges for Plumbing Piping" for thermometers, pressure gauges, and flow meters in domestic water piping.
3. Section 221116 "Domestic Water Piping" for water meters.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For domestic water piping specialties.

1. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Test and inspection reports.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: **125 psig (860 kPa)** unless otherwise indicated.

2.3 VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by the following, or approved equal.
 - a. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - b. [Cash Acme, A Division of Reliance Worldwide Corporation.](#)
 - c. [WATTS.](#)
 - d. [Zurn Industries, LLC.](#)
2. Standard: ASSE 1001.
3. Size: **NPS 1/4 to NPS 3 (DN 8 to DN 80)**, as required to match connected piping.
4. Body: Bronze.
5. Inlet and Outlet Connections: Threaded.
6. Finish: Rough bronze, Chrome plated.

- B. Hose-Connection Vacuum Breakers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - b. [MIFAB, Inc.](#)
 - c. [WATTS.](#)
 - d. [Woodford Manufacturing Company.](#)
 - e. [Zurn Industries, LLC.](#)
2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.

5. Finish: Chrome or nickel plated, Rough bronze.

2.4 BACKFLOW PREVENTERS

A. Intermediate Atmospheric-Vent Backflow Preventers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - b. [Legend Valve & Fitting, Inc.](#)
 - c. [WATTS.](#)
 - d. [Zurn Industries, LLC.](#)
2. Standard: ASSE 1012.
3. Operation: Continuous-pressure applications.
4. Size: **NPS 1/2 (DN 15) NPS 3/4 (DN 20)**.
5. Body: Bronze.
6. End Connections: Union, solder joint.
7. Finish: Rough bronze.

B. Reduced-Pressure-Principle Backflow Preventers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Ames Fire & Waterworks; A WATTS Brand.](#)
 - b. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - c. [WATTS.](#)
 - d. [Zurn Industries, LLC.](#)
2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: **12 psig (83 kPa)** maximum, through middle third of flow range.
5. Size: 3”.
6. Design Flow Rate: **85 gpm (L/s)**.
7. Selected Unit Flow Range Limits: **<Insert gpm (L/s)>**.
8. Pressure Loss at Design Flow Rate: **<Insert psig (kPa)>** for sizes **NPS 2 (DN 50)** and smaller; **<Insert psig (kPa)>** for **NPS 2-1/2 (DN 65)** and larger.
9. Body: Bronze or stainless steel for **NPS 2 (DN 50)** and smaller; ductile or cast iron with interior lining that complies with AWWA C550 or that is FDA approved or stainless steel for **NPS 2-1/2 (DN 65)** and larger.
10. End Connections: Threaded for **NPS 2 (DN 50)** and smaller; flanged for **NPS 2-1/2 (DN 65)** and larger.
11. Configuration: Designed for horizontal, straight-through flow.
12. Accessories:

- a. Valves **NPS 2 (DN 50)** and Smaller: Ball type with threaded ends on inlet and outlet.
- b. Valves **NPS 2-1/2 (DN 65)** and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.
- c. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

C. Double-Check, Backflow-Prevention Assemblies:

- 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Ames Fire & Waterworks; A WATTS Brand.
 - b. Apollo Flow Controls; Conbraco Industries, Inc.
 - c. WATTS.
- 2. Standard: ASSE 1015.
- 3. Operation: Continuous-pressure applications unless otherwise indicated.
- 4. Pressure Loss: **5 psig (35 kPa)** maximum, through middle third of flow range.
- 5. Size: **<Insert NPS (DN)>**.
- 6. Design Flow Rate: **<Insert gpm (L/s)>**.
- 7. Selected Unit Flow Range Limits: **<Insert gpm (L/s)>**.
- 8. Pressure Loss at Design Flow Rate: **<Insert psig (kPa)>** for sizes **NPS 2 (DN 50)** and smaller; **<Insert psig (kPa)>** for **NPS 2-1/2 (DN 65)** and larger.
- 9. Body: Bronze cast silicon copper alloy or stainless steel for **NPS 2 (DN 50)** and smaller; ductile or cast iron with interior lining that complies with AWWA C550 or that is FDA approved or stainless steel for **NPS 2-1/2 (DN 65)** and larger.
- 10. End Connections: Threaded for **NPS 2 (DN 50)** and smaller; flanged for **NPS 2-1/2 (DN 65)** and larger.
- 11. Configuration: Designed for horizontal, straight-through flow.
- 12. Accessories:
 - a. Valves **NPS 2 (DN 50)** and Smaller: Ball type with threaded ends on inlet and outlet.
 - b. Valves **NPS 2-1/2 (DN 65)** and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.

2.5 WATER PRESSURE-REDUCING VALVES

A. Water Regulators:

- 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. WATTS.
 - c. Zurn Industries, LLC.
- 2. Standard: ASSE 1003.

3. Pressure Rating: Initial working pressure of 150 psig (1035 kPa).
4. Size: <Insert NPS (DN)>.
5. Design Flow Rate: <Insert gpm (L/s)>.
6. Design Inlet Pressure: <Insert psig (kPa)>.
7. Design Outlet Pressure Setting: <Insert psig (kPa)>.
8. Body: Bronze with chrome-plated finish for NPS 2 (DN 50) and smaller; bronze cast iron with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).
9. Valves for Booster Heater Water Supply: Include integral bypass.
10. End Connections: Threaded or solder for NPS 2 (DN 50) and smaller; flanged or solder for NPS 2-1/2 and NPS 3 (DN 65 and DN 80).

2.6 BALANCING VALVES

A. Memory-Stop Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. Crane; a Crane brand.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. Red-White Valve Corp.
2. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
3. Pressure Rating: 400-psig (2760-kPa) minimum CWP.
4. Size: NPS 2 (DN 50) or smaller.
5. Body: Copper alloy.
6. Port: Standard or full port.
7. Ball: Chrome-plated brass or stainless steel.
8. Seats and Seals: Replaceable.
9. End Connections: Solder joint or threaded.
10. Handle: Vinyl-covered steel with memory-setting device.

2.7 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. Leonard Valve Company.
 - c. TACO Comfort Solutions, Inc.
 - d. WATTS.
 - e. Zurn Industries, LLC.

2. Standard: ASSE 1070.
3. Pressure Rating: **125 psig (860 kPa)**.
4. Type: Thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded union inlets and outlet.
7. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: **<Insert deg F (deg C)>**.
9. Tempered-Water Design Flow Rate: **<Insert gpm (L/s)>**.
10. Valve Finish: Chrome plated.

B. Primary, Thermostatic, Water Mixing Valves:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Standard: ASSE 1017.
3. Pressure Rating: **125 psig (860 kPa)** minimum unless otherwise indicated.
4. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded union inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: **<Insert deg F (deg C)>**.
9. Tempered-Water Design Flow Rate: **<Insert gpm (L/s)>**.
10. Selected Valve Flow Rate at **45-psig (310-kPa)** Pressure Drop: **<Insert gpm (L/s)>**.
11. Pressure Drop at Design Flow Rate: **<Insert psig (kPa)>**.
12. Valve Finish: Chrome plated.
13. Piping Finish: Chrome plated.
14. Cabinet: Factory fabricated, stainless steel, for recessed mounting and with hinged, stainless steel door.

C. Primary, Electronic, Water Mixing Valve Assemblies:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Acorn Engineering Company; a Division of Morris Group International.](#)
 - b. [Leonard Valve Company.](#)
 - c. [POWERS; A WATTS Brand.](#)
2. Standard: ASSE 1017.
3. Pressure Rating: **125 psig (860 kPa)** minimum unless otherwise indicated.
4. Type: Exposed, electronically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded or solder joint inlets and outlet.
7. Accessories: Manual temperature override control, check stops on hot- and cold-water supplies, and automatic hot- and cold-water shutoff upon inlet supply failure.
8. Tempered-Water Setting: **<Insert deg F (deg C)>**.
9. Tempered-Water Design Flow Rate: **<Insert gpm (L/s)>**.
10. Selected Valve Flow Rate at **45-psig (310-kPa)** Pressure Drop: **<Insert gpm (L/s)>**.

11. Pressure Drop at Design Flow Rate: <Insert **psig (kPa)**>.
12. Valve Finish: Bronze.
13. Digital temperature control and monitoring module.
 - a. Controls temperature within plus or minus **2 deg F (1 deg C)**.
 - b. User programmable at module or through BAS.
 - c. ASHRAE 188 compliance.
 - d. Local and remote monitoring.
 - e. BACNet Modbus Metasys Ethernet protocol language(s).
 - f. 115 V ac, 60 Hz.
 - g. Battery backup.

2.8 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. WATTS.
 - b. Zurn Industries, LLC.
2. Pressure Rating: **125 psig (860 kPa)** minimum unless otherwise indicated.
3. Body: Bronze for **NPS 2 (DN 50)** and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved, epoxy coated and for **NPS 2-1/2 (DN 65)** and larger.
4. End Connections: Threaded for **NPS 2 (DN 50)** and smaller; flanged for **NPS 2-1/2 (DN 65)** and larger.
5. Screen: Stainless steel with round perforations unless otherwise indicated.
6. Perforation Size:
 - a. Strainers **NPS 2 (DN 50)** and Smaller: **0.020 inch (0.51 mm)**.
 - b. Strainers **NPS 2-1/2 to NPS 4 (DN 65 to DN 100)**: **0.045 inch (1.14 mm)**.
 - c. Strainers **NPS 5 (DN 125)** and Larger: **0.10 inch (2.54 mm)**.
7. Drain: Pipe plug.

2.9 HOSE BIBBS

A. Hose Bibbs:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. MIFAB, Inc.
 - c. Zurn Industries, LLC.
2. Standard: ASME A112.18.1 for sediment faucets.

3. Body Material: Bronze.
4. Seat: Bronze, replaceable.
5. Supply Connections: **NPS 1/2 or NPS 3/4 (DN 15 or DN 20)** threaded or solder-joint inlet.
6. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
7. Pressure Rating: **125 psig (860 kPa)**.
8. Vacuum Breaker: Integral or field-installation, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
9. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
10. Finish for Service Areas: Rough bronze.
11. Finish for Finished Rooms: Chrome or nickel plated.
12. Operation for Equipment Rooms: Wheel handle or operating key.
13. Operation for Service Areas: Operating key.
14. Operation for Finished Rooms: Wheel handle.
15. Include operating key with each operating-key hose bibb.
16. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.10 WALL HYDRANTS

A. Nonfreeze Wall Hydrants:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. WATTS.
 - e. Zurn Industries, LLC.
2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
3. Pressure Rating: **125 psig (860 kPa)**.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Inlet: **NPS 3/4 or NPS 1 (DN 20 or DN 25)**.
7. Outlet, Concealed: With integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
8. Box: Deep, flush mounted with cover.
9. Box and Cover Finish: Polished nickel bronze.
10. Outlet, Exposed: With integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
11. Nozzle and Wall-Plate Finish: Polished nickel bronze.
12. Operating Keys(s): One with each wall hydrant.

B. Nonfreeze, Hot- and Cold-Water Wall Hydrants:

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

- a. [Jay R. Smith Mfg Co; a division of Morris Group International.](#)
 - b. [Josam Company.](#)
 - c. [MIFAB, Inc.](#)
 - d. [WATTS.](#)
 - e. [Zurn Industries, LLC.](#)
2. Standard: ASME A112.21.3M for [concealed] [exposed]-outlet, self-draining wall hydrants.
 3. Pressure Rating: 125 psig (860 kPa).
 4. Operation: Loose key.
 5. Casing and Operating Rods: Of length required to match wall thickness. Include wall clamps.
 6. Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25).
 7. Outlet: Concealed.
 8. Box: Deep, flush mounted with cover.
 9. Box and Cover Finish: [Polished nickel bronze] [Chrome plated] <Insert finish>.
 10. Vacuum Breaker:
 - a. Nonremovable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.
 - b. Garden-hose thread complying with ASME B1.20.7 on outlet.
 11. Operating Key(s): One with each wall hydrant.
- C. Moderate-Climate Wall Hydrants:
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Jay R. Smith Mfg Co; a division of Morris Group International.](#)
 - b. [MIFAB, Inc.](#)
 - c. [WATTS.](#)
 - d. [Zurn Industries, LLC.](#)
 2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
 3. Pressure Rating: 125 psig (860 kPa).
 4. Operation: Loose key.
 5. Inlet: NPS 3/4 or NPS 1 (DN 20 or DN 25).
 6. Outlet, Concealed:
 - a. With integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.
 - b. Garden-hose thread complying with ASME B1.20.7.
 7. Box: Deep, flush mounted with cover.
 8. Box and Cover Finish: Polished nickel bronze.
 9. Outlet, Exposed:

- a. With integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.
 - b. Garden-hose thread complying with ASME B1.20.7.
10. Nozzle and Wall-Plate Finish: Polished nickel bronze.
11. Operating Key(s): One with each wall hydrant.

D. Nonfreeze Vacuum Breaker Wall Hydrants:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. WATTS.
 - c. Zurn Industries, LLC.
- 2. Standard: ASSE 1019, Type A or Type B.
- 3. Type: Automatic draining with integral air-inlet valve.
- 4. Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.
- 5. Pressure Rating: **125 psig (860 kPa).**
- 6. Operation: Loose key or wheel handle.
- 7. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
- 8. Inlet: **NPS 1/2 or NPS 3/4 (DN 15 or DN 20).**
- 9. Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.

2.11 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

- 1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
- 2. Pressure Rating: **400-psig (2760-kPa)** minimum CWP.
- 3. Size: **NPS 3/4 (DN 20).**
- 4. Body: Copper alloy.
- 5. Ball: Chrome-plated brass.
- 6. Seats and Seals: Replaceable.
- 7. Handle: Vinyl-covered steel.
- 8. Inlet: Threaded or solder joint.
- 9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.12 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

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

- a. [Jay R. Smith Mfg Co; a division of Morris Group International.](#)
 - b. [Josam Company.](#)
 - c. [MIFAB, Inc.](#)
 - d. [Sioux Chief Manufacturing Company, Inc.](#)
 - e. [WATTS.](#)
2. Standard: ASSE 1010 or PDI-WH 201.
 3. Type: Piston.
 4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.13 TRAP-SEAL PRIMER DEVICE

A. Supply-Type, Trap-Seal Primer Device:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Jay R. Smith Mfg Co; a division of Morris Group International.](#)
 - b. [Josam Company.](#)
 - c. [MIFAB, Inc.](#)
 - d. [Sioux Chief Manufacturing Company, Inc.](#)
 - e. [WATTS.](#)
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig (860 kPa) minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

B. Drainage-Type, Trap-Seal Primer Device:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or approved equal.
 - a. [Jay R. Smith Mfg Co; a division of Morris Group International.](#)
 - b. [MIFAB, Inc.](#)
 - c. [Precision Plumbing Products.](#)
 - d. [Zurn Industries, LLC.](#)
2. Standard: ASSE 1044, lavatory P-trap with NPS 3/8 (DN 10) minimum, trap makeup connection.
3. Size: NPS 1-1/4 (DN 32) minimum.
4. Material: Chrome-plated, cast brass.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

- A. Backflow Preventers: Install in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 - 1. Locate backflow preventers in same room as connected equipment or system.
 - 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
 - 3. Do not install bypass piping around backflow preventers.
- B. Water Regulators: Install with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gauges on inlet and outlet.
- C. Balancing Valves: Install in locations where they can easily be adjusted. Set at indicated design flow rates.
- D. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.
 - 1. Install cabinet-type units recessed in or surface mounted on wall as specified.
- E. Y-Pattern Strainers: For water, install on supply side of each control valve water pressure-reducing valve solenoid valve and pump.
- F. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.
- G. Supply-Type, Trap-Seal Primer Device: Install with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- H. Drainage-Type, Trap-Seal Primer Device: Install as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 PIPING CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 IDENTIFICATION

- A. Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 - 1. Vacuum breakers.
 - 2. Backflow preventers.
 - 3. Water pressure-reducing valves.
 - 4. Balancing valves.
 - 5. Temperature-actuated, water mixing valves.
 - 6. Wall hydrants.
 - 7. Trap-seal primer device.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.
- D. Adjust each pressure vacuum breaker reduced-pressure-principle backflow preventer double-check, backflow-prevention assembly and double-check, detector-assembly backflow preventer in accordance with manufacturer's written instructions, authorities having jurisdiction and the device's reference standard.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
 - 1. Test each pressure vacuum breaker reduced-pressure-principle backflow preventer double-check, backflow-prevention assembly and double-check, detector-assembly backflow preventer according to authorities having jurisdiction and the device's reference standard.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- C. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 221119

SECTION 221316 – SANITARY WASTE AND VENT PIPING

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 but not limited to the following soil and waste, sanitary drainage and vent piping inside the building:
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.

1.3 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water (30 kPa).

1.4 ACTION SUBMITTALS

- A. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Hub-and-Spigot, Cast-Iron Pipe and Fittings: ASTM A 74, Service class.
 - 1. Gaskets: ASTM C 564, rubber.
- B. Hubless Cast-Iron Pipe and Fittings: ASTM A 888 or CISPI 301.
 - 1. Solvent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.
 - 2. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.

- a. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
- C. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
 - 1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought-copper, solder-joint fittings.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Special pipe fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.
- B. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- C. Aboveground, soil, waste, and vent piping NPS 4 (DN 100) and smaller shall be any of the following:
 - 1. Hubless cast-iron soil pipe and fittings and sovent stack fittings; Heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
 - 2. Copper DWV tube, copper drainage fittings, and soldered joints.
- D. Aboveground, soil, waste, and vent piping NPS 5 (DN 125) and larger shall be any of the following:
 - 1. Hubless cast-iron soil pipe and fittings and sovent stack fittings; Heavy-duty, shielded, stainless-steel couplings; and hubless-coupling joints.
- E. Underground, soil, waste, and vent piping NPS 4 (DN 100) and smaller shall be any of the following:
 - 1. Service class, hub-and-spigot, cast-iron soil pipe and fittings; gaskets; and compression joints.
- F. Underground, soil and waste Piping NPS 5 (DN 125) and larger shall be any of the following:
 - 1. Service class, hub-and spigot cast-iron soil pipe and fittings; gaskets; and compression joints.

3.2 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

- C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."
- D. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Wall penetration systems are specified in Division 22 Section "Common Work Results for Plumbing."
- E. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- F. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- G. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- H. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 2 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 3 (DN 100) and larger.
 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- I. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- J. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.3 **JOINT CONSTRUCTION**

- A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 1. Gasketed Joints: Make with rubber gasket matching class of pipe and fittings.
 2. Hubless Joints: Make with rubber gasket and sleeve or clamp.

- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.4 VALVE INSTALLATION

- A. General-duty valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- B. Shutoff Valves: Install shutoff valve on each sewage pump discharge.
 - 1. Use gate or full-port ball valve for piping NPS 2 (DN 50) and smaller.
 - 2. Use gate valve for piping NPS 2-1/2 (DN 65) and larger.
- C. Check Valves: Install swing check valve, downstream from shutoff valve, on each sewage pump discharge.
- D. Backwater Valves: Install backwater valves in piping subject to sewage backflow.
 - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
 - 2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
 - 3. Install backwater valves in accessible locations.
 - 4. Backwater valves are specified in Division 22 Section "Sanitary Waste Piping Specialties."

3.5 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.

- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
 3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
 4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
 5. Spacing for 10-foot (3-m) lengths may be increased to 10 feet (3 m). Spacing for fittings is limited to 60 inches (1500 mm).
- G. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).
- H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1-1/4 (DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 2. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 3. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
 4. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
 5. NPS 6 (DN 150): 10 feet (3 m) with 5/8-inch (16-mm) rod.
- I. Install supports for vertical copper tubing every 10 feet (3 m).
- J. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- B. Connect drainage and vent piping to the following:
 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section "Sanitary Waste Piping Specialties."
 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section "Sanitary Waste Piping Specialties."
 4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger.

3.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction.
1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 2. Prepare reports for tests and required corrective action.

3.8 **CLEANING**

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION

SECTION 221319 – SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes but not limited to the following sanitary drainage piping specialties:
 - 1. Backwater valves.
 - 2. Cleanouts.
 - 3. Floor drains.
 - 4. Roof flashing assemblies.
 - 5. Miscellaneous sanitary drainage piping specialties.
 - 6. Flashing materials.

1.3 ACTION SUBMITTALS

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

1.4 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 BACKWATER VALVES

- A. Horizontal, Cast-Iron Backwater Valves:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal.
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfr. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
 - 2. Standard: ASME A112.14.1.

3. Size: Same as connected piping.
4. Body: Cast iron.
5. Cover: Cast iron with bolted access check valve.
6. End Connections: Hub and spigot or hubless.
7. Type Check Valve: Removable, bronze, swing check, factory assembled or field modified to hang closed.
8. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.

B. Drain-Outlet Backwater Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal.
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfr. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Size: Same as floor drain outlet.
3. Body: Cast iron or bronze made for vertical installation in bottom outlet of floor drain.
4. Check Valve: Removable ball float.
5. Inlet: Threaded.
6. Outlet: Threaded or spigot.

2.2 CLEANOUTS

A. Exposed Cast-Iron Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal.
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Cast-Iron Floor Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal.
 - a. Josam Company; Josam Div.
 - b. Oatey.
 - c. Sioux Chief Manufacturing Company, Inc.
 - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - e. Tyler Pipe; Wade Div.
 - f. Watts Drainage Products Inc.
 - g. Zurn Plumbing Products Group; Light Commercial Operation.
 - h. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Threaded, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Clamping Device: Required.
7. Outlet Connection: Inside callk.
8. Closure: Brass plug with straight threads and gasket.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Heavy Duty.
13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to clean out.

C. Cast-Iron Wall Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal.
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Tyler Pipe; Wade Div.
 - e. Watts Drainage Products Inc.
 - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.

2.3 FLOOR DRAINS

A. Cast-Iron Floor Drains:

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

- a. Commercial Enameling Co.
 - b. Josam Company; Josam Div.
 - c. MIFAB, Inc.
 - d. Prier Products, Inc.
 - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - f. Tyler Pipe; Wade Div.
 - g. Watts Drainage Products Inc.
 - h. Zurn Plumbing Products Group; Light Commercial Operation.
 - i. Zurn Plumbing Products Group; Specification Drainage Operation.
- 2. Standard: ASME A112.6.3.
 - 3. Pattern: Floor drain.
 - 4. Body Material: Gray iron.
 - 5. Seepage Flange: Required.
 - 6. Anchor Flange: Required.
 - 7. Clamping Device: Required.
 - 8. Outlet: Bottom .
 - 9. Backwater Valve: Not required.
 - 10. Coating on Interior and Exposed Exterior Surfaces: Not required.
 - 11. Sediment Bucket: Not required.
 - 12. Top or Strainer Material: Nickel bronze.
 - 13. Top of Body and Strainer Finish: Nickel bronze.
 - 14. Top Loading Classification: Heavy Duty.

2.4 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal.
 - a. Acorn Engineering Company; Elmdor/Stoneman Div.
 - b. Thaler Metal Industries Ltd.
- B. Description: Manufactured assembly made of 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch- (1.6-mm-) thick, lead flashing collar and skirt extending at least 8 inches (200 mm) from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.
- 1. Open-Top Vent Cap: Without cap.
 - 2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
 - 3. Extended Vent Cap: With field-installed, vandal-proof vent cap.

