

Robert Poole Building #056
Additions and Renovations
April 22, 2016

ADDENDUM NO. 2

This Addendum is issued pursuant to the Instructions to Bidders and Conditions of the Contract. This Addendum serves to clarify, revise, and supersede information in the Bid Documents, and previously issued Addenda.

The bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

The Bid Date is May 4, 2016 at 4:00 PM.

The following items will become part of the Bid Documents for this project:

1. Addendum No. 2 issued by JRS Architects, dated April 22, 2016, attached.

END OF ADDENDUM NO. 2

Additions & Renovations at Robert Poole Building #56
Maryland Stadium Authority
Baltimore City Public Schools
JRS Architects
April 22, 2016

ADDENDUM #2

This Addendum is issued pursuant to the Instructions to Bidders and Conditions of the Contract. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.

The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

ATTACHMENTS

This Addendum includes the following attached Sheets:

- A004, Partition Types, revision 1, dated 4/22/16
- M114, New Work First Floor Plan B – Mechanical Piping, rev 1, dated 4/22/16
- M118, New Work Third Floor Plan B – Mechanical Piping, rev 1, 4/22/16
- M119 New Work Third Floor Plan C – Mechanical Piping, rev 1, 4/22/16
- M211 New Work Basement & First Floor Plan A – Ductwork, rev 1, 4/22/16
- M212 New Work Second & Roof Plan A – Ductwork, rev 1, 4/22/16
- M213 New Work Basement Plan B – Ductwork, rev 1, 4/22/16
- M215 New Work First Floor Plan C – Ductwork, rev 1, 4/22/16
- M219 New Work Third Floor Plan C – Ductwork, rev 1, 4/22/16
- M502 Details – Mechanical, rev 1, 4/22/16
- M503 Details – Mechanical, rev 1, 4/22/16
- P022 Demo Basement Floor Plan B – Plumbing, rev 1, 4/22/16
- P113 New Work Basement Plan B – Plumbing, rev 2, 4/22/16
- P401 Enlarged Plans – Plumbing, rev 2, 4/22/16
- E111 New Work Basement & First Floor Plan A – Lighting, rev 1, 4/22/16
- E113 New Work Basement Plan B – Lighting, rev 1, 4/22/16
- E117 New Work Second Floor Plan C – Lighting, rev 1, 4/22/16
- E118 New Work Third Floor Plan B – Lighting, rev 1, 4/22/16
- E119 New Work Third Floor Plan C – Lighting, rev 1, 4/22/16
- E313 New Work Basement Plan B – Mechanical Power, rev 1, 4/22/16
- E401 Enlarged Floor Plans – Electrical, rev 1, 4/22/16
- E600 Electrical Panel Schedules, rev 1, 4/22/16
- E601 Electrical Panel Schedules, rev 1, 4/22/16
- E602 Electrical Panel Schedules, rev 1, 4/22/16
- E603 Electrical Panel Schedules, rev 1, 4/22/16
- E604 Electrical Panel Schedules, rev 1, 4/22/16
- E605 Electrical Panel Schedules, rev 1, 4/22/16
- E606 Electrical Panel Schedules, rev 1, 4/22/16
- E608 Electrical Panel Schedules, rev 1, 4/22/16
- E610 Lighting Control Schedule, rev 1, 4/22/16

E700 Lighting Fixture Schedule, rev 1, 4/22/16
E701 Lighting Fixture Schedule, rev 1, 4/22/16
FA001 Symbols, Legends, and Abbreviations – Fire Alarm, rev 1, 4/22/16
T100 Site Plan, revision 2, dated 4/22/16

This Addendum includes the attached Addendum Drawings:

LAD 2.01, Addendum 2, 4/22/16, revising L1.01
LAD 2.02, Addendum 2, 4/22/16, revising L1.03
LAD 2.03, Addendum 2, 4/22/16, revising L1.04
LAD 2.04, Addendum 2, 4/22/16, revising L1.04
LAD 2.05, Addendum 2, 4/22/16, revising L1.05
LAD 2.06, Addendum 2, 4/22/16, revising L1.06
LAD 2.07, Addendum 2, 4/22/16, revising L1.07
AAD 2.01, Water Entrance Slab, dated 4/22/16, revising Sheet A113
AAD 2.02, Mechanical Room Access Panel, dated 4/22/16, revising Sheet A113
AAD 2.03, Kitchen MAU, dated 4/22/16, revising Sheet A121
AAD 2.04, Pipe Penetration, dated 4/22/16, revising Sheet A401
AAD 2.05, Delete Reveal, dated 4/22/16, revising Sheet A430
AAD 2.06, Learning Stair Column Enclosure, dated 4/22/16, revising Sheet A506
AAD 2.07, Elevator Pit Waterproofing, dated 4/22/16, revising Sheet A510
AAD 2.08, Wet Wall – Toilet 225, dated 4/22/16, revising Sheet A553
AAD 2.09, Waterproofing Existing Wall, dated 4/22/16, revising Sheet A407.
AAD 2.10, Mailbox Unit, dated 4/22/16, revising Sheet A440.
AAD 2.11, Media Center Bookshelf, dated 4/22/16, revising Sheet A442
AAD 2.12, Media Center Entry Shelves, dated 4/22/16, revising Sheet A442
AAD 2.13, Media Center Bookshelf, dated 4/22/16, revising Sheet A442
ADD S2.01 FNDN A, Level 1A Partial Plan, dated 4/18/16, revising S111
ADD S2.02 FNDN B, C Partial Plan, 4/18/16, revising S113
ADD S2.03 Level 1B Partial Plan, 4/18/16, revising S114
ADD S2.04 Level 1C Partial Plan, 4/18/16, revising S115
ADD S2.05 Level 2B Partial Plan, 4/18/16, revising S116
ADD S2.06 Level 2C Partial Plan, 4/18/16, revising S117
ADD S2.07 Level 2C Partial Plan, 4/18/16, revising S117
ADD S2.08 Level 3B Partial Plan, 4/18/16, revising S118
ADD S2.09 Level 3C & R2 Partial Plan, 4/18/16, revising S119
ADD S2.10 Floor Trough Detail, 4/22/16, revising S402
ADD S2.11 Hood Support Detail, 4/22/16, revising S504
ADD S2.12 Window Well Infill Detail, 4/22/16, revising S501

This Addendum includes the attached Specification Sections:

Table of Contents, dated 4/22/16
01 2500 Substitution Procedures, dated 4/22/16, 4 pages
01 2600 Contract Modification Procedures, dated 4/22/16, 3 pages
01 2900 Payment Procedures, dated 4/22/16, 5 pages
01 3100 Project Management and Coordination, dated 4/22/16, 12 pages
01 3300 Submittal Procedures, dated 4/22/16, 10 pages
01 3516 Alteration Project Procedures, dated 4/22/16, 5 pages
01 4000 Quality Requirements, dated 4/22/16, 10 pages
01 4200 References, dated 4/22/16, 8 pages
01 5000 Temporary Facilities and Controls, dated 4/22/16, 10 pages

- 01 5639 Temporary Tree and Plant Protection, dated 4/22/16, 11 pages
- 01 6000 Product Requirements, dated 4/22/16, 5 pages
- 01 7300 Execution, dated 4/22/16, 9 pages
- 01 7823 Operation and Maintenance Data, dated 4/22/16, 8 pages
- 01 7839 Project Record Documents, dated 4/22/16, 5 pages
- 01 7900 Demonstration and Training, dated 4/22/16, 6 pages
- 01 8113 Sustainable Design Requirements, dated 4/22/16, 18 pages
- 01 8119 Indoor Air Quality Requirements, dated 4/22/19, 9 pages
- 09 6813 Tile Carpeting, dated 4/22/16, 6 pages
- 10 5613 Metal Storage Shelving, dated 4/22/16, 5 pages
- 12 9300 Site Furnishings, dated 4/22/16, 9 pages
- 31 5000 Excavation Support and Protection, dated 4/22/16, 5 pages
- 32 1400 Unit Paving, dated 4/22/16, 16 pages
- 32 1540 Crushed Stone Paving, dated 4/22/16, 6 pages
- 32 3113 Chain Link Fences and Gates, dated 4/22/16, 8 pages
- 32 3119 Decorative Metal Fences and Gates, dated 4/22/16, 5 pages
- 32 9113 Soil Preparation, dated 4/22/16, 10 pages
- 32 9200 Turf and Grasses, dated 4/22/16, 8 pages
- 32 9300 Plants, dated 4/22/16, 19 pages