2.5 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Deep-Seal Traps:

- 1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
- 2. Size: Same as connected waste piping.
 - a. NPS 2 (DN 50): 4-inch- (100-mm-) minimum water seal.
 - b. NPS 2-1/2 (DN 65) and Larger: 5-inch- (125-mm-) minimum water seal.

- B. Floor-Drain, Trap-Seal Primer Fittings:
1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
 2. Size: Same as floor drain outlet with NPS 1/2 (DN 15) side inlet.
- C. Air-Gap Fittings:
1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
 2. Body: Bronze or cast iron.
 3. Inlet: Opening in top of body.
 4. Outlet: Larger than inlet.
 5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.
- D. Sleeve Flashing Device:
1. Description: Manufactured, cast-iron fitting, with clamping device that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 2 inches (51 mm) above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
 2. Size: As required for close fit to riser or stack piping.
- E. Stack Flashing Fittings:
1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
 2. Size: Same as connected stack vent or vent stack.
- F. Vent Caps:
1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
 2. Size: Same as connected stack vent or vent stack.

2.6 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
1. General Use: 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
 2. Vent Pipe Flashing: 3.0-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
 3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.
- B. Fasteners: Metal compatible with material and substrate being fastened.
- C. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- D. Solder: ASTM B 32, lead-free alloy.

- E. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.
- C. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 - 1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
 - 4. Locate at base of each vertical soil and waste stack.
- D. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- E. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- F. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
 - b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
 - c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.
 - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 - 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- G. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- H. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- I. Install deep-seal traps on floor drains and other waste outlets, if indicated.

- J. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
 - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 - 2. Size: Same as floor drain inlet.
- K. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- L. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- M. Install vent caps on each vent pipe passing through roof.
- N. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- O. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 - 1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 07 Section "Sheet Metal Flashing and Trim."

- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

3.4 **LABELING AND IDENTIFYING**

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each grease interceptor.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.5 **PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 221413 - FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless, cast-iron soil pipe and fittings.
3. PVC pipe and fittings.
4. Specialty pipe and fittings.

B. Related Requirements:

1. Section 334400 "Stormwater Conveyances" for storm drainage piping outside the building.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. **Product Data:** For adhesives, indicating VOC content.
2. **Laboratory Test Reports:** For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For siphonic roof drainage system. Include calculations, plans, and details.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Detail storm drainage piping. Show support locations, type of support, weight on each support, required clearances, and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- 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. [Charlotte Pipe and Foundry Company.](#)
 - 2. [NewAge Casting.](#)
- B. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark and NSF certification mark.
 - 2. Class: ASTM A 74, Service class.
- C. Gaskets: ASTM C 564, rubber.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- 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. [Charlotte Pipe and Foundry Company.](#)
 - 2. [NewAge Casting.](#)
- B. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark and NSF certification mark.
 - 2. Standard: ASTM A 888 or CISPI 301.
- C. CISPI, Hubless-Piping Couplings:
 - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. [Charlotte Pipe and Foundry Company.](#)
 - b. [Dallas Specialty & Mfg. Co.](#)
 - c. [MIFAB, Inc.](#)
 - d. [NewAge Casting.](#)
 - 2. Couplings shall bear CISPI collective trademark and NSF certification mark.
 - 3. Standards: ASTM C 1277 and CISPI 310..
 - 4. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.
- D. Heavy-Duty, Hubless-Piping Couplings:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. [Charlotte Pipe and Foundry Company.](#)
 - b. [Dallas Specialty & Mfg. Co.](#)
 - c. [MIFAB, Inc.](#)
 - d. [NewAge Casting.](#)
2. Standard: ASTM C 1540.
3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

E. Cast-Iron, Hubless-Piping Couplings:

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. [Charlotte Pipe and Foundry Company.](#)
2. Standard: ASTM C 1277.
3. Description: Two-piece ASTM A 48/A 48M, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 PVC PIPE AND FITTINGS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 1. [Charlotte Pipe and Foundry Company.](#)
 2. [JM Eagle.](#)
 3. [Mueller Industries, Inc.](#)
- B. NSF Marking: Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic storm drain and "NSF-sewer" for plastic storm sewer piping.
- C. Solid-Wall PVC Pipe: ASTM D 2665; drain, waste, and vent.
- D. Cellular-Core PVC Pipe: ASTM F 891, Schedule 40.
- E. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- F. Adhesive Primer: ASTM F 656.
 1. [Adhesive primer shall have a](#) VOC content of 550 g/L or less.
 2. [Adhesive primer shall comply with](#) the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

G. Solvent Cement: ASTM D 2564.

1. Solvent cement shall have a VOC content of 510 g/L or less.

2.4 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified-piping-system fitting.
3. Unshielded, Nonpressure Transition Couplings:
 - 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) Dallas Specialty & Mfg. Co.
 - 2) Fernco Inc.
 - 3) Plastic Oddities.
 - b. Standard: ASTM C 1173.
 - c. Description: Elastomeric sleeve, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - d. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - 2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
4. Shielded, Nonpressure Transition Couplings:
 - 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) Cascade Waterworks Mfg. Co.
 - 2) Mission Rubber Company, LLC; a division of MCP Industries.
 - b. Standard: ASTM C 1460.
 - c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - d. End Connections: Same size as and compatible with pipes to be joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312316 "Excavation."

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
 - 1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
 - 2. Install piping as indicated unless deviations from layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- K. Make changes in direction for piping using appropriate branches, bends, and long-sweep bends.
 - 1. Do not change direction of flow more than 90 degrees.
 - 2. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of drainage piping in direction of flow is prohibited.
- L. Lay buried building piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
 3. Maintain swab in piping and pull past each joint as completed.
- M. Install piping at the following minimum slopes unless otherwise indicated:
1. Building Storm Drain: 2 percent downward in direction of flow for piping **NPS 3 (DN 80)** and smaller; 1 percent downward in direction of flow for piping **NPS 4 (DN 100)** and larger.
 2. Horizontal Storm Drainage Piping: 2 percent downward in direction of flow.
- N. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- O. Install aboveground PVC piping according to ASTM D 2665.
- P. Install underground PVC piping according to ASTM D 2321.
- Q. Install engineered siphonic drain specialties and storm drainage piping in locations indicated.
- R. Plumbing Specialties:
1. Install backwater valves in storm drainage gravity-flow piping.
 - a. Comply with requirements for backwater valves specified in Section 221423 "Storm Drainage Piping Specialties."
 2. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers in storm drainage gravity-flow piping.
 - a. Comply with requirements for cleanouts specified in Section 221423 "Storm Drainage Piping Specialties."
 3. Install drains in storm drainage gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221423 "Storm Drainage Piping Specialties."
- S. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- T. Install sleeves for piping penetrations of walls, ceilings, and floors.
1. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- U. Install sleeve seals for piping penetrations of concrete walls and slabs.
1. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

- V. Install escutcheons for piping penetrations of walls, ceilings, and floors.
 - 1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Hubless, Cast-Iron Soil Piping Coupled Joints:
 - 1. Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- C. PVC, Nonpressure-Piping, Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 appendices.
- D. Joint Restraints and Sway Bracing:
 - 1. Provide joint restraints and sway bracing for storm drainage piping joints to comply with the following conditions:
 - a. Provide axial restraint for pipe and fittings **5 inches (125 mm)** and larger, upstream and downstream of all changes in direction, branches, and changes in diameter greater than two pipe sizes.
 - b. Provide rigid sway bracing for pipe and fittings **4 inches (100 mm)** and larger, upstream and downstream of all changes in direction 45 degrees and greater.
 - c. Provide rigid sway bracing for pipe and fittings **5 inches (125 mm)** and larger, upstream and downstream of all changes in direction and branch openings.

3.4 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
 - 1. Install transition couplings at joints of piping with small differences in ODs.
 - 2. In Drainage Piping: Shielded, nonpressure transition couplings.

3.5 VALVE INSTALLATION

- A. General valve installation requirements for general-duty valve installations are specified in the following Sections:
 - 1. Section 220523.12 "Ball Valves for Plumbing Piping."
 - 2. Section 220523.13 "Butterfly Valves for Plumbing Piping."

3. Section 220523.14 "Check Valves for Plumbing Piping."

B. Shutoff Valves:

1. Install shutoff valve on each sump pump discharge.
2. Install gate full port ball valve for piping **NPS 2 (DN 50)** and smaller.
3. Install gate valve for piping **NPS 2-1/2 (DN 65)** and larger.

C. Check Valves: Install swing-check valve, between pump and shutoff valve, on each sump pump discharge.

D. Backwater Valves: Install backwater valves in piping subject to backflow.

1. Horizontal Piping: Horizontal backwater valves. Use normally closed type unless otherwise indicated.
2. Install backwater valves in accessible locations.
3. Comply with requirements for backwater valves specified in Section 221423 "Storm Drainage Piping Specialties."

3.6 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for hangers, supports, and anchor devices specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install individual, straight, horizontal piping runs:
 - a. **100 Feet (30 m)** and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than **100 Feet (30 m)**: MSS Type 43, adjustable roller hangers.
 - c. Longer Than **100 Feet (30 m)** if Indicated: MSS Type 49, spring cushion rolls.
7. Multiple, Straight, Horizontal Piping Runs **100 Feet (30 m)** or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install hangers for cast-iron soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

D. Install hangers for PVC piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

- E. Support horizontal piping and tubing within 12 inches (300 mm) of each fitting, valve, and coupling.
- F. Support vertical cast-iron soil piping with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent, but as a minimum at base and at each floor.
- G. Support vertical PVC piping with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect storm drainage piping to roof drains and storm drainage specialties.
 - 1. Install test tees (wall cleanouts) in conductors near floor, and floor cleanouts with cover flush with floor.
 - 2. Install horizontal backwater valves with cleanout cover flush with floor.
 - 3. Comply with requirements for backwater valves cleanouts and drains specified in Section 221423 "Storm Drainage Piping Specialties."
- D. Where installing piping adjacent to equipment, allow space for service and maintenance.
- E. Make connections according to the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.8 IDENTIFICATION

- A. Identify exposed storm drainage piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 3. Test Procedure:
 - a. Test storm drainage piping, except outside leaders, on completion of roughing-in.
 - b. Close openings in piping system and fill with water to point of overflow, but not less than **10-foot head of water (30 kPa)**. From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 5. Prepare reports for tests and required corrective action.
- C. Piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.10 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.11 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground storm drainage piping **NPS 6 (DN 150)** and smaller shall be any of the following:
 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, heavy-duty, hubless-piping couplings; and coupled joints.

3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- C. Aboveground, storm drainage piping **NPS 8 (DN 200)** and larger shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, heavy-duty, hubless-piping couplings; and coupled joints.
 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- D. Underground storm drainage piping **NPS 6 (DN 150)** and smaller shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, heavy-duty, cast-iron, hubless-piping couplings; and coupled joints.
 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- E. Underground, storm drainage piping **NPS 8 (DN 200)** and larger shall be **any of** the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI, heavy-duty, cast-iron, hubless-piping couplings; and coupled joints.
 3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 4. Cellular-core, sewer and drain series, PVC pipe; PVC socket fittings; and solvent-cemented joints.
 5. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

END OF SECTION 221413

SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Metal roof drains.
 2. Miscellaneous storm drainage piping specialties.
 3. Cleanouts.
 4. Backwater valves.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Related Requirements:
1. Refer to Division 7

1.3 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 METAL ROOF DRAINS

- A. Cast-Iron, Large-Sump, General-Purpose Roof Drains:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. Sioux Chief Manufacturing Company, Inc.
 - e. Wade; a subsidiary of McWane Inc.
 - f. WATTS.
 - g. Zurn Industries, LLC.
 2. Standard: ASME A112.6.4.

3. Body Material: Cast iron.
4. Dimension of Body: Nominal 14-to 16-inch (357- to 406-mm) diameter.
5. Combination Flashing Ring and Gravel Stop: Required.
6. Flow-Control Weirs: Required.
7. Outlet: Bottom, Side.
8. Outlet Type: No hub.
9. Extension Collars: Not required.
10. Underdeck Clamp: Not required.
11. Expansion Joint: Not required.
12. Sump Receiver Plate: Not required.
13. Dome Material: PE.
14. Perforated Gravel Guard: Stainless steel.
15. Vandal-Proof Dome: Required.
16. Water Dam: 2 inches (50 mm) high.

B. Metal, Roof Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. Wade; a subsidiary of McWane Inc.
 - e. WATTS.
 - f. Zurn Industries, LLC.
2. Standard: ASME A112.6.4.
3. Body Material: Cast iron.
4. Dimension of Body: Nominal 6-inch (152-mm) diameter.
5. Outlet: Bottom, Side.
6. Outlet Type: Threaded.
7. Dome Material: Bronze.
8. Wire Mesh: Stainless steel or brass over dome.
9. Vandal-Proof Dome: Required.

2.2 MISCELLANEOUS STORM DRAINAGE PIPING SPECIALTIES

A. Downspout Adaptors:

1. Description: Manufactured, gray-iron casting, for attaching to horizontal-outlet, parapet roof drain and to exterior, sheet metal downspout.
2. Size: Inlet size to match parapet drain outlet.

B. Downspout Boots:

1. Description: Manufactured, ASTM A48/A48M, gray-iron casting, with strap or ears for attaching to building; NPS 4 (DN 100) outlet; and shop-applied bituminous coating.
2. Size: Inlet size to match downspout and NPS 4 (DN 100) outlet.

C. Conductor Nozzles:

1. Description: Bronze body with threaded inlet and bronze wall flange with mounting holes.
2. Size: Same as connected conductor.

2.3 CLEANOUTS

A. Cast-Iron Exposed Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. WATTS.
 - e. Zurn Industries, LLC.
2. Standard: ASME A112.36.2M.
3. Size: Same as connected branch.
4. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch, No-hub, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk or raised-head, brass plug.
6. Closure Plug Size: Same as, or not more than, one size smaller than cleanout size.

B. Cast-Iron Exposed Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. Oatey.
 - d. Sioux Chief Manufacturing Company, Inc.
 - e. WATTS.
 - f. Zurn Industries, LLC.
2. Standard: ASME A112.36.2M.
3. Size: Same as connected branch.
4. Type: Cast-iron soil pipe with cast-iron ferrule Heavy-duty, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Clamping Device: Not required.
7. Outlet Connection: Hub with gasket Threaded.
8. Closure: Brass plug with straight threads and gasket.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
11. Frame and Cover Shape: Round.

12. Top Loading Classification: Heavy, Medium Duty.
13. Riser: ASTM A74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. <Manufacturers: Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. Wade; a subsidiary of McWane Inc.
 - e. WATTS.
 - f. Zurn Industries, LLC.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hub-and-spigot, cast-iron soil pipe T-branch, No-hub, cast-iron soil pipe test tee as required to match connected piping.
5. Closure Plug:
 - a. Brass.
 - b. Countersunk head.
 - c. Drilled and threaded for cover attachment screw.
 - d. Size: Same as, or not more than, one size smaller than cleanout size.
6. Wall Access: Round, deep, chrome-plated bronze cover plate with screw.
7. Wall Access: Round, nickel-bronze, copper-alloy, or stainless-steel wall-installation frame and cover.

D. Test Tees:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. WATTS.
 - e. Zurn Industries, LLC.
2. Standard: ASME A112.36.2M and ASTM A74, ASTM A888, or CISPI 301.
3. Size: Same as connected drainage piping.
4. Body Material: Hub-and-spigot, cast-iron soil-pipe T-branch or no-hub, cast-iron soil-pipe test tee as required to match connected piping.
5. Closure Plug: Countersunk, brass.
6. Closure Plug Size: Same as, or not more than, one size smaller than cleanout size.

2.4 BACKWATER VALVES

A. Cast-Iron, Horizontal Backwater Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or Approved Equal.
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. Wade; a subsidiary of McWane Inc.
 - e. WATTS.
 - f. Zurn Industries, LLC.
2. Standard: ASME A112.14.1.
3. Size: Same as connected piping.
4. Body Material: Cast iron.
5. Cover: Cast iron with bolted or threaded access check valve.
6. End Connections: Hub and spigot or no hub.
7. Check Valve: Removable, bronze, swing check, factory assembled or field modified to hang closed.
8. Extension: ASTM A74, Service class; full-size, cast-iron soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.
9. Size: Same as connected piping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.
 1. Install flashing collar or flange of roof drain to prevent leakage between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
 2. Install expansion joints, if indicated, in roof drain outlets.
 3. Position roof drains for easy access and maintenance.
- B. Install downspout adapters on outlet of back-outlet parapet roof drains and connect to sheet metal downspouts.
- C. Install downspout boots at grade with top **6 inches (152 mm) min.** above grade. Secure to building wall.
- D. Install conductor nozzles at exposed bottom of conductors where they spill onto grade.
- E. Install cleanouts in aboveground piping and building drain piping according to the following instructions unless otherwise indicated:

1. Use cleanouts the same size as drainage piping up to **NPS 4 (DN 100)**. Use **NPS 4 (DN 100)** for larger drainage piping unless larger cleanout is indicated.
 2. Locate cleanouts at each change in direction of piping greater than 45 degrees.
 3. Locate cleanouts at minimum intervals of **50 feet (15 m)** for piping **NPS 4 (DN 100)** and smaller and **100 feet (30 m)** for larger piping.
 4. Locate cleanouts at base of each vertical storm piping conductor.
- F. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- G. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- H. Install horizontal backwater valves in floor with cover flush with floor.
- I. Install test tees in vertical conductors and near floor.
- J. Install wall cleanouts in vertical conductors. Install access door in wall if indicated.
- K. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface unless otherwise indicated.
- L. Install through-penetration firestop assemblies for penetrations of fire- and smoke-rated assemblies.
1. Comply with requirements in Division 7.
- M. Comply with requirements for piping specified in Section 221413 "Facility Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

3.2 FLASHING INSTALLATION

- A. Fabricate flashing from single piece of metal unless large pans, sumps, or other drainage shapes are required.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.

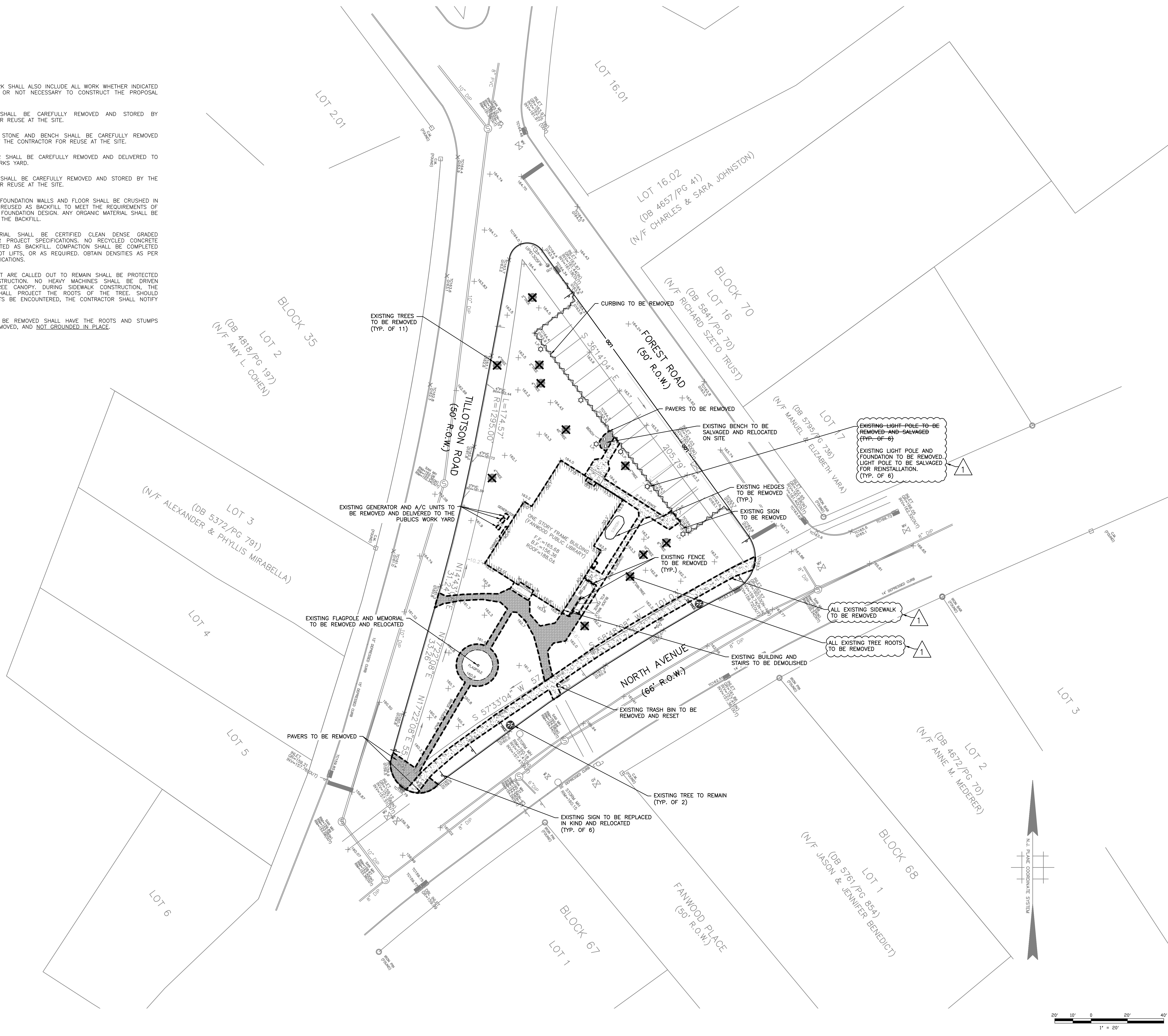
3.3 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221423

NOTES

- DEMOLITION WORK SHALL ALSO INCLUDE ALL WORK WHETHER INDICATED ON THIS PLAN OR NOT NECESSARY TO CONSTRUCT THE PROPOSAL IMPROVEMENTS.
- LIGHT POLES SHALL BE CAREFULLY REMOVED AND STORED BY CONTRACTOR FOR REUSE AT THE SITE.
- THE MEMORIAL STONE AND BENCH SHALL BE CAREFULLY REMOVED AND STORED BY THE CONTRACTOR FOR REUSE AT THE SITE.
- THE GENERATOR SHALL BE CAREFULLY REMOVED AND DELIVERED TO THE PUBLIC WORKS YARD.
- THE FLAGPOLE SHALL BE CAREFULLY REMOVED AND STORED BY THE CONTRACTOR FOR REUSE AT THE SITE.
- THE BASEMENT/FOUNDATION WALLS AND FLOOR SHALL BE CRUSHED IN PLACE AND BE REUSED AS BACKFILL TO MEET THE REQUIREMENTS OF THE PROPOSED FOUNDATION DESIGN. ANY ORGANIC MATERIAL SHALL BE REMOVED FROM THE BACKFILL.
- BACKFILL MATERIAL SHALL BE CERTIFIED CLEAN DENSE GRADED AGGREGATE PER PROJECT SPECIFICATIONS. NO RECYCLED CONCRETE WILL BE ACCEPTED AS BACKFILL. COMPACTION SHALL BE COMPLETED IN ONE (1) FOOT LIFTS, OR AS REQUIRED. OBTAIN DENSITIES AS PER PROJECT SPECIFICATIONS.
- ANY TREES THAT ARE CALLED OUT TO REMAIN SHALL BE PROTECTED THROUGH CONSTRUCTION. NO HEAVY MACHINES SHALL BE DRIVEN UNDER THE TREE CANOPY. DURING SIDEWALK CONSTRUCTION, THE CONTRACTOR SHALL PROTECT THE ROOTS OF THE TREE. SHOULD EXCESSIVE ROOTS BE ENCOUNTERED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
- ALL TREES TO BE REMOVED SHALL HAVE THE ROOTS AND STUMPS COMPLETELY REMOVED, AND NOT GROUNDED IN PLACE.



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NO.	DATE	REVISIONS	BY	CHKD
1	08/09/2022	ADDENDUM 1	FS	PB

PETER F. BONDAR, P.E.
CONSULTING ENGINEER

07-22-2022
LICENSED PROFESSIONAL ENGINEER
STATE OF NJ LICENSE No. GE48108

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GENERAL NOTES

- THESE GENERAL NOTES APPLY TO ALL SHEETS IN THIS SET OF PLANS.
- EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND IS NOT GUARANTEED AS TO ACCURACY OR COMPLETENESS. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS SATISFACTION PRIOR TO EXCAVATION, DRIVING OF PILES, OR ANY OTHER SUBSURFACE DISTURBANCE. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTION, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS AND SIZES. TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION OR STRUCTURE FABRICATION TO PERMIT ADJUSTMENTS AS REQUIRED TO AVOID CONFLICTS.
- ALL DIMENSIONS AND GRADES SHOWN ON THE PLANS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY DISCREPANCIES EXIST PRIOR TO PROCEEDING WITH CONSTRUCTION FOR NECESSARY PLAN CHANGES. NO EXTRA COMPENSATION SHALL BE MADE TO THE CONTRACTOR FOR WORK HAVING TO BE REDONE DUE TO DIMENSIONS OR GRADES SHOWN INCORRECTLY ON THESE PLANS IF SUCH NOTIFICATION HAS NOT BEEN GIVEN.
- ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
 - NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AS CURRENTLY AMENDED.
 - CURRENTLY PREVAILING MUNICIPAL SPECIFICATIONS, STANDARDS AND REQUIREMENTS.
 - CURRENTLY PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.
 - NATIONAL FIRE PROTECTION ASSOCIATION AND AMERICAN WATER WORKS ASSOCIATION STANDARDS, AS CURRENTLY AMENDED.
- THE CONTRACTOR SHALL NOTIFY THE UNDERSIGNED PROFESSIONAL IMMEDIATELY IF ANY FIELD CONDITIONS ENCOUNTERED DIFFER MATERIALLY FROM THOSE PRESENTED HEREON.
- ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE REQUIREMENTS OF THE GOVERNING AUTHORITIES OR AGENCIES.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH CURRENT OSHA STANDARDS.
- FIRE DEPARTMENT CONNECTIONS ARE TO MATCH FANWOOD EQUIPMENT AND SHALL BE COORDINATED THROUGH THE OWNER.
- NJDOT STANDARD ROADWAY CONSTRUCTION / TRAFFIC CONTROL / BRIDGE CONSTRUCTION DETAILS 2019, LATEST REVISION, ARE APPLICABLE TO THIS PROJECT EXCEPT FOR THOSE DETAILS CONTAINED HEREIN.
- THE CONTRACTOR SHALL VERIFY THE LOCATION, GRADE, AND INVERT ELEVATION OF ALL EXISTING UTILITY STRUCTURES.
- THE CONTRACTOR SHALL COORDINATE UTILITY INSTALLATION WITH THE RESPECTIVE UTILITY COMPANY IF APPLICABLE. THE UTILITY COMPANY SHALL VERIFY INSTALLATION LOCATION(S).
- PROPOSED FIRE AND DOMESTIC WATER LINE SIZES SHALL BE VERIFIED WITH THE ARCHITECTURAL PLANS AND MECHANICAL CONTRACTOR.
- CONTOURS AND SPOT ELEVATIONS INDICATE FINISHED GRADE.
- ALL DISTURBED AREAS NOT RECEIVING IMPERVIOUS SURFACE OR LANDSCAPING SHALL BE RESTORED IN ACCORDANCE WITH THE LANDSCAPING/SOIL EROSION AND SEDIMENT CONTROL SEEDING SPECIFICATIONS.
- SITE GRADING SHALL BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATION SET FORTH BY THE DESIGN ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL SOFT, YIELDING, OR UNSUITABLE MATERIALS AND REPLACING WITH SUITABLE MATERIALS AS APPROVED BY THE ENGINEER. ALL EXCAVATED OR FILLED AREAS SHALL BE COMPACTED TO 95% MODIFIED PROCTOR MAXIMUM DENSITY. MOISTURE CONTENT AT TIME OF PLACEMENT SHALL NOT EXCEED 2% ABOVE OR 3% BELOW OPTIMUM.
- ALL AREAS WHERE NATURAL VEGETATION AND/OR TREES (WITHIN THE LIMIT OF DISTURBANCE) ARE TO REMAIN SHALL BE PROTECTED BY THE ERECTION OF FENCING, AND NO DISTURBANCES SHALL OCCUR PRIOR TO INSPECTION BY THE OWNER OR OWNER'S REPRESENTATIVE AND THE ISSUANCE OF WRITTEN AUTHORIZATION TO PROCEED WITH THE CONSTRUCTION. THESE PROTECTIVE MEASURES SHALL NOT BE ALTERED OR REMOVED WITHOUT THE APPROVAL OF THE OWNER OR OWNER'S REPRESENTATIVE.
- ALL PROPOSED CONSTRUCTION IS TO CONFORM TO THE LATEST EDITION OF THE NEW JERSEY UNIFORM CONSTRUCTION CODE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXISTENCE AND LOCATION OF ALL EXISTING UTILITIES WITHIN THE LIMITS OF WORK THRU THE USE OF RECORD DOCUMENTS PROVIDED BY THE OWNER AND THE ENGINEER, AND FIELD SURVEY AND/OR TEST PIT EXCAVATIONS IF SAME ARE DETERMINED TO BE NECESSARY. CONTRACTOR ALSO RESPONSIBLE FOR CALLING 1-800-MARKOUT FOR UTILITY MARKOUT PRIOR TO CONSTRUCTION.
- TWO SURVEY BENCHMARKS SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
- REMOVAL OF OFF-SITE DEMOLITION MATERIALS SHALL BE IN CONFORMANCE WITH STATE AND LOCAL REGULATIONS.
- EXACT LOCATION OF PROPOSED ROOF LEADERS TO BE CONFIRMED BY PROJECT ARCHITECT PRIOR TO INSTALLATION.
- ALL SITE TRAFFIC CONTROL PROVISIONS WILL BE IMPLEMENTED PURSUANT TO THE PROVISIONS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2009 (OR CURRENT) EDITION.
- DUST CONTROL AND STREET SWEEPING SHALL BE PROVIDED ON AN AS NEEDED BASIS. THERE SHALL BE NO ADDITIONAL COST.

ZONING TABLE			
Block 36, Lot 1	PERMITTED	EXISTING	PROPOSED
Minimum Lot Area	15,000 SF	20,904.93 Ft.	20,904.93 Ft.
Minimum Lot Width	100 Ft.	220 Ft.	220 Ft.
Minimum Lot Frontage	75 Ft. 40 Ft.	220 Ft.	220 Ft.
Minimum Front Yard Setback (Tillotson Rd.)	30 Ft.	10.2 Ft.	0 Ft.*
Minimum Front Yard Setback (North Ave.)	30 Ft.	26.6 Ft.	11.81 Ft.*
Minimum Front Yard Setback (Forest Rd.)	30 Ft.	33.4 Ft.	22.2 Ft.*
Maximum Building Height	28 Ft.	< 28 Ft.	29.5 Ft.*
Maximum Building Coverage	20%	15.42%	42.69%*
Maximum Improvement Coverage	35%	37.61%	62.43%*

*VARIANCE CONDITION

STANDARD LEGEND

EXISTING (Show Size, and Type) PROPOSED (Show Size, and Type)

TC TC
W W
G G
T T
E E

RECONSTRUCT (Flow and Type) RESET HEAD

EXISTING STORM DRAINS EXISTING SANITARY SEWERS
PROPOSED SANITARY SEWERS AND STORM DRAINS (ONLY IN SPECIAL CASES DRAW TO SIZE)

EDGE OF PAVEMENT (BITUMINOUS, CONCRETE)

SHOULDERS

SLOPES

CENTERLINE, BASELINE AND TRANSVERSE LINE LABEL LINE: E, E, E
RIGHT OF WAY LINES
ACCESS PERMITTED
NO ACCESS

TOWNSHIP, CITY, COUNTY LINE

PROPERTY LINES

WETLANDS LINE

CURBS

FENCES

RESET BEAM GUIDE RAIL

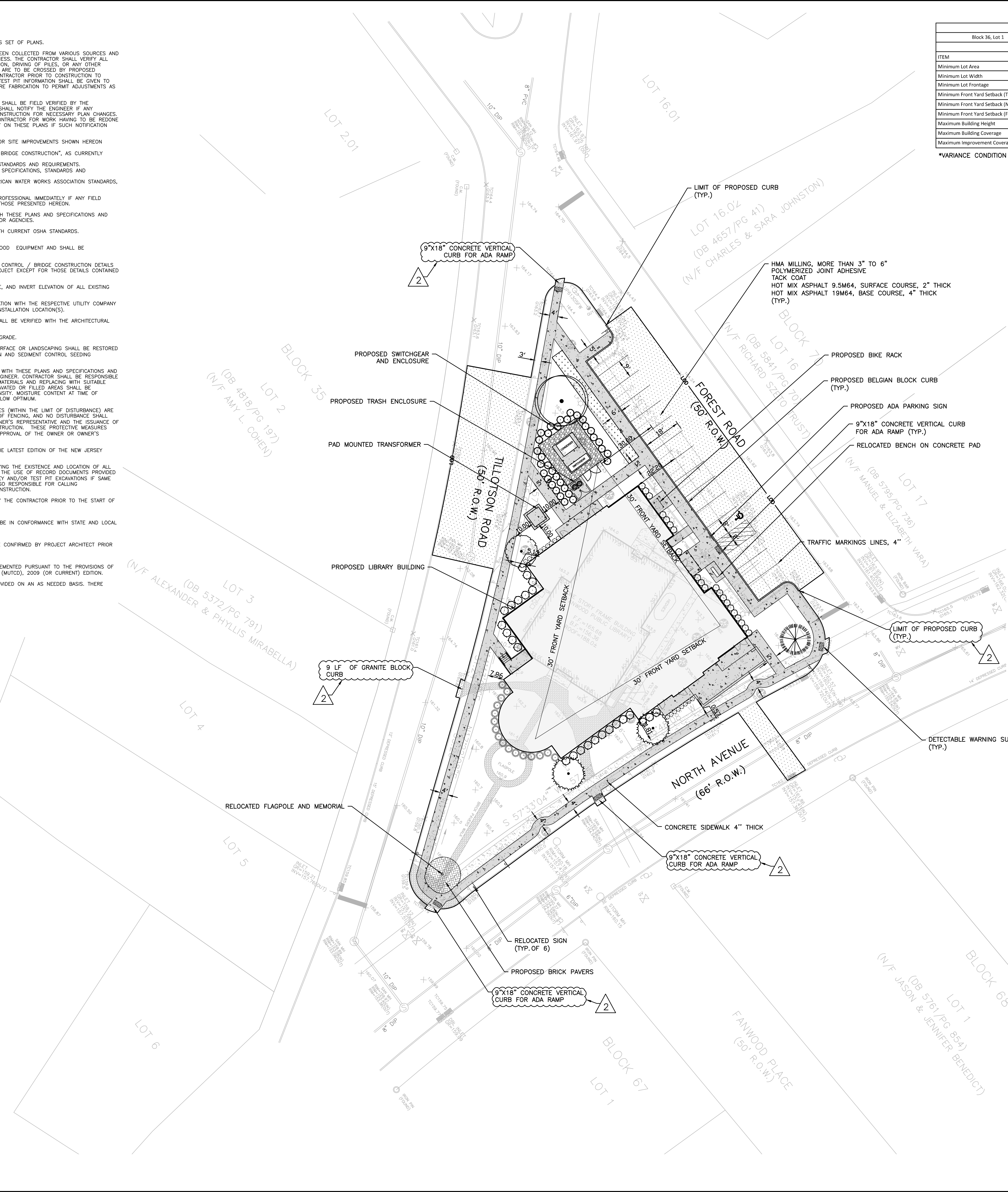
BEAM GUIDE RAIL

RAILROAD

REPRESENTS BOTTOM OF DITCH OR CREEK

INLETS (TYPE AS INDICATED)

PROPOSED
RESET EXISTING CASTING
NEW INLET CASTING (TYPE AS SPECIFIED)
RECONSTRUCT
INLETS CONVERTED TO MANHOLE
NEW MONUMENT
PROPOSED R.C. END SECT. OR C.M. HEADWALL
PROPOSED HEADWALL & APRON
TREE TO BE REMOVED (T.B.R.)
PROPOSED UTILITY POLE
BORING TEST LOCATION
TEST PIT
PROBINGS
BENCH MARK CALLOUT
PROP. F.C.R.T.
PROP. CHARGE

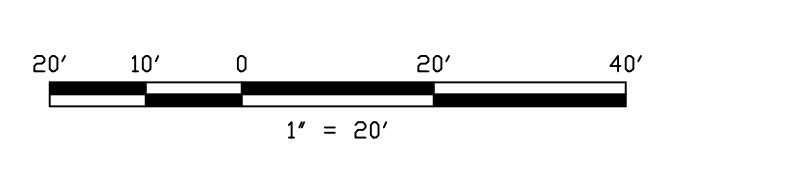


HATCH PATTERNS

MILLING & OVERLAY

CONCRETE SIDEWALK

RAIN GARDEN



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NO.	DATE	REVISIONS
1	07/18/2022	REVISED PER BOROUGH COMMENTS
2	08/09/2022	ADDENDUM 1

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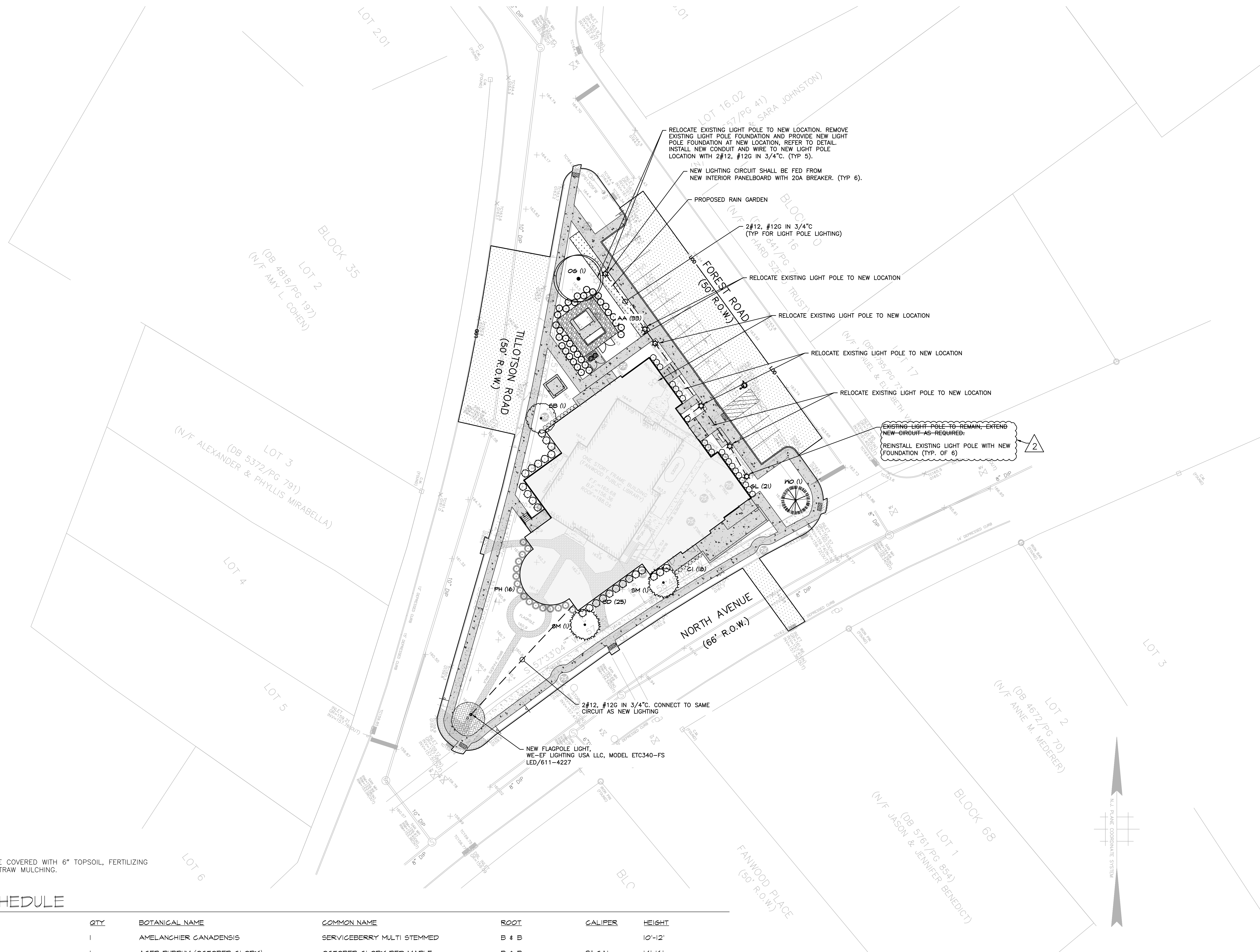
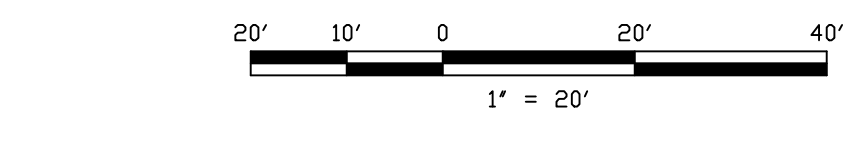
NOTES

- ALL LAWNS SHALL BE COVERED WITH 6" TOPSOIL, FERTILIZING AND SEEDING AND STRAW MULCHING.

PLANT SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	GALIPER	HEIGHT
SB	1	AMELANCHIER CANADENSIS	SERVICEBERRY MULTI STEMMED	B & B		10'-12'
OS	1	ACER RUBRUM (OCTOBER GLORY)	OCTOBER GLORY RED MAPLE	B & B	3" CAL.	14'-16'
SM	2	MANGNOLIA VIRGINIANA	SWEETBAY MAGNOLIA	B & B		8'-10'
WO	1	QUERCUS PHELLOS	WILLOW OAK	B & B	3" CAL.	12'-14'
AA	33	THUJA OCCIDENTALIS	AMERICAN ARBORVITAE	B & B		6'-8'
SHRUB	QTY	BOTANICAL NAME	COMMON NAME	CONT.	HEIGHT/SPREAD	
GL	21	ILEX CRENATA (GREEN LUSTRE)	GREEN LUSTRE JAPANESE HOLLY	5 GALLONS	18"-24"	
PH	16	HYDRANGEA PANICULATE GRANDIFLORA	PEE GEE HYDRANGEA		3'-4'	
SD	25	CORNUS ALBA SIBIRIA	SIBERIAN DOGWOOD		2'-3'	
CI	18	ILLEX GLABRA COMPACTA	COMPACT INKBERRY		18"-24"	

QTY.	RAIN GARDEN PLUGS	NEW ENGLAND ASTER	2" PLUG
-	1,000 ASTER NOVAE-ANGLIAE	JOE PYE WEED	2" PLUG
-	1,000 EUPATORIUM FISTULOSUM	BLUEFLAG IRIS	2" PLUG
-	1,000 IRIS VERSICOLOR	BLAZING STAR	2" PLUG
-	1,000 LIATRIS SPICATA	SWITCH GRASS	2" PLUG
-	1,000 PANICUM VIRGATUM	FOXGLOVE BEARDTONGUE	2" PLUG
-	1,000 PENSTEMON DIGITALIS	NEW YORK IRONWEED	2" PLUG
-	1,000 VERNONIA NOVEBORACENSIS		



NO.	DATE	REVISIONS	BY	CHKD
2	06/9/2022	ADDENDUM 1	FS	PB
1	07/18/2022	REVISED PER BOROUGH COMMENTS	FS	PB

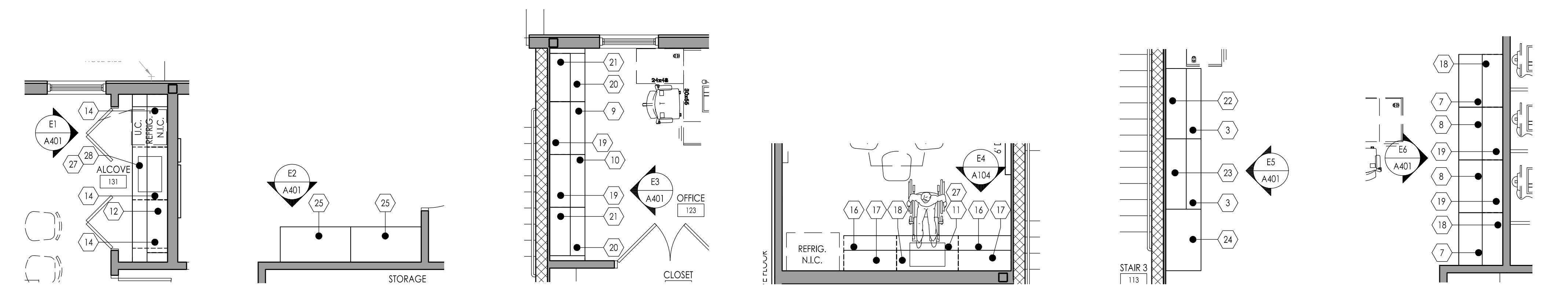
PETER F. BONDAR, P.E.
 CONSULTING ENGINEER

07-22-2022
 LICENSED PROFESSIONAL ENGINEER
 STATE OF NJ LICENSE No. GE48108

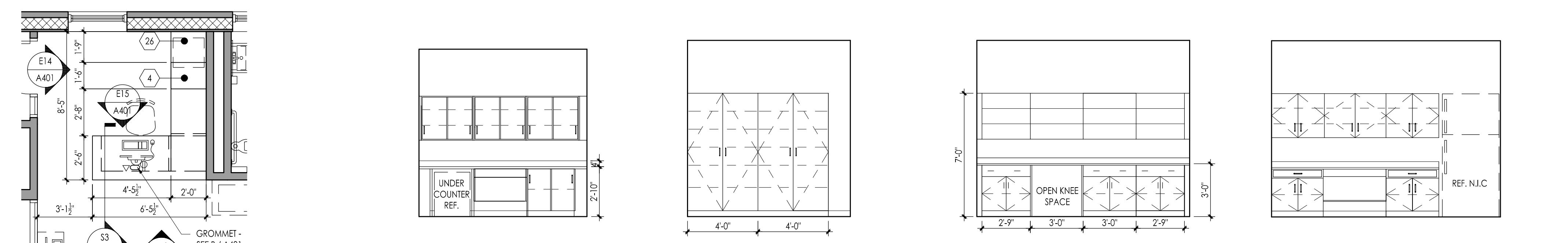
BOROUGH OF FANWOOD
PROPOSED FANWOOD MEMORIAL LIBRARY
 BOROUGH OF FANWOOD, LINCOLN COUNTY, NEW JERSEY
LIGHTING AND LANDSCAPING PLAN



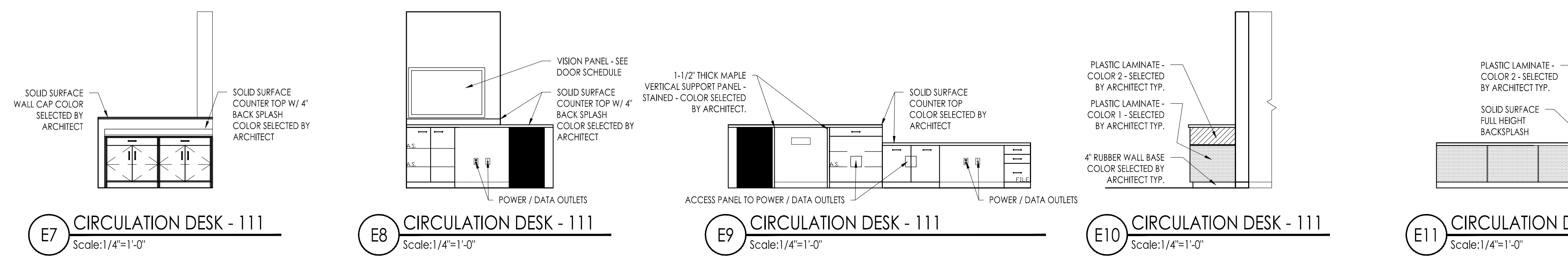
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CHECKED BY	PB	LSP	
DRAWN BY	FS	C007	
DATE	07-22-2022		
SCALE	1"=20'		
PROJ. NO.	FNW00471		



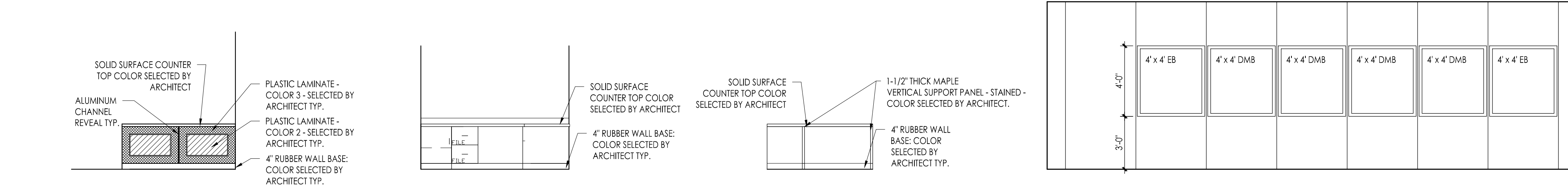
P1 ALCOVE 131 Scale: 1/4"=1'-0"
P2 COMMUNITY ROOM "B" - 138 Scale: 1/4"=1'-0"
P3 OFFICE - 123 Scale: 1/4"=1'-0"
P4 BREAK ROOM - 106 Scale: 1/4"=1'-0"
P5 TECH WORK AREA # 1 Scale: 1/4"=1'-0"
P6 TECH WORK AREA # 2 Scale: 1/4"=1'-0"



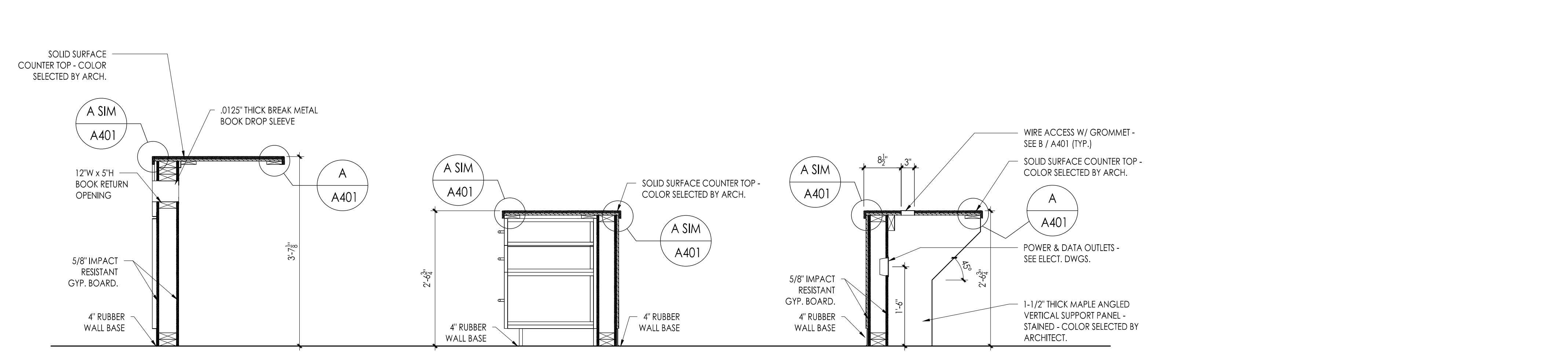
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E1 ALCOVE - 131 Scale: 1/4"=1'-0"
E2 COMMUNITY ROOM "B" - 138 Scale: 1/4"=1'-0"
E3 OFFICE - 123 Scale: 1/4"=1'-0"
E4 BREAK ROOM 108 Scale: 1/4"=1'-0"
E5 TECH/ WORK AREA # 1 Scale: 1/4"=1'-0"
E6 TECH/ WORK AREA # 2 Scale: 1/4"=1'-0"



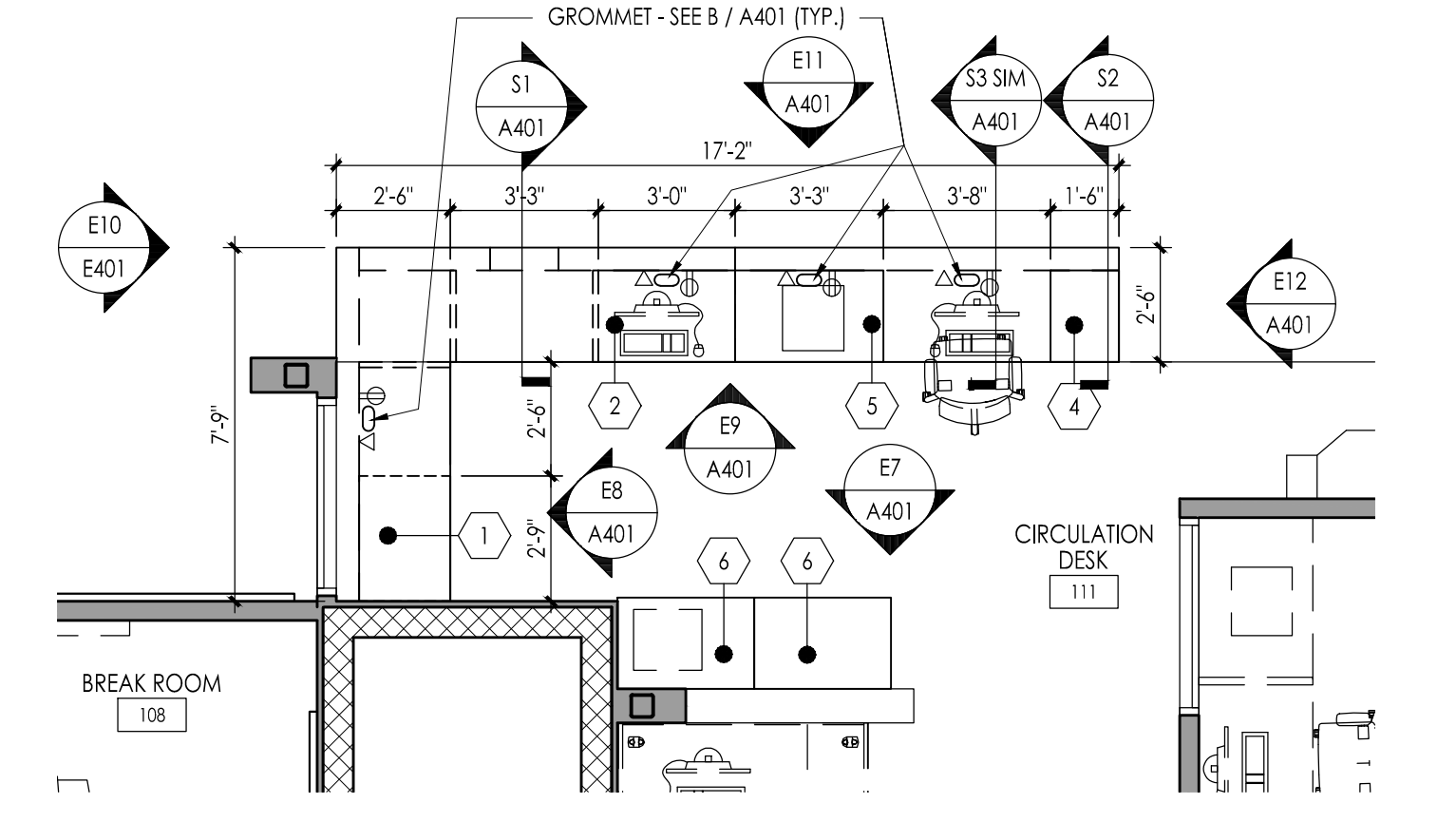
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E8 CIRCULATION DESK - 111 Scale: 1/4"=1'-0"
E9 CIRCULATION DESK - 111 Scale: 1/4"=1'-0"
E10 CIRCULATION DESK - 111 Scale: 1/4"=1'-0"
E11 CIRCULATION DESK - 111 Scale: 1/4"=1'-0"
E12 CIRCULATION DESK - 111 Scale: 1/4"=1'-0"



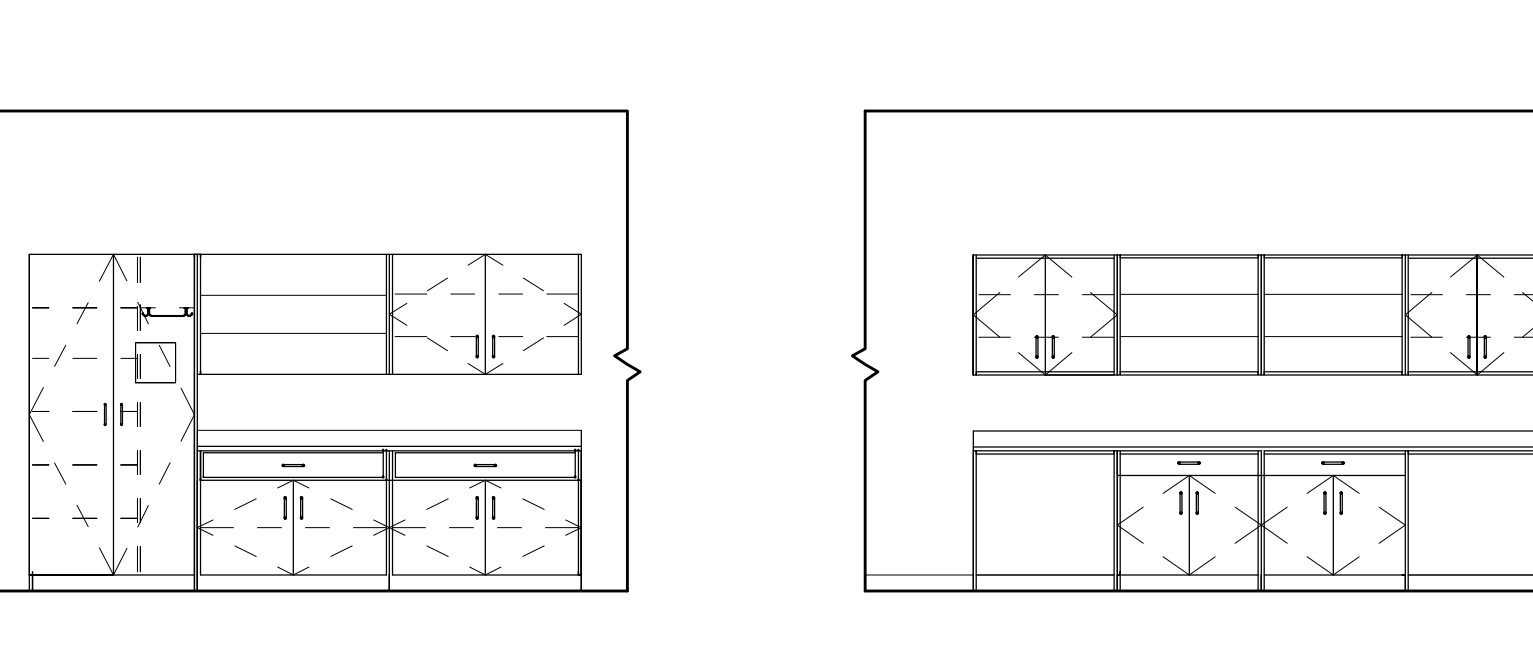
E13 CHILDREN'S SERVICES - 119 Scale: 1/4"=1'-0"
E14 CHILDREN'S SERVICES - 119 Scale: 1/4"=1'-0"
E15 CHILDREN'S SERVICES - 119 Scale: 1/4"=1'-0"
E16 COMMUNITY MEETING ROOM - 129 & 133 (FOLDING PARTITION) Scale: 1/4"=1'-0" (MEETING ROOM 'B' 133 SHOWN - MEETING ROOM 'A' 129 OPP. HAND)



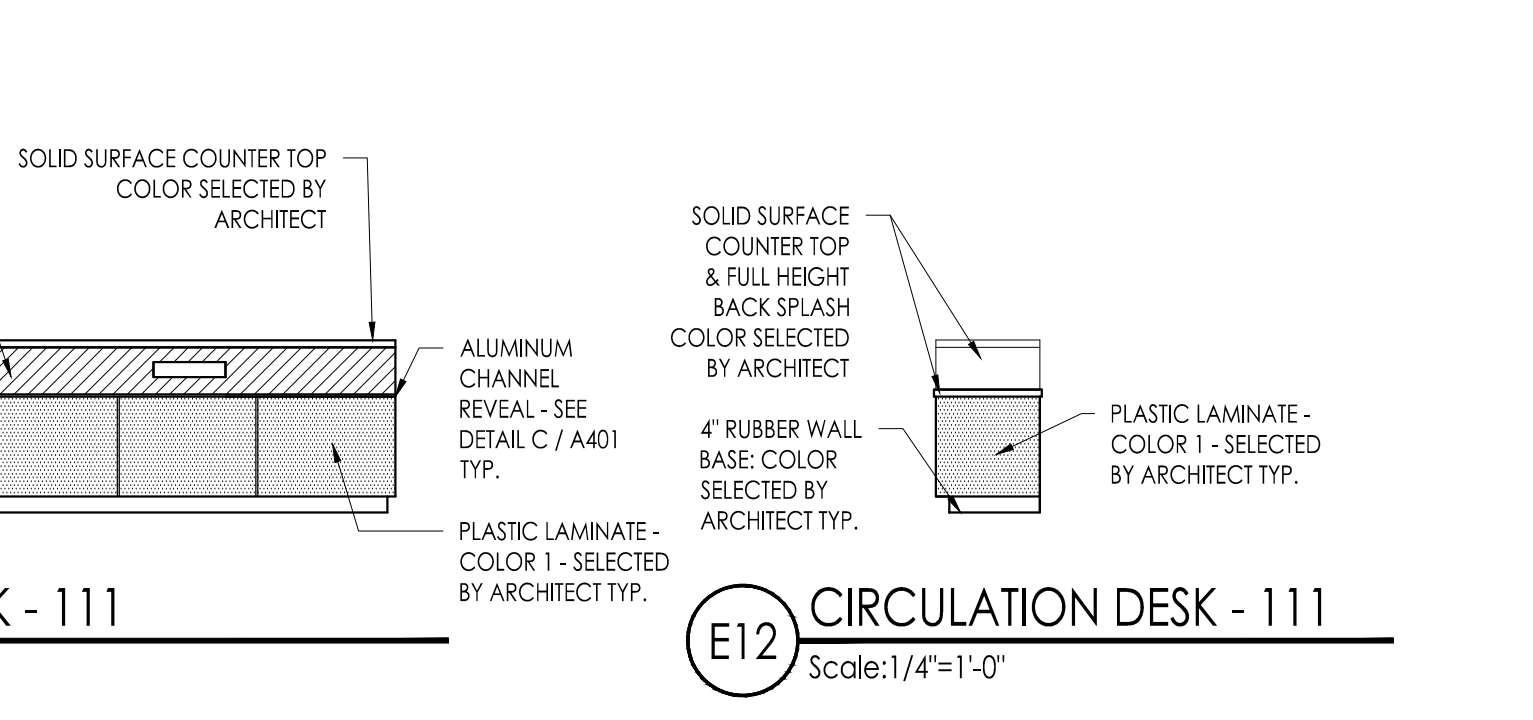
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S2 CIRCULATION DESK Scale: 3/4"=1'-0"
S3 CIRCULATION DESK Scale: 3/4"=1'-0"



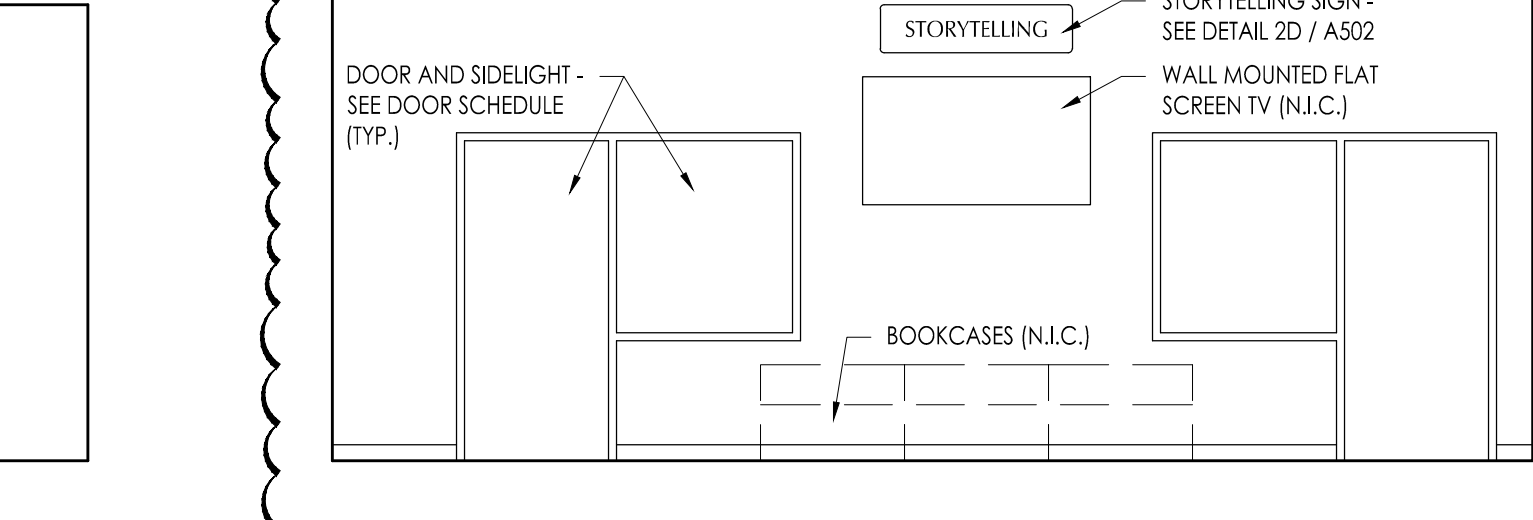
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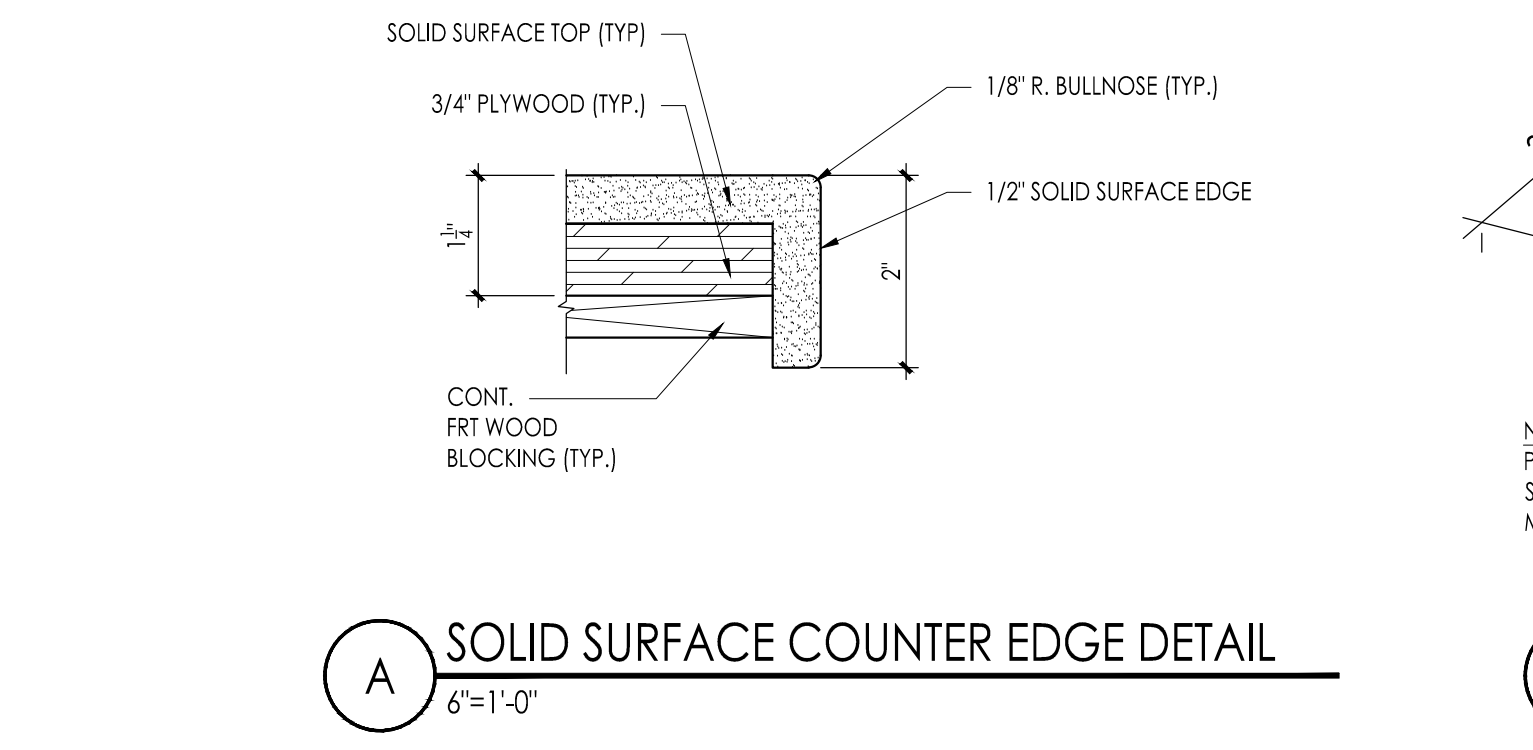
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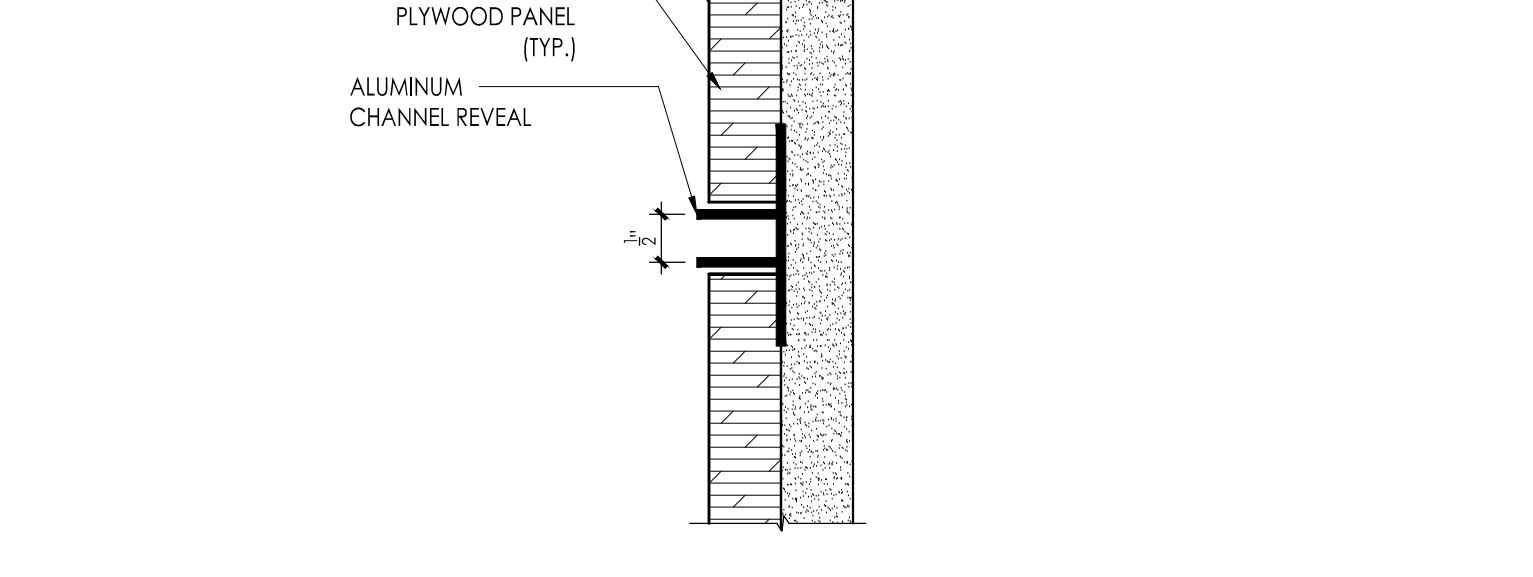
E7 CIRCULATION DESK - 111 Scale: 1/4"=1'-0"



E17 CHILDREN'S SERVICES - 119 Scale: 1/4"=1'-0"



A SOLID SURFACE COUNTER EDGE DETAIL Scale: 6"=1'-0"
B GROMMET DETAIL Scale: 6"=1'-0"



C REVEAL DETAIL Scale: 6"=1'-0"

SNK NOTE 'A': (ITEM #27)
 SL-ADA-1921-A-GR STAINLESS STEEL SINK, JUST MANUFACTURING OR APPROVED EQUAL, THE STYLIST GROUP "A" SERIES, TYPE 304, WHEELCHAIR ACCESSIBLE SINK, SINGLE COMPARTMENT, SELF-RIM, 18 GAUGE STAINLESS STEEL, 19" x 21" x 6" DEEP, DRAIN CENTER, SINK UNDERCATED W/ SOUND DEADENING MATERIAL, FURNISH COMPLETE WITH JET FAUCET (#1-H-174-63) CONCEALED HOT & COLD WATER MIXING FAUCET WITH SWIVEL GOSNECK SPOUT, AERATOR AND WRIST BLADE HANDLES. INCLUDES ONE JET GROSS DRAIN ASSEMBLY (#1-H-ADA-35-FS) W/ DRAIN INSULATING KIT (#1-H-ADA-150) W/ STAINLESS STEEL FLAT STRAINER & 4" LONG STAINLESS STEEL TAILPIECE (#1-35-35-F).
 SINK, FAUCET, STRAINER AND TAILPIECE TO BE SUPPLIED BY EQUIPMENT CONTRACTOR. THE PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL ALL TRAPS, VALVES, WASTE LINES, ETC. AS REQUIRED TO MAKE THE SYSTEM FULLY FUNCTIONAL. THE PLUMBING CONTRACTOR SHALL MAKE THE FINAL PLUMBING CONNECTIONS REQUIRED TO MAKE THE SYSTEM FULLY FUNCTIONAL. SEE GENERAL CASEWORK NOTES # 6 & 7.

NOTE:
 ALL FURNITURE AND EQUIPMENT WITHOUT THE SYMBOL OR MARKED (N.I.C.) IS NOT IN CONTRACT UNLESS NOTED OTHERWISE. SEE EQUIPMENT SCHEDULE FOR EQUIPMENT MARKED WITH THE SYMBOL.

NOTE:
 PROVIDE A MINIMUM 18" BARRIER-FREE MANEUVERING CLEARANCE AT THE FULL SIDE OF ALL DOORS ADJACENT TO CABINETS, SHELVING, ETC.

EQUIPMENT CONTRACT NOTE:
 THE EQUIPMENT SUB-CONTRACTOR(S) SHALL BE (A) SUB-CONTRACTOR(S) OF THE GENERAL CONSTRUCTION WORK CONTRACTOR.

GENERAL MILLWORK NOTES:
 1. THE GENERAL PRIME CONTRACTOR SHALL TURN OVER TO THE ELECTRICAL SUB-CONTRACTOR IN A PACKAGE, ALL ELECTRICAL DEVICES, BACKBOXES, FACETS, NIPPLES, LOCKNUTS AND ACCESSORIES, ETC., FOR INSTALLATION AND FINAL CONNECTION.
 2. THE GENERAL PRIME CONTRACTOR SHALL PROVIDE AN ITEMIZED LIST AND A DESIGNATED SITE LOCATION FOR THE TRANSFER OF THE MATERIALS REFERENCED IN NOTE 1 TO THE ELECTRICAL SUB-CONTRACTOR. THE LIST SHALL HAVE A DESCRIPTION OF THE ITEMS AND QUANTITY ALONG WITH A SIGN-OFF LINE FOR THE ELECTRICAL SUB-CONTRACTOR. A COPY OF THE SIGNED LIST IS TO BE SUBMITTED TO THE ARCHITECT / OWNER PRIOR TO BILLING FOR THIS EQUIPMENT.

GENERAL CASEWORK NOTES:
 1. CATALOG NUMBERS REFER TO MOST CURRENT STEVENS CATALOG UNLESS OTHERWISE NOTED, FOR REFERENCE ONLY.
 2. ALL CASEWORK DOORS AND DRAWERS TO HAVE LOCKS KEYS ALIKE PER ROOM AND MASTER KEYS.
 3. ALL TOPS SHALL BE PLYWOOD, 1" TOTAL THK. WITH PLASTIC LAMINATE COVERING ON ALL EXPOSED SURFACES (UNLESS NOTED OTHERWISE).
 4. ALL BACKSPASHES SHALL BE 3/4" PLYWOOD WITH PLASTIC LAMINATE COVERING ON ALL EXPOSED SURFACES (UNLESS NOTED OTHERWISE).
 5. ALL FURNITURE AND EQUIPMENT SHOWN DASHED AND/OR INDICATED AS (N.I.C.) IS NOT IN CONTRACT.
 6. THE CASEWORK & EQUIPMENT SUB-CONTRACTOR(S) SHALL TURN OVER TO THE PLUMBING AND ELECTRICAL PRIME CONTRACTOR(S) IN A PACKAGE, ALL SINKS, FIXTURES, FAUCETS, TAILPIECES, STRAINERS, GAS COCKES, ETC., AND ELECTRICAL DEVICES, NIPPLES AND LOCKNUTS, ETC., FOR INSTALLATION AND FINAL CONNECTION.
 7. THE CASEWORK AND EQUIPMENT SUB-CONTRACTOR SHALL PROVIDE AN ITEMIZED LIST AND A DESIGNATED SITE LOCATION FOR THE TRANSFER OF THE MATERIALS REFERENCED IN NOTE 6 TO THE PLUMBING AND ELECTRICAL PRIME CONTRACTORS. THE LIST SHALL HAVE A DESCRIPTION OF THE ITEMS AND QUANTITY ALONG WITH A SIGN-OFF LINE FOR THE PLUMBING AND ELECTRICAL PRIME CONTRACTORS. A COPY OF THE SIGNED LIST IS TO BE SUBMITTED TO THE ARCHITECT / OWNER PRIOR TO BILLING FOR THIS EQUIPMENT.
 8. EQUIPMENT SUB-CONTRACTOR SHALL MAKE SINK CUT-OUTS.
 9. ALL DUPLEX OUTLETS SHALL BE G.F.C.I. UNLESS NOTED OTHERWISE.
 10. SINK CABINETS SHALL BE INSTALLED BEFORE THE INSTALLATION OF ADJACENT CABINETS.
 11. ALL CONTRACTORS TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION AND NOTIFY ARCHITECT IN WRITTEN FORM OF ANY DISCREPANCIES.
 12. PROVIDE ALL FILLERS AS REQUIRED. FILLERS AT BASE CABINETS SHALL BE AT FRONT OF CABINET AND COUNTERTOP SHALL BE CONTINUOUS OVER FILLER PANEL. FILLERS AT TALL CABINETS SHALL BE AT FRONT AND TOP OF CABINET. FILLERS AT WALL CASES SHALL BE AT FRONT, TOP AND BOTTOM OF CABINET. FINISH TO MATCH CASEWORK.
 13. PLUMBING CONTRACTOR TO PROVIDE AND INSTALL CLAY TRAPS ON SINKS IN ART CLASSROOM AND SHALL MAKE FINAL CONNECTIONS TO ALL WASTEVENTS, WATER LINES ETC. AS REQUIRED TO MAKE SYSTEM FULLY FUNCTIONAL.
 14. ALL PRINTERS AND COMPUTERS ARE N.I.C. (TYPICAL)
 15. RUBBER BASE ON ALL CASEWORK BY G.C. (TYPICAL)

WILLIAM D. HOPKINS III, AIA, LEED AP
 NY 10017/20001 17A - 802/200X
 GEORGE E. DUTHIE JR., AIA, FP
 NY 10405/20001
 Date: 11/22/22

F V H D P C . C O M

FVH D architects
 planners
 Fraytak Veisz Hopkins Duthie P C
 Corporate: 1515 Lower Ferry Road - Trenton - New Jersey 08618
 Pennsylvania: 140 Whitaker Ave - Mont Clare - Pennsylvania 17053

Project Name
New Fanwood Memorial Library

Project Owner Name
Borough of Fanwood

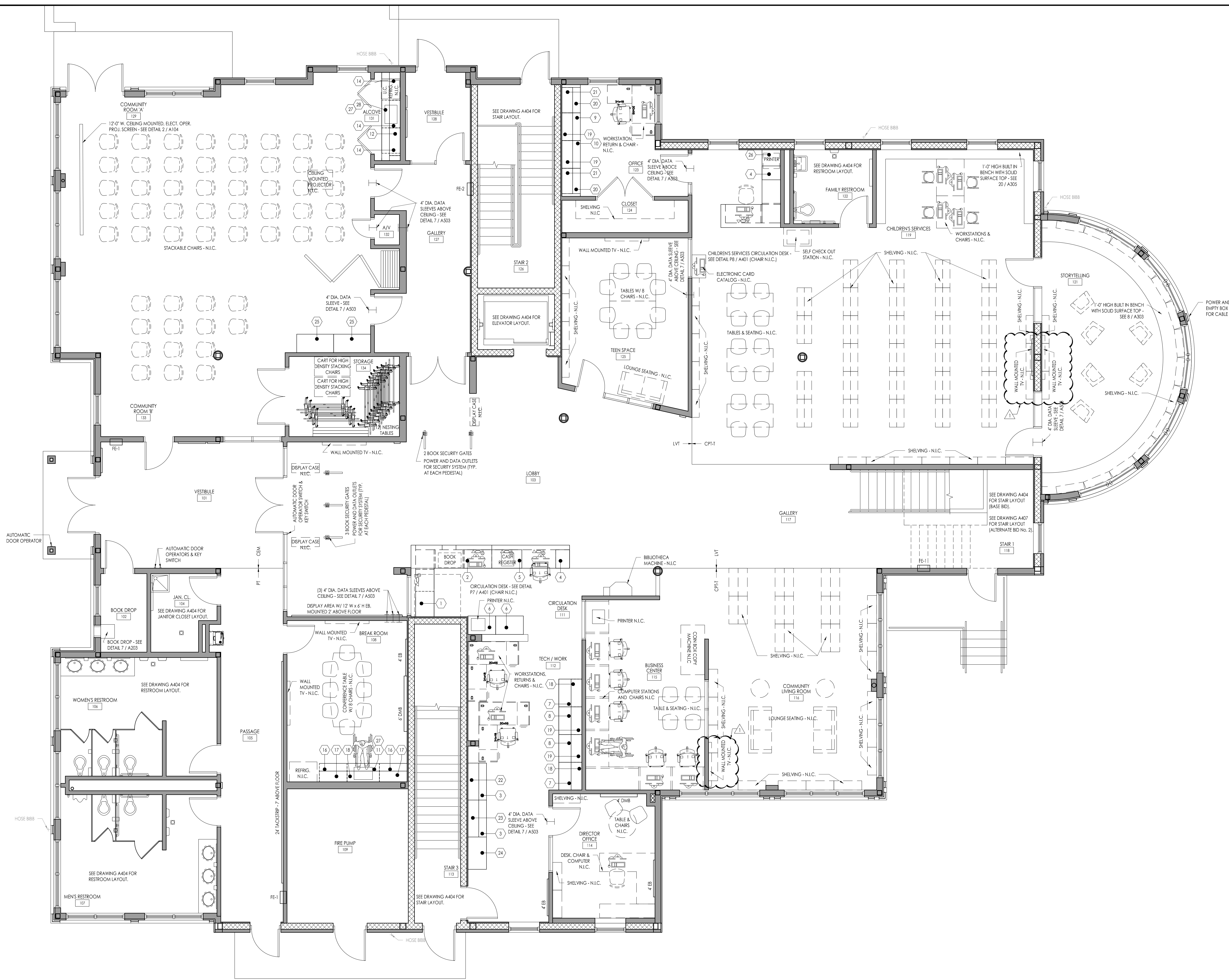
Project Location
5 Forest Road, Fanwood, NJ 07023

Project Number
5292
 Project Date
07.22.2022
 Checked By
G.R.D.
 Drawn By
NEH / KM
 Scale
As Noted

Drawing Name
Equipment Details, Notes & Millwork Details

Revisions
 No. Date Description
 1 8.11.2022 Addendum 1

Drawing Number
A401



Room Layouts - First Floor
Scale: 1/4" = 1'-0"

NOTE:
SEE DETAILS 2 AND 3 / G003 FOR
ALL DRYMARKER AND EXHIBITION
BOARDS (TYPICAL).

WILLIAM D. HOPKINS III AIA, LEED AP
NY 240779000 PA - 8402300X
GEORGE E. DUTHE JR., AIA, LP
NY 240439900

F V H D P C . C O M

FVHD architects
planners
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Corporate: 1515 Lower Ferry Road - Trenton - New Jersey 08618
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Project Name
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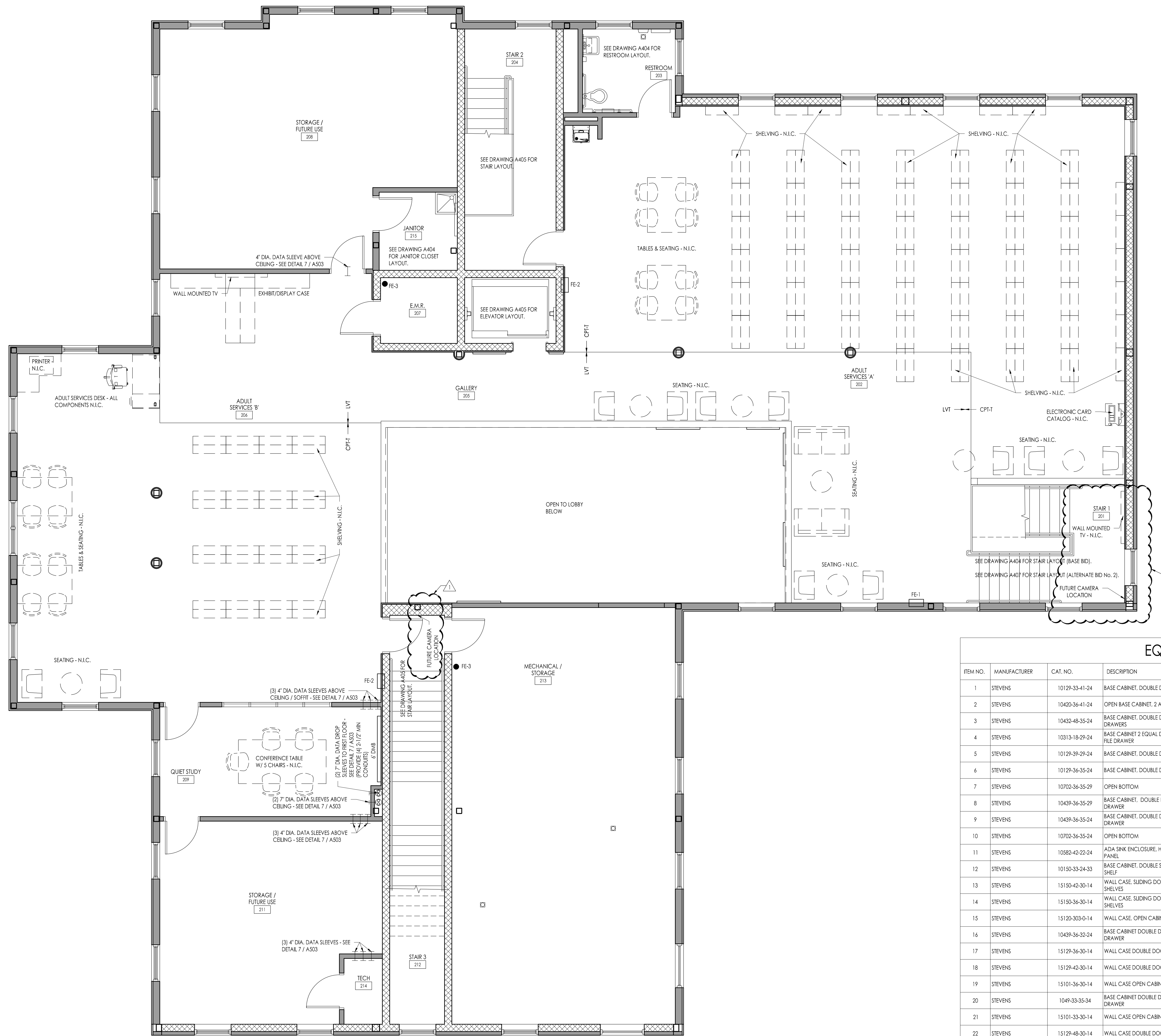
Project Location
5 Forest Road, Fanwood, NJ 07023

Project Number
5292
Project Date
07.22.2022
Checked By
G.R.D.
Drawn By
NEH / KM
Scale
1/4" = 1'-0"

Drawing Name
Room Layouts - First Floor

No.	Date	Description
1	8.11.2022	Addendum 1

Drawing Number
A402



ITEM NO.	MANUFACTURER	CAT. NO.	DESCRIPTION	WIDTH	DEPTH	HEIGHT	REMARKS
1	STEVENS	10129-33-41-24	BASE CABINET, DOUBLE DOORS, 2 ADJ. SHELF.	33"	24"	41"	
2	STEVENS	10420-36-41-24	OPEN BASE CABINET, 2 ADJ. SHELVES, 1 DRAWER	36"	24"	41"	
3	STEVENS	10432-48-35-24	BASE CABINET, DOUBLE DOORS, 1 ADJ. SHELF, 2 DRAWERS	48"	24"	35"	
4	STEVENS	10313-18-29-24	BASE CABINET 2 EQUAL DRAWERS, FULL EXTENSION FILE DRAWER	36"	24"	35"	
5	STEVENS	10129-39-29-24	BASE CABINET, DOUBLE DOORS, 1 ADJ. SHELF	39"	24"	29"	
6	STEVENS	10129-36-35-24	BASE CABINET, DOUBLE DOORS, 1 ADJ. SHELF	36"	24"	35"	
7	STEVENS	10702-36-35-29	OPEN BOTTOM	36"	29"	35"	
8	STEVENS	10439-36-35-29	BASE CABINET, DOUBLE DOORS, 1 ADJ. SHELF, 1 DRAWER	36"	29"	35"	
9	STEVENS	10439-36-35-24	BASE CABINET, DOUBLE DOORS, 1 ADJ. SHELF, 1 DRAWER	36"	24"	35"	
10	STEVENS	10702-36-35-24	OPEN BOTTOM	36"	24"	35"	
11	STEVENS	10582-42-22-24	ADA SINK ENCLOSURE, HINGED LOCKED ACCESS PANEL	42"	24"	22"	
12	STEVENS	10150-33-24-33	BASE CABINET, DOUBLE SLIDING DOORS, 1 ADJ. SHELF	33"	24"	32"	
13	STEVENS	15150-42-30-14	WALL CASE, SLIDING DOORS, CENTER DIVIDER, ADJ. SHELVES	42"	14"	30"	
14	STEVENS	15150-36-30-14	WALL CASE, SLIDING DOORS, CENTER DIVIDER, ADJ. SHELVES	36"	14"	30"	
15	STEVENS	15120-303-0-14	WALL CASE, OPEN CABINET, 2 ADJ. SHELVES	30"	14"	30"	
16	STEVENS	10439-36-32-24	BASE CABINET DOUBLE DOORS, 1 ADJ. SHELF, 1 DRAWER	36"	24"	32"	
17	STEVENS	15129-36-30-14	WALL CASE DOUBLE DOORS, 2 ADJ. SHELVES	36"	14"	30"	
18	STEVENS	15129-42-30-14	WALL CASE DOUBLE DOORS, 2 ADJ. SHELVES	42"	14"	30"	
19	STEVENS	15101-36-30-14	WALL CASE OPEN CABINET, 2 ADJ. SHELVES	36"	14"	35"	
20	STEVENS	1049-33-35-34	BASE CABINET DOUBLE DOORS, 1 ADJ. SHELF, 1 DRAWER	33"	24"	35"	
21	STEVENS	15101-33-30-14	WALL CASE OPEN CABINET, 2 ADJ. SHELVES	33"	14"	30"	
22	STEVENS	15129-48-30-14	WALL CASE DOUBLE DOORS, 2 ADJ. SHELVES	42"	24"	85"	
23	STEVENS	15101-48-30-14	WALL CASE OPEN CABINETS, 2 ADJ. SHELVES	48"	14"	30"	
24	STEVENS	25605-42-24-84	WARDROBE/STORAGE, FULL HEIGHT DIVIDER, LEFT ADJ. SHELVES, RIGHT FIXED SHELF, WARDROBE HOOK WARDROBE	42"	24"	84"	
25	STEVENS	25129-48-84-24	TALL STORAGE CABINET, 5 ADJ. SHELVES	48"	24"	84"	
26	STEVENS	10121-21-29-24	BASE CABINET 1 ADJ. SHELF, DOOR HINGED LEFT	21"	24"	29"	
27	JUST	SL-ADA-1921-A-GR	ADA COMPLIANT SINK	19"	18"		SEE SINK NOTE 'A' ON DWG. A401
28	STEVENS	10582-36-22-24	ADA SINK ENCLOSURE	36"	24"	22"	

Room Layouts - Second Floor
 Scale: 1/4" = 1'-0"

NOTE:
 SEE DETAILS 2 AND 3 / G003 FOR
 ALL DRYMARKER AND EXHIBITION
 BOARDS (TYPICAL).

ROOM FINISH SCHEDULE - FIRST FLOOR

Table with columns: NUMBER, ROOM NAME, FLOOR, BASE, WAINSCOT, WALL FINISH, CEILING, NOTES. Lists room finishes for the first floor.

ROOM FINISH SCHEDULE - SECOND FLOOR

Table with columns: NUMBER, ROOM NAME, FLOOR, BASE, WAINSCOT, WALL FINISH, CEILING, NOTES. Lists room finishes for the second floor.

ROOM FINISH SCHEDULE NOTES

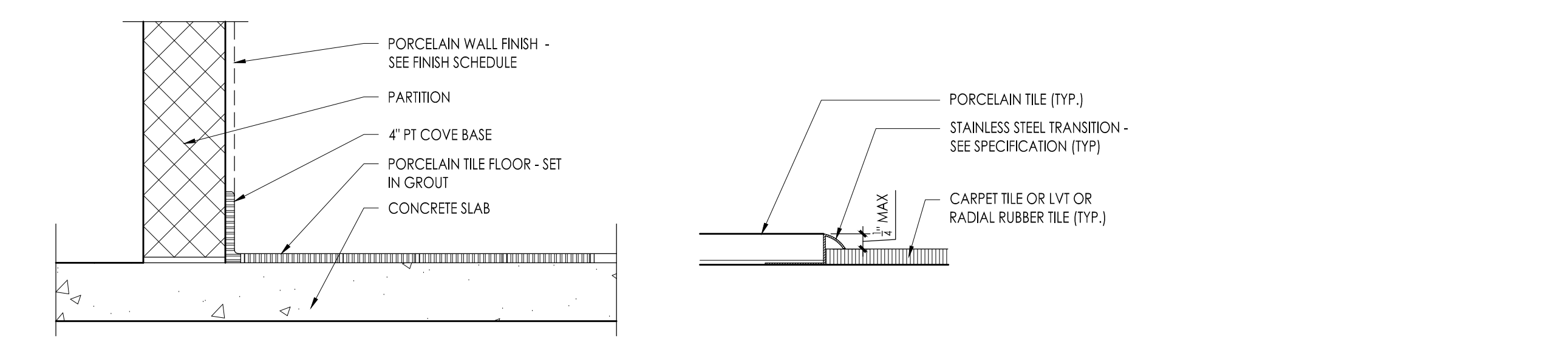
- 1. CEILING HEIGHT AND/OR MATERIALS VARIES - SEE REFLECTED CEILING PLAN.
2. SEE PORCELAIN TILE FLOORING AND BASE DETAIL 'A' - THIS DRAWING.
3. FLOOR MATERIAL VARIES - SEE FLOOR PLAN OR ROOM LAYOUT AND TRANSITION DETAIL 'B' - THIS DRAWING.
4. SEE DRAWING A701 FOR FLOOR PATTERN LAYOUT.
5. PROVIDE SOUND-CONTROL REDUCTION UNDERLAYMENT UNDER THE LVT FLOOR FINISH UNDER ALTERNATE BID NO. 2.
6. CARPET TILE TREADS WITH RUBBER NOSING AND RISER ON STAIRS.
7. PAINT ALL EXPOSED STAIR COMPONENTS (RAILINGS, POSTS, BALLASTERS, STRINGERS, PANS, CHAINNELS, ETC.) UNLESS COMPONENT IS FACTORY PRE-FINISHED.
8. PAINT EXPOSED CONSTRUCTION ABOVE DECORATIVE CEILING SYSTEM CLOUDS - COLOR AS SELECTED BY ARCHITECT.

ABBREVIATIONS

- AL - ALUMINUM
AACB - ACRYLIC ACOUSTIC CEILING BOARD (2'-0" x 4'-0")
ACB-1 - ACRYLIC CEILING BOARD TYPE 1 (2'-0" x 4'-0" TYP.)
ACB-2 - ACRYLIC CEILING BOARD TYPE 2 (2'-0" x 4'-0" TYP.)
CEP - CONCRETE MASONRY UNIT - PAINTED
CONC-S - CONCRETE (SEALED)
CPT-1 - CARPET TILE TYPE 1 (2'-0" x 2'-0")
CPT-2 - CARPET TILE TYPE 2 (1'-6" x 3'-0")
DCS-1 - DECORATIVE CEILING SYSTEM TYPE 1 (2'-0" x 2'-0" TYP.)
EXP-P - EXPOSED CONSTRUCTION - PAINTED
EXP-C - EXPOSED CONSTRUCTION - CONCRETE MASONRY UNIT - PAINTED
GP - GYPSUM BOARD - PAINTED
LVT - LUXURY VINYL TILE
PT - PARTITION
RRT - RADIAL RUBBER TILE
RUB - RUBBER BASE

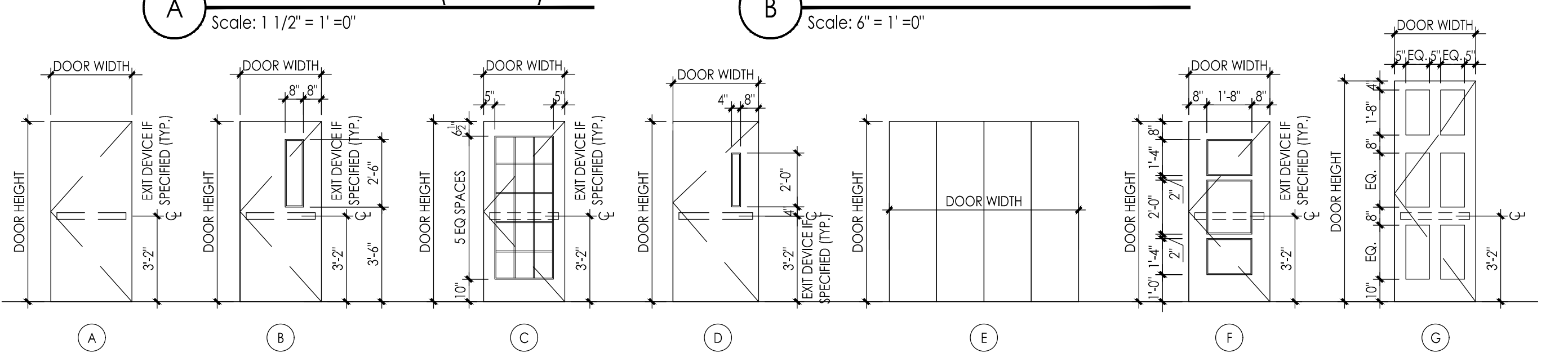
GENERAL FINISH NOTES:

- A. SEE SPECIFICATION FOR ADDITIONAL INFORMATION ON MATERIALS / MANUFACTURER / PERFORMANCE AND WARRANTY INFORMATION.
B. MATERIALS LISTED ON THE FINISH SCHEDULE REFER TO THE MAJORITY OF WALLS, FLOOR AND CEILING OF ROOMS SCHEDULED. REFER TO PLANS, DETAILS, INTERIOR ELEVATIONS, CEILING PLANS AND NOTES FOR THOSE MATERIALS NOT INDICATED ON THE SCHEDULE BUT ARE STILL REQUIRED IN THE ROOM.
C. PAINT ALL EXPOSED DUCTS, SPRINKLER PIPES, ETC. - COLOR AS SELECTED BY ARCHITECT.



Scale: 1/2" = 1'-0"

Scale: 6" = 1'-0"



Scale: 1/4" = 1'-0"

DOOR SCHEDULE - FIRST FLOOR

Table with columns: DR NO, DOOR LOCATION, DOOR, FRAME, HARDWARE, RATING, SIGN TYPE, NOTES. Lists door specifications for the first floor.

DOOR SCHEDULE - SECOND FLOOR

Table with columns: DR NO, DOOR LOCATION, DOOR, FRAME, HARDWARE, RATING, SIGN TYPE, NOTES. Lists door specifications for the second floor.

DOOR SCHEDULE NOTES

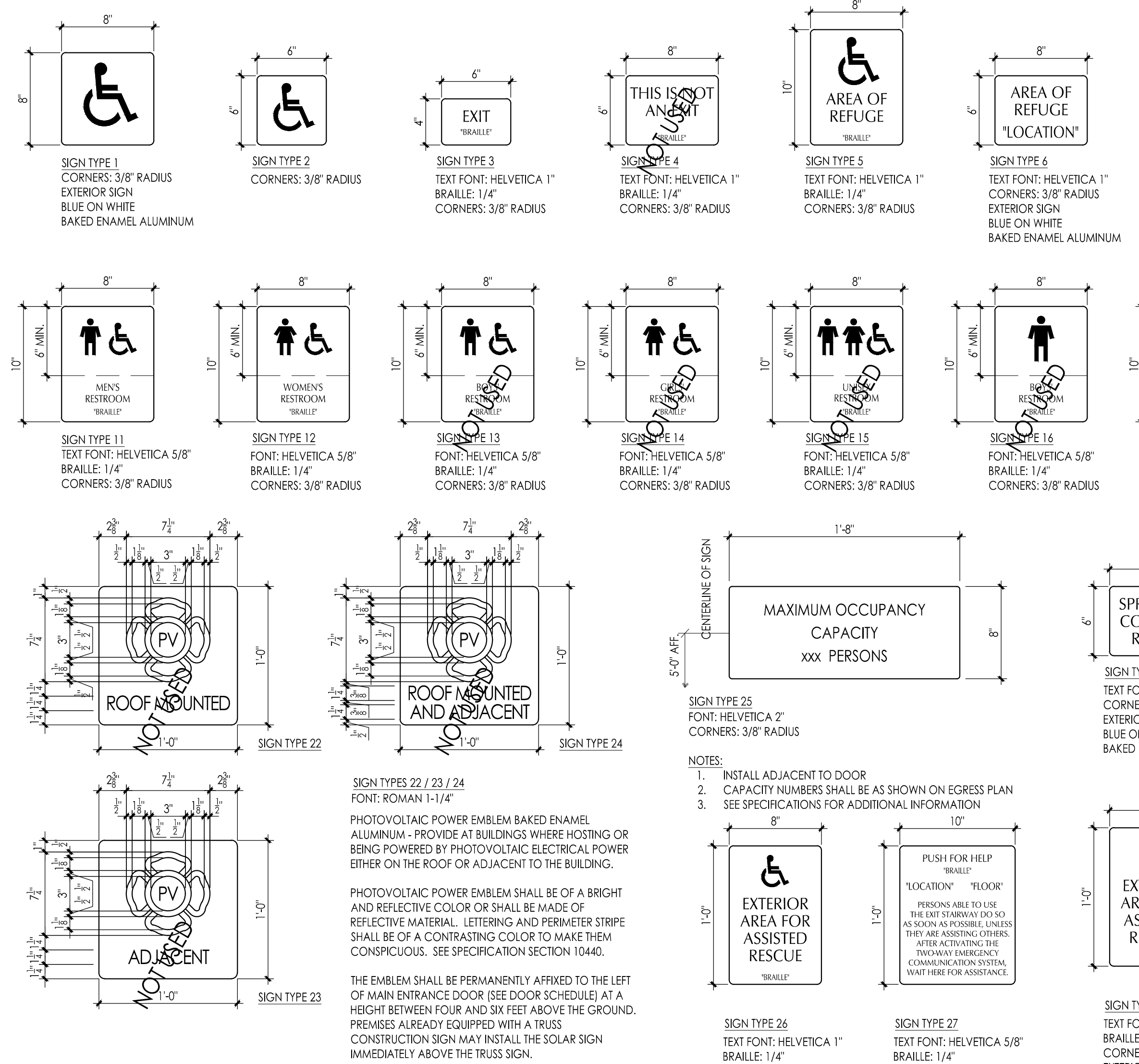
- 1. PROVIDE SECURITY WINDOW FILM TYPE '1' W/ PA ON SIGHTLINE GLASS - SEE FRAME TYPES & SPECIFICATION DRAWINGS A422.
2. BORROWED LIGHT - SEE HOLLOW METAL FRAME TYPES.
3. DOOR SHALL BE RATED FOR STARTOWER CONSTRUCTION.
4. INSTALL (1) SIGN TYPE 'S' ON STAIR SIDE OF DOOR. INSTALL (1) SIGN TYPE 'S' AND (1) SIGN TYPE 'Z' AT AREA OF REUSE ADJACENT TO STAIR - SEE EGRESS PLAN.
5. AUTOMATIC DOOR OPERATOR
6. ELECTRO-MAGNETICALLY HELD OPEN - SEE SPECIFICATION AND ELECTRICAL DRAWINGS. DOOR IS CONNECTED TO LIBRARY SECURITY SYSTEM. PROVIDE (1) SPECIAL SIGN TYPE 'A' ON BOTH LEAFS OF DOOR. SEE SPECIAL SIGN DETAILS ON THIS DRAWING.
7. PROVIDE SPECIAL SIGN TYPE 'B' - SEE SPECIAL SIGN DETAILS ON THIS DRAWING.
8. BIFOLD DOOR WITH PARTICLE BOARD CORE - 1-3/8" THICK - SEE SPECIFICATION.

GENERAL DOOR NOTES

- A. ALL DOORS ARE 1 3/4" THICK UNLESS OTHERWISE NOTED.
B. ALL DOORS ARE SCLC CORES UNLESS OTHERWISE NOTED.
C. SEE DOOR TYPES ON THIS DRAWING.
D. SEE ALUMINUM FRAME TYPES AND HOLLOW METAL FRAME TYPES ON DRAWINGS A422.
E. SEE SIGNAGE TYPES AND DETAILS ON THIS DRAWING.
F. SEE HEAD, JAMB, SADDLE AND SILL DETAILS ON DRAWING A602.
G. COORDINATE ALL ACCESS CONTROL, PREP AND WIRING WITH ELECTRICAL (SUB)CONTRACTOR AND OWNER'S SECURITY VENDOR (TYP.)

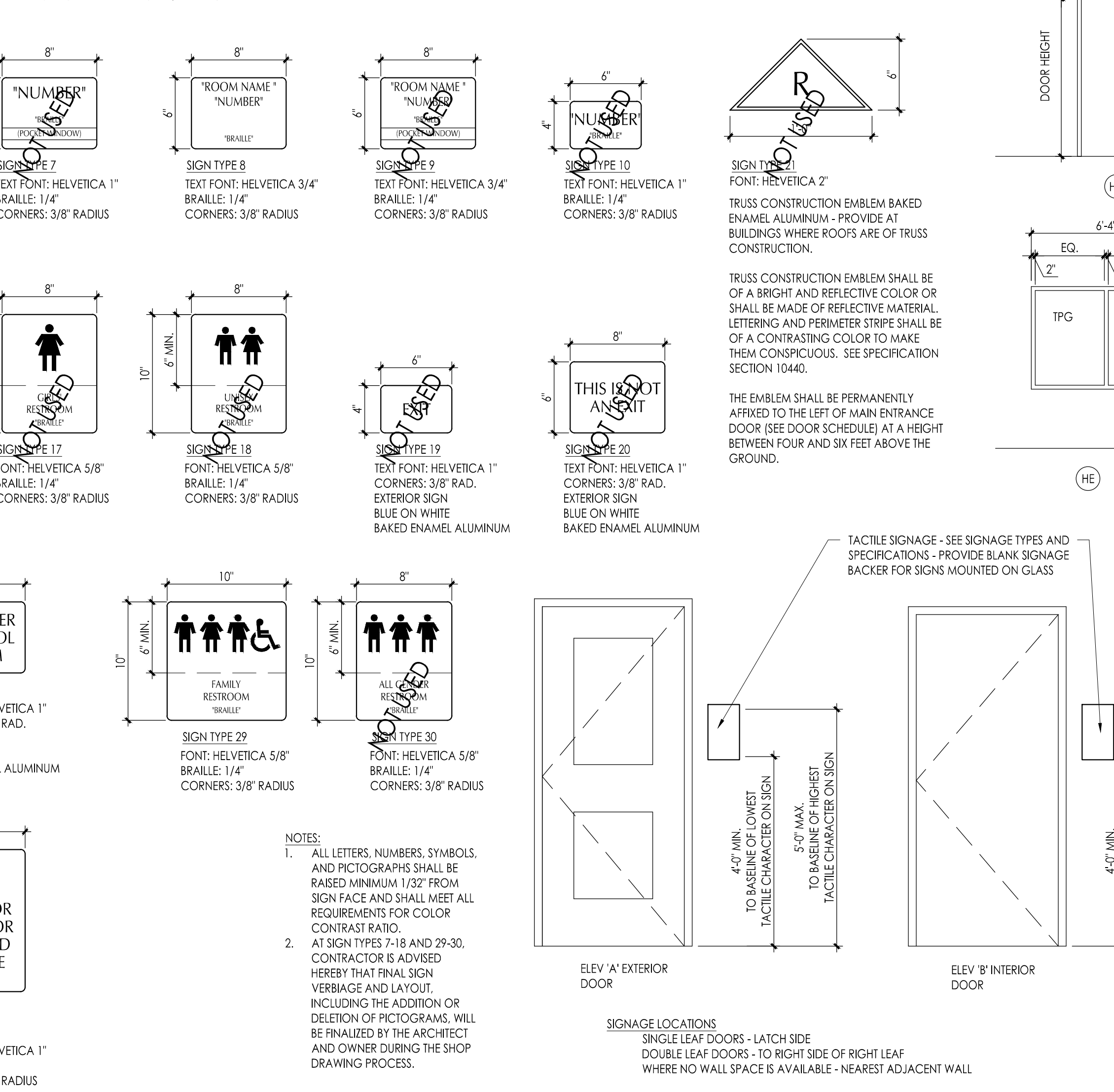
ABBREVIATIONS

- AL - ALUMINUM
FRG-1B - FIRE-RATED IMPACT-RESISTANT GLAZING - TYPE 1B
FRP - FIBERGLASS REINFORCED POLYESTER
HM - HOLLOW METAL
INSUL - INSULATED TEMPERED GLASS
INSUL-F - INSULATED LAMINATED GLASS
SEC - SECURITY GLAZING
W - SECURITY WINDOW FILM
TPG - TEMPERED PLATE GLASS
TPG-F - TEMPERED PLATE GLASS W/ SECURITY WINDOW FILM
WD - WOOD



SIGNAGE TYPES

Scale: 1-1/2" = 1'-0"

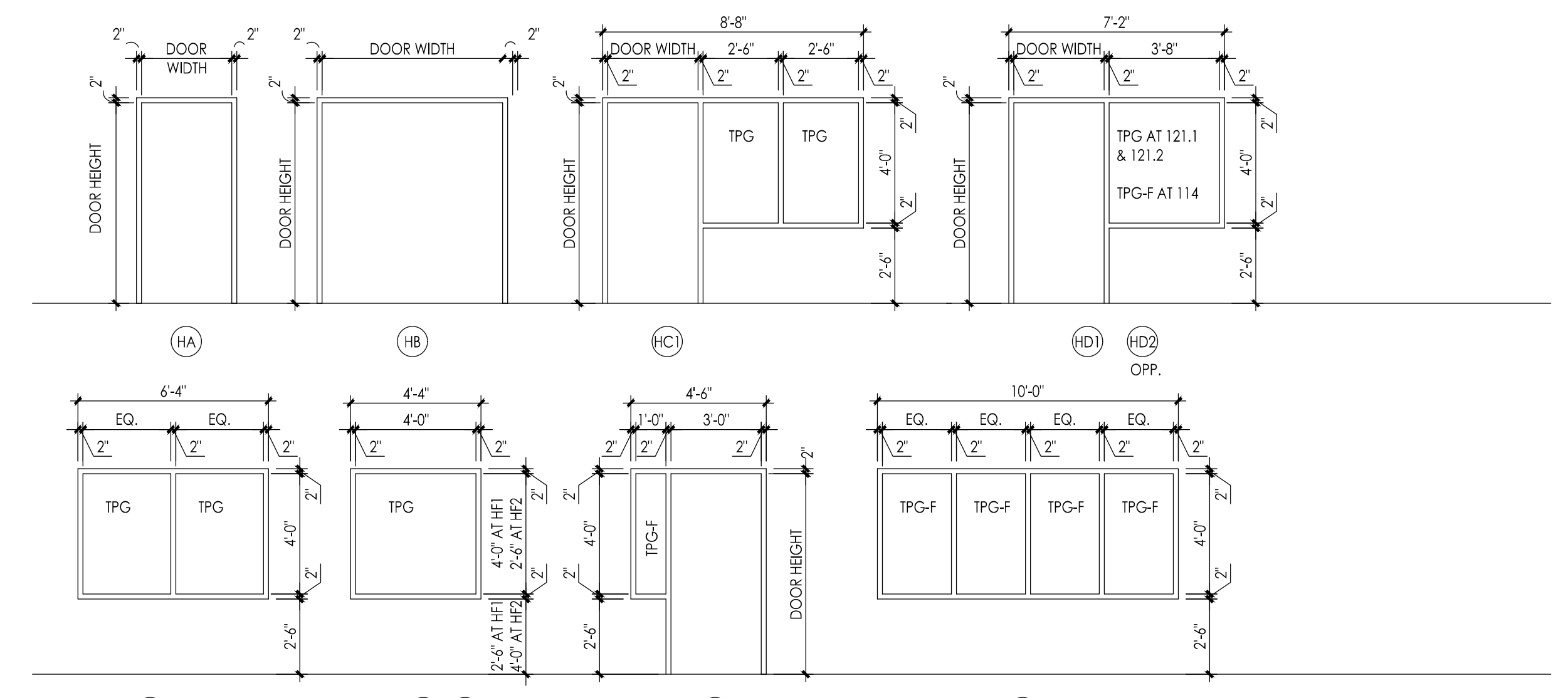


SIGNAGE LOCATION DETAILS

Scale: 1/2" = 1'-0"

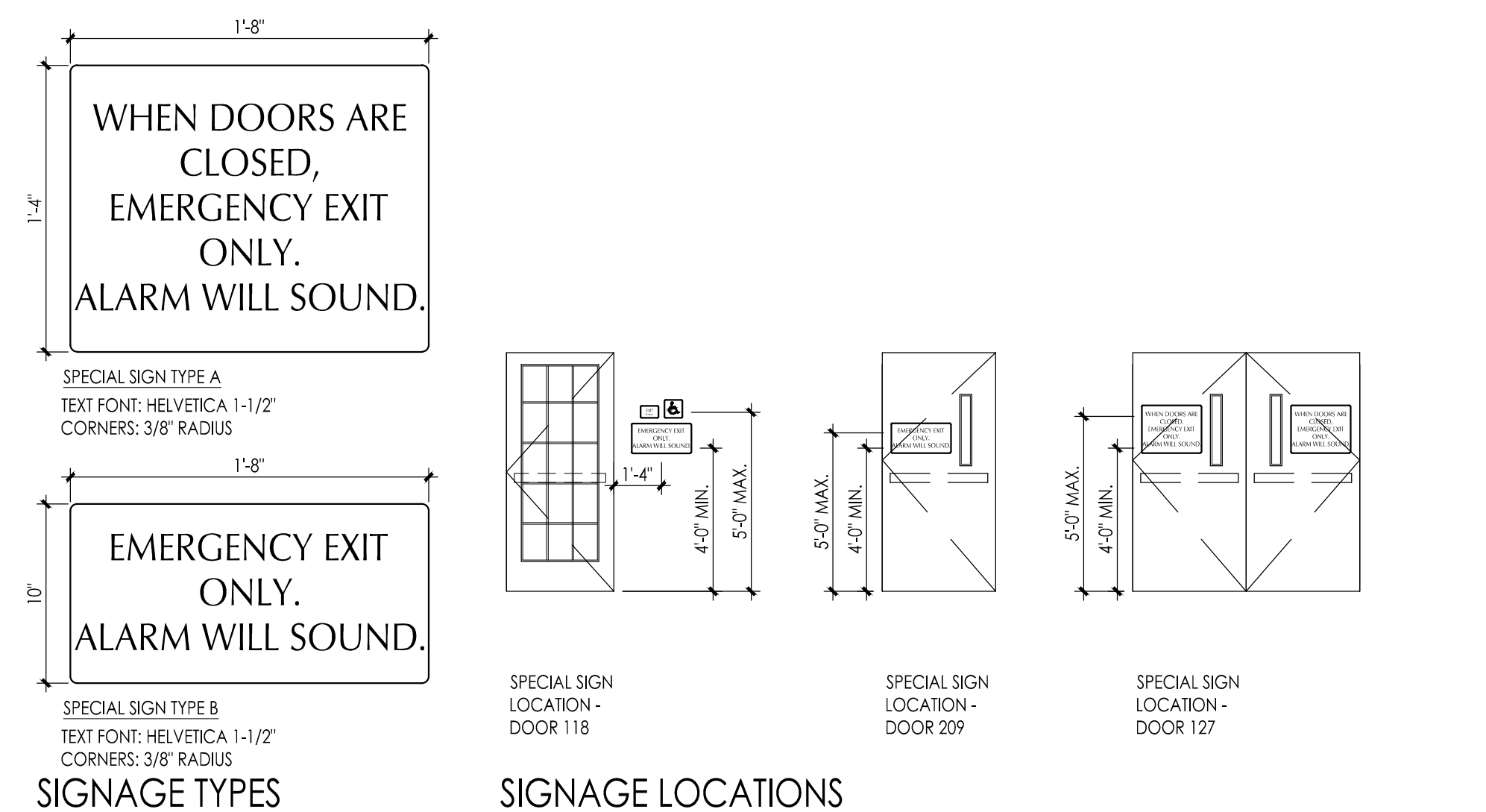
ALUMINUM FRAME TYPES

Scale: 1/4" = 1'-0"



HOLLOW METAL FRAME TYPES

Scale: 1/4" = 1'-0"



SIGNAGE TYPES

Scale: 1-1/2" = 1'-0"

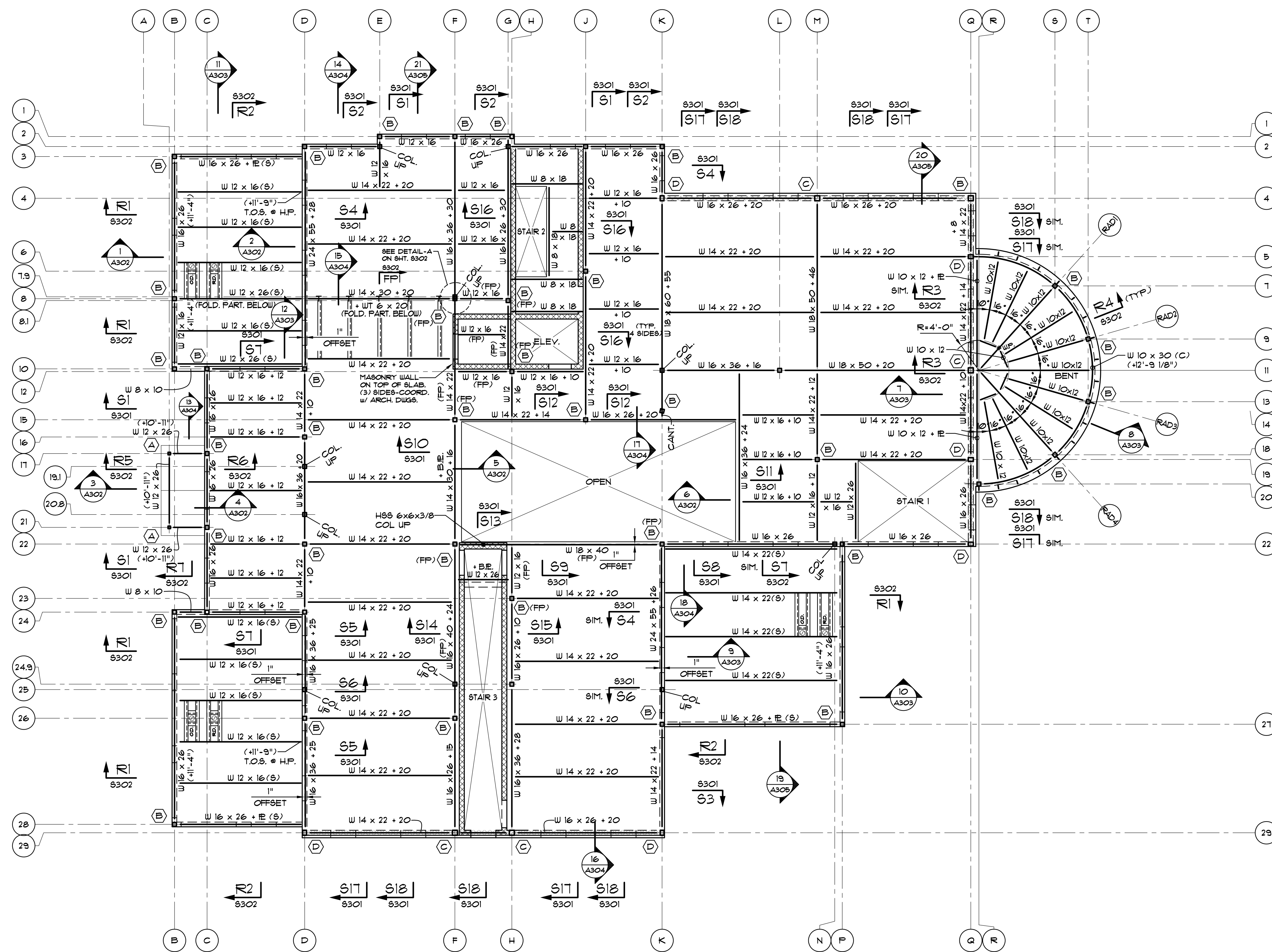
SIGNAGE LOCATIONS

Scale: 1/4" = 1'-0"

SPECIAL SIGNAGE DETAILS

Scale: As Noted See additional signage details on A502

Project Name: New Fanwood Memorial Library
Project Owner Name: Borough of Fanwood
Project Location: 5 Forest Road, Fanwood, NJ 07023
Project Number: 5292
Project Date: 07.22.2022
Checked By: G.R.D.
Drawn By: NEH
Scale: As Noted
Drawing Name: Room Finish and Door Schedules, Details and Notes
Revisions: 1. 8.11.2022 Addendum 1
Drawing Number: A601



FLOOR FRAMING PLAN

1/8" = 1'-0"
 ELEVATION TOP OF FINISHED FLOOR SLAB: +3'-6" ABOVE DATUM
 EL. 0'-0" UNLESS OTHERWISE NOTED ON PLAN.
 FLOOR SLAB: 5 1/2" CONC. SLAB + 6" x 6" W 14 WUF. ON 2" - 20 GA. COMPOSITE METAL FLOOR DECK (GALVANIZED).
 ELEVATION TOP OF STEEL BEAMS TO BE: -5 1/2" BELOW TOP OF SLAB UNLESS OTHERWISE NOTED THIS () ON PLAN.
 [] - INDICATES ELEVATION BOTTOM OF IE AT BEAM + IE LINTEL AND BOTTOM OF ANGLE AT BEAM + L₁ LINTEL. COORD. WITH ARCH. DUGS.
 W 16 x 26 + 16 - INDICATES W 16 x 26 STEEL BEAM WITH (16) - 3/4" x SHEAR STUDS. SPACE ALL STEEL MEMBERS EQUALLY UNLESS OTHERWISE NOTED ON PLAN.
 (FP) - INDICATES STEEL MEMBER TO RECEIVE SPRAY FIREPROOFING. COORDINATE WITH ARCH. DUGS. AND SPECIFICATIONS FOR LOCATION, EXTENT, AND 'UL' NUMBERS REGARDING ALL FIREPROOFING.

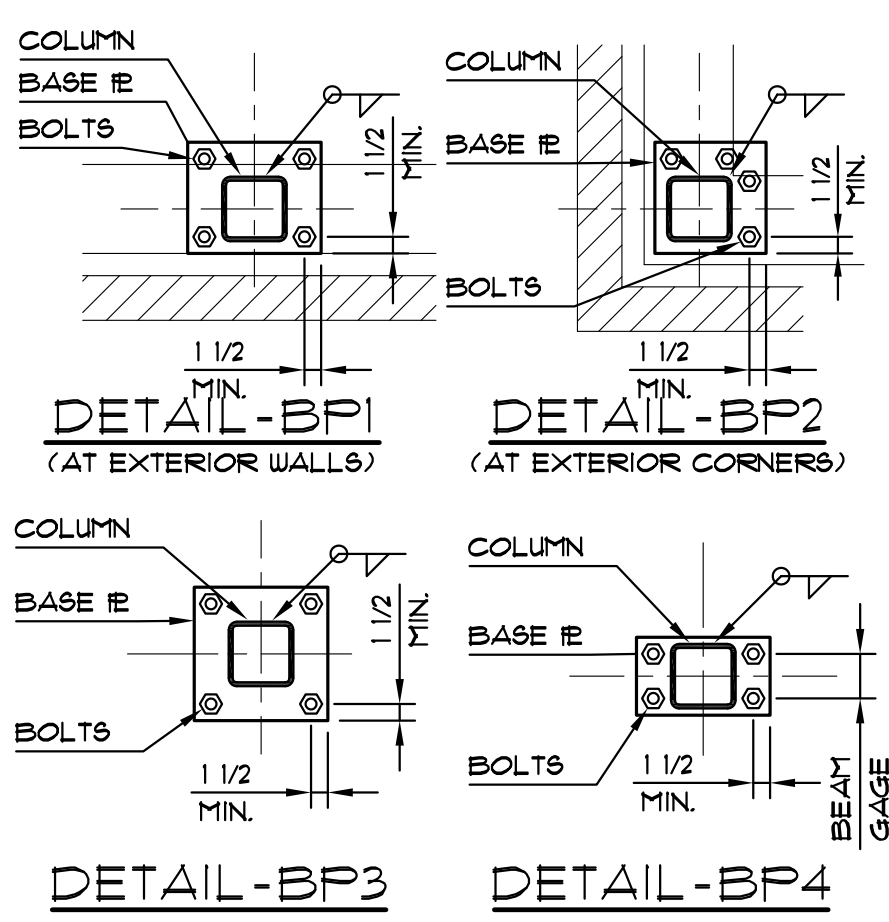
ROOF FRAMING PLAN

1/8" = 1'-0"
 ELEVATION TOP OF STEEL BEAMS NOTED THIS () ON PLAN ABOVE DATUM UNLESS OTHERWISE NOTED.
 ROOF DECK: 1 1/2" - 20 GA. TYPE 'B' (WIDE RIB) METAL ROOF DECK (GALV.). PROVIDE FRAMES AROUND ALL ROOF DRAINS & AT ALL OTHER ROOF OPENINGS LARGER THAN 8" AS PER TYPICAL DETAIL.
 COORDINATE SIZE & LOCATION OF ALL ROOF OPNGS. W/ ARCH. & MECH. DUGS. SPACE ALL STEEL MEMBERS EQUALLY UNLESS OTHERWISE NOTED ON PLAN.
 [] - INDICATES ELEVATION BOTTOM OF IE AT BEAM + IE LINTEL AND BOTTOM OF ANGLE AT BEAM + L₁ LINTEL. SEE ARCH. DUGS.
 (S) - INDICATES SLOPING MEMBER.
 PROVIDE GAGE METAL CLOSURE STRIPS AT RIDGES, AND CHANGES IN DECK DIRECTION.
 () - INDICATES BEAMS TO HAVE CONTINUOUS 1/4" BENT PLATE FOR DECK SUPPORT. PROVIDE GAGE METAL CLOSURE STRIPS AT ALL RIDGES, HIPS VALLEYS, AND CHANGES IN DECK DIRECTION.

COLUMN SCHEDULE

MARK	SIZE	BASE PLATE	ANCHOR BOLTS	DETAIL
(A)	HSS 4 x 4 x 3/8	3/4" x 10" x 0'-10"	(4) - 3/4" #	
(B)	HSS 6 x 6 x 3/8	3/4" x 12" x 1'-0"	(4) - 3/4" #	
(C)	HSS 8 x 8 x 3/8	3/4" x 14" x 1'-2"	(4) - 3/4" #	
(D)	HSS 8 x 6 x 3/8	3/4" x 14" x 1'-0"	(4) - 3/4" #	

- NOTES:
- BOTTOM OF BASE PLATES TO BE: -1" BELOW DATUM ELEVATION UNLESS OTHERWISE NOTED THIS [] ON PLAN FROM DATUM.
 - ALL COLUMNS TO HAVE (4) - 3/4" # ANCHOR BOLTS WITH 9" MIN. EMBEDMENT + 3" HOOK UNLESS OTHERWISE NOTED. ALL ANCHOR BOLTS SHALL BE ASTM F1554.
 - ALL 1" # ANCHOR BOLTS TO HAVE MINIMUM 12" EMBEDMENT AND HEAVY HEX NUTS AT THEIR EMBEDDED ENDS AS PER 'AISC' UNLESS OTHERWISE NOTED.
 - ALL HSS COLUMNS TO BE F_y = 46 KSI.
 - ALL HSS COLUMNS TO HAVE 3/4" THICK CAP. E. # BEAM BEARING 1/2" THICK CAP. E. # JOIST BEARING. ALL OTHERS 1/4" THICK CAP. E. - U.O.N.
 - ALL STEEL COLUMNS SUPPORTING CANTILEVER MEMBERS TO HAVE 3/4" TOP PLATES W/ (4) - 3/4" # A325 BOLTS U.O.N.
 - ALL ANCHOR BOLTS SHALL BE ASTM F1554 Gr. 36.
 - SEE TYPICAL THRU-E DETAIL FOR BEAM TO TUBE COLUMN CONNECTIONS.
 - () - INDICATES THE POINT AT WHICH A STEEL COLUMN TERMINATES. COORDINATE THE HEIGHT OF STEEL WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
 - WHERE ANY FACE OF COLUMN ABUTS MASONRY WALLS, PROVIDE ADJUSTABLE MASONRY ANCHORS # 24" O.C. VERTICALLY.
 - OMIT MASONRY ANCHORS AT FIRE WALLS.



Drawing name: D:\Jobs\2020 - Fanwood - FVHD\21070 - Framing.dwg
 Date: Aug 11, 2022 - 3:46pm

Harrison-Hammett, P.C.
 Consulting Structural Engineers
 40 Knowles Street, Flemington, New Jersey 08534
 Tel: 609-818-1808 www.hhpcse.com

 DONALD M. HAMMETT, N.J.P.E. 917976 DATE: 8/11/22

WILLIAM D. HOPKINS III, AIA, LEED AP
 NY 74070000 PA - 84023208
 GEORGE E. DUTHIE JR., AIA, LP
 NY 34639000

 DATE: 8/11/22

FVHD architects
 planners
Fraytak Veisz Hopkins Duthie P.C.
 Corporate: 1515 Lower Ferry Road - Trenton - New Jersey 08628
 Pennsylvania: 140 Whitaker Ave - North Chazy - Pennsylvania 17453
 FVHDP.C. . C O M

Project Name
New Fanwood Memorial Library

Project Owner Name
Borough of Fanwood

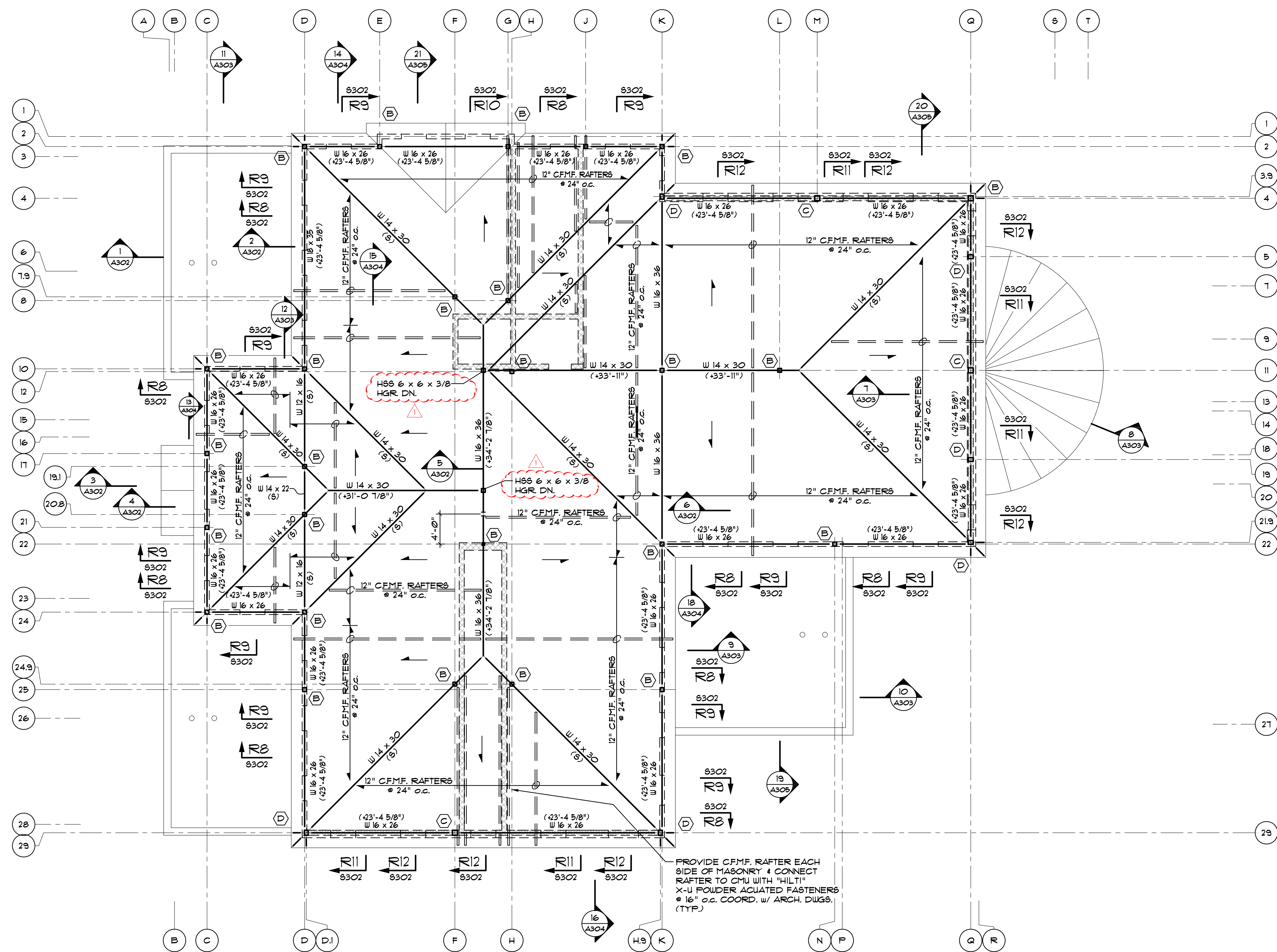
Project Location
5 Forest Road, Fanwood, NJ 07023

Project Number
5292
 Project Date
07.22.2022
 Checked By
DH
 Drawn By
RC
 Scale
As Noted

Drawing Name
2ND FLOOR FRAMING PLAN / LOW ROOF FRAMING PLAN

No.	Date	Description
1	8.11.22	ADDENDUM 1

Drawing Number
S201

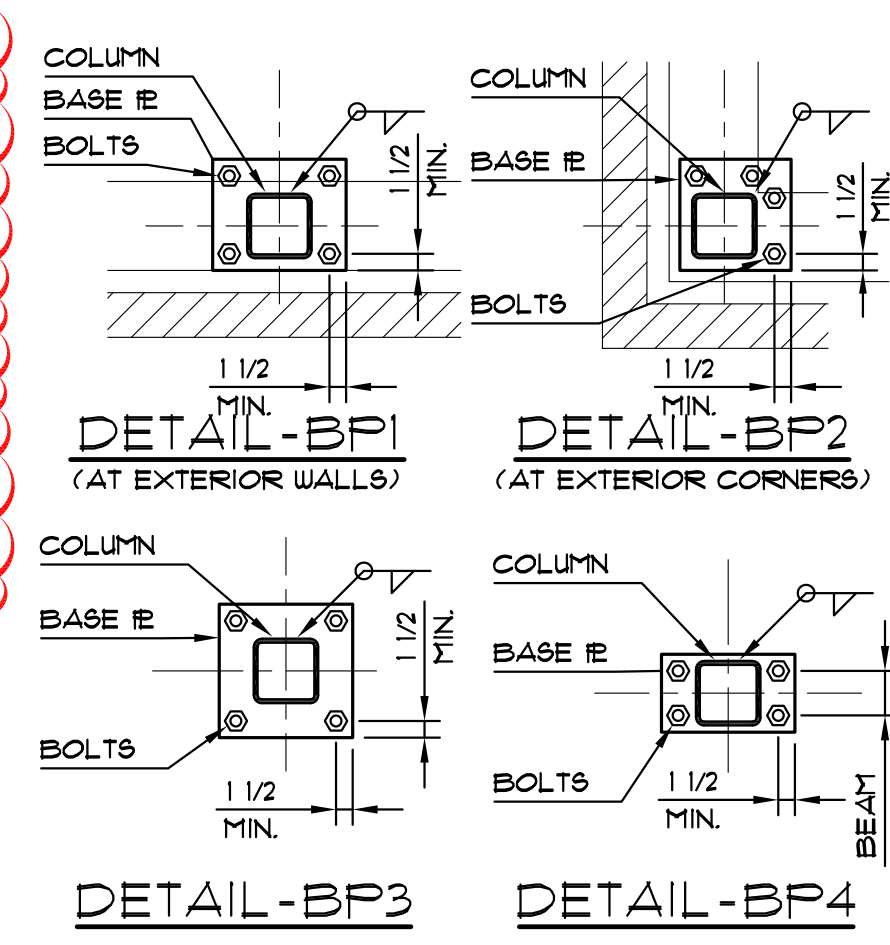


ROOF FRAMING PLAN
 1/8" = 1'-0"
 ELEVATION TOP OF STEEL BEAMS NOTED THIS (+) ON PLAN ABOVE DATUM UNLESS OTHERWISE NOTED.
 ROOF DECK: 1 1/2" x 20 GA. TYPE 'B' (WIDE RIB) METAL ROOF DECK (GALV.). PROVIDE FRAME AROUND ALL ROOF DRAINS & AT ALL OTHER ROOF OPENINGS LARGER THAN 8" AS PER TYPICAL DETAIL.
 COORDINATE SIZE & LOCATION OF ALL ROOF OPENINGS w/ ARCH. & MECH. DUGS. SPACE ALL STEEL MEMBERS EQUALLY UNLESS OTHERWISE NOTED ON PLAN.
 [] - INDICATES ELEVATION BOTTOM OF IE AT BEAM + IE LINTEL AND BOTTOM OF ANGLE AT BEAM + L₂ LINTEL. SEE ARCH. DUGS.
 (S) - INDICATES SLOPING MEMBER.
 PROVIDE GAGE METAL CLOSURE STRIPS AT RIDGES, AND CHANGES IN DECK DIRECTION.
 Y - INDICATES BEAMS TO HAVE CONTINUOUS 1/4" BENT PLATE FOR DECK SUPPORT. PROVIDE GAGE METAL CLOSURE STRIPS AT ALL RIDGES, HIPS VALLEYS, AND CHANGES IN DECK DIRECTION.

COLUMN SCHEDULE

MARK	SIZE	BASE PLATE	ANCHOR BOLTS	DETAIL
(A)	HSS 4 x 4 x 3/8	3/4" x 10" x 0'-10"	(4) - 3/4" #	
(B)	HSS 6 x 6 x 3/8	3/4" x 12" x 1'-0"	(4) - 3/4" #	
(C)	HSS 8 x 8 x 3/8	3/4" x 14" x 1'-2"	(4) - 3/4" #	
(D)	HSS 8 x 6 x 3/8	3/4" x 14" x 1'-0"	(4) - 3/4" #	

- NOTES:**
- BOTTOM OF BASE PLATES TO BE - 1" BELOW DATUM ELEVATION UNLESS OTHERWISE NOTED THIS [BE] ON PLAN FROM DATUM.
 - ALL COLUMNS TO HAVE (4) - 3/4" # ANCHOR BOLTS WITH 9" MIN. EMBEDMENT + 3" HOOK UNLESS OTHERWISE NOTED. ALL ANCHOR BOLTS SHALL BE ASTM F1554.
 - ALL 1" # ANCHOR BOLTS TO HAVE MINIMUM 12" EMBEDMENT AND HEAVY HEX NUTS AT THEIR EMBEDDED ENDS AS PER 'AISC' UNLESS OTHERWISE NOTED.
 - ALL HSS COLUMNS TO BE F_y = 46 KSI.
 - ALL HSS COLUMNS TO HAVE 3/4" THICK CAP E. # BEAM BEARING 1/2" THICK CAP E. # JOIST BEARING ALL OTHERS 1/4" THICK CAP E. - U.G.O.N.
 - ALL STEEL COLUMNS SUPPORTING CANTILEVER MEMBERS TO HAVE 3/4" TOP PLATES w/ (4) - 3/4" # A325 BOLTS U.G.O.N.
 - ALL ANCHOR BOLTS SHALL BE ASTM F1554 Gr. 36.
 - SEE TYPICAL THRU-E DETAIL FOR BEAM TO TUBE COLUMN CONNECTIONS.
 - (-) - INDICATES THE POINT AT WHICH A STEEL COLUMN TERMINATES. COORDINATE THE HEIGHT OF STEEL WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
 - WHERE ANY FACE OF COLUMN ABUTS MASONRY WALLS, PROVIDE ADJUSTABLE MASONRY ANCHORS # 24" O.C. VERTICALLY.
 - OMIT MASONRY ANCHORS AT FIRE WALLS.



PROVIDE CFMF RAFTER EACH SIDE OF MASONRY & CONNECT RAFTER TO CHU WITH "HIT" X-U FOUDEUR ACQUATED FASTENERS # 16" o.c. COORD. w/ ARCH. DUGS. (TYP.)

Drawing name: D:\Jobs\21070 - Fanwood - FVHD\21070 - Rev.dwg
 Date: Aug 11, 2022 - 3:49pm

Harrison-Hammett, P.C.
 Consulting Structural Engineers
 40 Knowles Street, Roseland, New Jersey 07068
 Tel: 609-818-1808 www.hhpcsa.com

 DONALD M. HAMMETT, N.J.P.E. 817976 DATE: 8/11/22

WILLIAM D. HOPKINS III, AIA, LEED AP
 NY-240726000 PA-84023206
 GEORGE E. DUTHIE JR., AIA, LP
 NY-240397600

FVHD architects
 planners
 Fraytak Veisz Hopkins Duthie P.C.
 Corporate: 1515 Lower Ferry Road - Trenton - New Jersey 08628
 Pennsylvania: 140 Whitaker Ave - Mont Clare - Pennsylvania 17433

F.V.H.D.P.C. - C.O.M.
 Date: 8/11/22

Project Name
New Fanwood Memorial Library

Project Owner Name
Borough of Fanwood

Project Location
5 Forest Road, Fanwood, NJ 07023

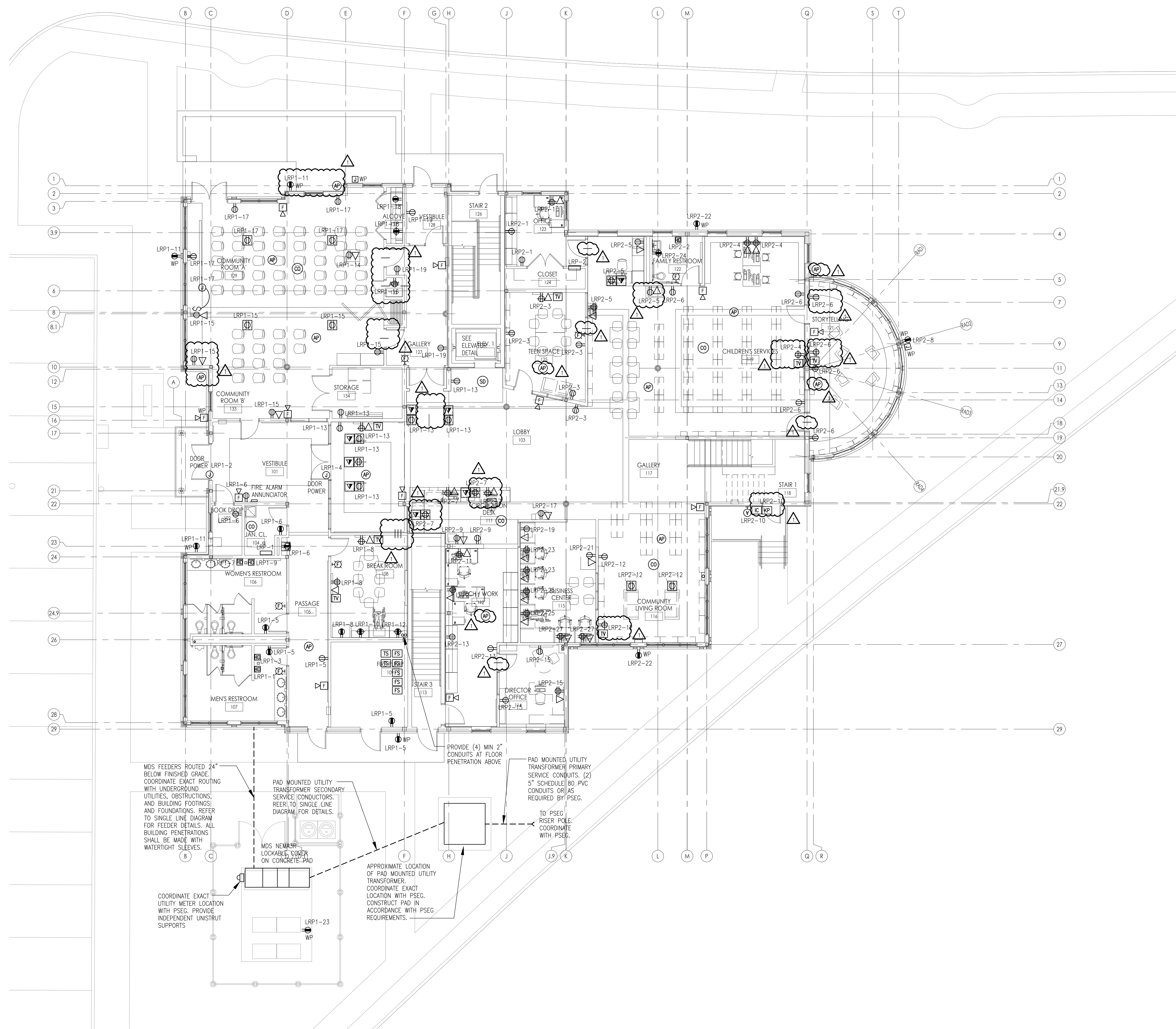
Project Number
5292
 Project Date
07.22.2022
 Checked By
DH
 Drawn By
RC
 Scale
As Noted

Drawing Name
ROOF FRAMING PLAN

Revisions

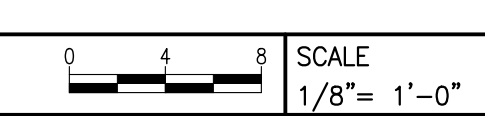
No.	Date	Description
1	8.11.22	ADDENDUM 1

Drawing Number
S202



- GENERAL NOTES**
1. REFER TO DRAWINGS E001 FOR SYMBOLS, ABBREVIATIONS, AND NOTES.
 2. REFER TO ARCHITECTURAL AND EQUIPMENT PLANS FOR EXACT LOCATIONS OF ALL EQUIPMENT.
 3. COORDINATE EXACT DEVICE LOCATIONS AND MOUNTING HEIGHTS WITH ARCHITECT/OWNER AND ARCHITECTURAL DOCUMENTS PRIOR TO INSTALLATION.
 4. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR LOCATIONS OF ALL MECHANICAL AND PLUMBING EQUIPMENT.
 5. THE CONTRACTOR MUST HAVE THE H.V.A.C. AND PLUMBING DRAWINGS FOR LOCATIONS OF EQUIPMENT AND CONTROL WIRING REQUIREMENTS. ONLY POWER FEEDER TO MECHANICAL EQUIPMENT ARE SCHEDULED ON THE ELECTRICAL DRAWINGS. FURNISH AND INSTALL ALL CODE REQUIRED DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT UNLESS SPECIFIED ON MECHANICAL DRAWINGS TO BE SUPPLIED BY MANUFACTURER. PROVIDE FUSED SWITCHES WHEREVER MANUFACTURER REQUIRES THEM.
 6. COORDINATE EXACT POWER REQUIREMENTS/NEMA CONFIGURATION OF RECEPTACLES FOR EQUIPMENT WITH FURNITURE MANUFACTURER. PROVIDE AND COORDINATE ALL CIRCUITS, WIRING, RECEPTACLES, CONDUITS, ETC. AS REQUIRED PER FURNITURE MANUFACTURER'S REQUIREMENTS.
 7. ALL WIRING ABOVE ACCESSIBLE SUSPENDED CEILINGS SHALL BE SUPPORTED WITH J-HOOKS SPACED AT MAXIMUM 4'-0" ON CENTERS.
 8. ALL RECEPTACLES SHALL BE TAMPER-RESISTANT TYPE.
 9. COORDINATE TELEDATA CONDUIT AND POINT OF ENTRY WITH IT/TELEDATA PROVIDERS' REQUIREMENTS. COORDINATE WORK WITH OWNER.

1 ELECTRICAL - FIRST FLOOR PLAN



WILLIAM D. HOPKINS III AIA LEED AP
 NJ #140176000 PA #40723504
 GEORGE E. DUTHIE JR., AIA, LP
 NJ #140397000

FVH D architects
 planners
Fraytak Veisz Hopkins Duthie P C
 Corporate: 1515 Lower Ferry Road - Trenton - New Jersey 08618
 Pennsylvania: 140 Whitaker Ave - Mont Clear - Pennsylvania 19435

1/22/22
 Date

F V H D P C . C O M

Project Name
NEW FANWOOD MEMORIAL LIBRARY

Project Owner Name
BOROUGH OF FANWOOD

Project Location
5 FOREST ROAD, FANWOOD, NJ 07023

Project Number
5292

Project Date
07.22.2022

Checked By
DG

Drawn By
DG

Scale
As Noted

Drawing Name
ELECTRICAL FIRST FLOOR POWER PLAN

No.	Date	Description
1	8.11.2022	ADDENDUM 1

Drawing Number
E201

Johnson & Urban, LLC
 Consulting Engineers
 Certificate of Authorization: 24GA2853200

295 State Route 34
 Colts Neck, NJ 07722
 t 732.772.1500
 f 732.772.1515

J&U Project # 21-022

Mark E. Lonergan, P.E.
 NJ License #106100000

Revised: 8/11/2022 10:48 AM By: dgl/awr
 File: W:\Projects\21-022-New Fanwood Memorial Library\Drawings\E201



1 ELECTRICAL - SECOND FLOOR PLAN

SCALE
1/8" = 1'-0"

- GENERAL NOTES
1. REFER TO DRAWINGS E001 FOR SYMBOLS, ABBREVIATIONS, AND NOTES.
 2. REFER TO ARCHITECTURAL AND EQUIPMENT PLANS FOR EXACT LOCATIONS OF ALL EQUIPMENT.
 3. COORDINATE EXACT DEVICE LOCATIONS AND MOUNTING HEIGHTS WITH ARCHITECT/OWNER AND ARCHITECTURAL DOCUMENTS PRIOR TO INSTALLATION.
 4. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR LOCATIONS OF ALL MECHANICAL AND PLUMBING EQUIPMENT.
 5. THE CONTRACTOR MUST HAVE THE H.V.A.C. AND PLUMBING DRAWINGS FOR LOCATIONS OF EQUIPMENT AND CONTROL WIRING REQUIREMENTS. ONLY POWER FEEDER TO MECHANICAL EQUIPMENT ARE SCHEDULED ON THE ELECTRICAL DRAWINGS. FURNISH AND INSTALL ALL CODE REQUIRED DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT UNLESS SPECIFIED ON MECHANICAL DRAWINGS TO BE SUPPLIED BY MANUFACTURER. PROVIDE FUSED SWITCHES WHEREVER MANUFACTURER REQUIRES THEM.
 6. COORDINATE EXACT POWER REQUIREMENTS/NEMA CONFIGURATION OF RECEPTACLES FOR EQUIPMENT WITH FURNITURE MANUFACTURER. PROVIDE AND COORDINATE ALL CIRCUITS, WIRING, RECEPTACLES, CONDUITS, ETC. AS REQUIRED PER FURNITURE MANUFACTURER'S REQUIREMENTS.
 7. ALL WIRING ABOVE ACCESSIBLE SUSPENDED CEILINGS SHALL BE SUPPORTED WITH J-HOOKS SPACED AT MAXIMUM 4'-0" ON CENTERS.
 8. ALL RECEPTACLES SHALL BE TAMPER-RESISTANT TYPE.
 9. CONDUITS FROM WIRELESS ACCESS POINTS SHALL BE ROUTED TO EITHER ACCESS PLATE IN WALL OR TO FIRST FLOOR CEILING PLENUM SPACE.

WILLIAM D. HOPKINS III AIA LEED AP
 NJ 310070000 PA 8022500
 GEORGE E. DUTHIE JR. AIA FP
 NJ 310097000

GSD Architects
 1/22/22
 Date

FVHD architects
 planners
Fraytak Veisz Hopkins Duthie P C
 1515 Lower Ferry Road - Trenton - New Jersey 08618
 Corporate: 140 Whitaker Ave - Mont Clear - Pennsylvania 17433
 Pennsylvania

F V H D P C . C O M

Project Name
**NEW
 FANWOOD
 MEMORIAL LIBRARY**

Project Owner Name
**BOROUGH OF
 FANWOOD**

Project Location
**5 FOREST ROAD,
 FANWOOD, NJ
 07023**

Project Number
5292

Project Date
07.22.2022

Checked By
DG

Drawn By
DG

Scale
As Noted

Drawing Name
**ELECTRICAL
 SECOND FLOOR
 POWER PLAN**

No.	Date	Description
1	8.11.2022	ADDENDUM 1

Drawing Number
E202

Johnson & Urban, LLC
 Consulting Engineers
 Certificate of Authorization: 24GA2853200

295 State Route 34
 Colts Neck, NJ 07722
 t 732.772.1500
 f 732.772.1515

J&U Project # 21-022

Mark E. Lonergan, P.E.
 NJ License # 34560000000000000000

Revised: 8/11/2022 10:48 AM By: dgl/evr
 File: W:\Projects\21-022-New Fanwood Memorial Library\Drawings\E202

Panel LRP-1		SCHEDULE														150 A Main Circuit Breaker									
Panel Location		Electric Closet																						225 A Bus	
120/208	Volts	3Ø, 4 Wire		Panel Short Circuit Rating: 42 KAC																					
C.B. POLE NO.	C.B. TRIP AMPS	C.B. LOAD VA	LOAD DESCRIPTION	CIR NO.	FEEDER DATA				PHASE A	PHASE B	PHASE C	FEEDER DATA				CIR NO.	LOAD DESCRIPTION	C.B. LOAD VA	C.B. TRIP AMPS	C.B. POLE NO.					
No.	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE	WIRE						
1	20	1,800	HAND DRYER	1	2	12	12	3/4	3300				2	12	12	3/4	2	DOOR OPERATOR	1,500	20	1				
1	20	1,800	HAND DRYER	3	2	12	12	3/4	3300				2	12	12	3/4	4	DOOR OPERATOR	1,500	20	1				
1	20	900	RECEPT. TLT.CORREX	5	2	12	12	3/4		1620			2	12	12	3/4	6	RECEPT. JCL.B.D.W.C.	720	20	1				
1	20	1,800	HAND DRYER	7	2	12	12	3/4	2340				2	12	12	3/4	8	RECEPT. BRK RM	540	20	1				
1	20	1,800	HAND DRYER	9	2	12	12	3/4	3600				2	12	12	3/4	10	RECEPT. BRK RM	1,800	20	1				
1	20	540	RECEPT. GALLERY/WEST.	11	2	12	12	3/4		2340			2	12	12	3/4	12	RECEPT. BRK RM	1,800	20	1				
1	20	1,080	RECEPT. LIBRY/STORAGE	13	2	12	12	3/4	1880				2	12	12	3/4	14	RECEPT. PRODUCEUR	800	20	1				
1	20	900	RECEPT. COMMUNITY RM.	15	2	12	12	3/4	2400				2	12	12	3/4	16	RECEPT. A/V	1,500	20	1				
1	20	1,080	RECEPT. COMMUNITY RM.	17	2	12	12	3/4		1440			2	12	12	3/4	18	RECEPT. COMMUNITY RM.	360	20	1				
1	20	540	RECEPT. GALLERY/WEST.	19	2	12	12	3/4	1019				2	12	12	3/4	20	LIT. PASSAGE, FP, TL, BRK	479	20	1				
1	20	400	RECEPT. EXTERIOR LIGHTING	21	2	12	12	3/4		1042			2	12	12	3/4	22	LIT. JAM CLOSERS, BK STORE	842	20	1				
1	20	180	RECEPT. EXTERIOR RECEPT.	23	2	12	12	3/4		780			2	12	12	3/4	24	LIT. COMM. RM.	600	20	1				
1	20	300	UH-1	25	2	12	12	3/4	673				2	12	12	3/4	26	LIT. VESTIBULE, GALLERY	373	20	1				
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1	20	1,200	EXTERIOR SITE LIT	29	2	10	10	3/4		1200							30	SPARE		20	1				
1	20	800	EXT. SITE LIT. SEE CML PLS	31	2	10	10	3/4	800								32	SPARE		20	1				
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1	20		SPARE	35													36	SPARE		20	1				
1	20		SPARE	37													38	SPARE	1,320	20	3				
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1	20		SPARE	62															1,320	20	3				
1	20		SPARE	63															1,320	20	3				
1	20		SPARE	64															1,320	20	3				
1	20		SPARE	65															1,320	20	3				
1	20		SPARE	66															1,320	20	3				
1	20		SPARE	67															1,320	20	3				
1	20		SPARE	68															1,320	20	3				
1	20		SPARE	69															1,320	20	3				
1	20		SPARE	70															1,320	20	3				
1	20		SPARE	71															1,320	20	3				
1	20		SPARE	72															1,320	20	3				
1	20		SPARE	73															1,320	20	3				
1	20		SPARE	74															1,320	20	3				
1	20		SPARE	75															1,320	20	3				
1	20		SPARE	76															1,320	20	3				
1	20		SPARE	77															1,320	20	3				
1	20		SPARE	78															1,320	20	3				
1	20		SPARE	79															1,320	20	3				
1	20		SPARE	80															1,320	20	3				
1	20		SPARE	81															1,320	20	3				
1	20		SPARE	82															1,320	20	3				
1	20		SPARE	83															1,320	20	3				
1	20		SPARE	84															1,320	20	3				
1	20		SPARE	85															1,320	20	3				
1	20		SPARE	86															1,320	20	3				
1	20		SPARE	87															1,320	20	3				
1	20		SPARE	88															1,320	20	3				
1	20		SPARE	89															1,320	20	3				
1	20		SPARE	90															1,320	20	3				
1	20		SPARE	91															1,320	20	3				
1	20		SPARE	92															1,320	20	3				
1	20		SPARE	93															1,320	20	3				
1	20		SPARE	94															1,320	20	3				
1	20		SPARE	95															1,320	20	3				
1	20		SPARE	96															1,320	20	3				
1	20		SPARE	97															1,320	20	3				
1	20		SPARE	98															1,320	20	3				
1	20		SPARE	99															1,320	20	3				
1	20		SPARE	100															1,320	20	3				
1	20		SPARE	101															1,320	20	3				
1</																									