REVISIONS TO PROJECT MANUAL TABLE OF CONTENTS

DELETE: Table of Contents dated 3/31/16

ADD: Table of Contents dated 4/22/16, attached

REVISIONS TO SPECIFICATIONS

	ADD: 01 2500 Substitution Procedures, dated 4/22/16, attached
	ADD: 01 2600 Contract Modification Procedures, dated 4/22/16, attached
	ADD: 01 2900 Payment Procedures, dated 4/22/16, attached
	ADD: 01 3100 Project Management and Coordination, dated 4/22/16, attached
	ADD: 01 3300 Submittal Procedures, dated 4/22/16, attached
	ADD: 01 3516 Alteration Project Procedures, dated 4/22/16, attached
	ADD: 01 4000 Quality Requirements, dated 4/22/16, attached
	ADD: 01 4200 References, dated 4/22/16, attached
	ADD: 01 5000 Temporary Facilities and Controls, dated 4/22/16, attached
	DELETE: 01 5639 Temporary Tree and Plant Protection, dated 3/31/16, ADD: 01 5639 Temporary Tree and Plant Protection, dated 4/22/16.
	ADD: 01 6000 Product Requirements, dated 4/22/16, attached
	ADD: 01 7300 Execution, dated 4/22/16, attached
	ADD: 01 7823 Operation and Maintenance Data, dated 4/22/16, attached
	ADD: 01 7839 Project Record Documents, dated 4/22/16, attached
	ADD: 01 7900 Demonstration and Training, dated 4/22/16, attached
	DELETE: 01 8113.23 Sustainable Design Requirements – LEED 2009 for Schools; ADD: 01 8113 Sustainable Design Requirements, dated 4/22/16, attached
	ADD: 01 8119 Indoor Air Quality Requirements, dated 4/22/19, attached
	ADD: 09 6813 Tile Carpeting, dated 4/22/16, attached
	ADD: 10 5613 Metal Storage Shelving, dated 4/22/16, attached
	DELETE: 12 9300 Site Furnishings, dated 3/31/16, ADD: 12 9300 Site Furnishings, dated 4/22/16.
	ADD: 31 5000 Excavation Support and Protection, dated 4/22/16, attached

		ADD: 32 1400 Unit Paving, dated 3/31/16, attached
		ADD: 32 1540 Crushed Stone Paving, dated 3/31/16, attached
		ADD: 32 3113 Chain Link Fences and Gates, dated 3/31/16, attached
		ADD: 32 3119 Decorative Metal Fences and Gates, dated 3/31/16, attached
		ADD: 32 9113 Soil Preparation, dated 3/31/16, attached
		ADD: 32 9200 Turf and Grasses, dated 3/31/16, attached
		ADD: 32 9300 Plants, dated 3/31/16, attached

REVISIONS TO DIVISIONS 01 - 32 SPECIFICATION SECTIONS (Not reissued)

Section	Paragraph	Change
01 7419	1.2.B	DELETE: "1. Section 011200...waste management." In its entirety.
02 4116	1.2.B	DELETE: "1. Section 011000...phasing requirements." in its entirety. DELETE: "2. Section 013200...demolition" in its entirety.
02 4119	1.2.B	DELETE: "1. Section 011000...phasing requirements." in its entirety.
05 1200	2.8.B.1	DELETE: "1. SSPC-SP 11, "Power Tool Cleaning to Bare Metal." ADD: "1. SSPC SP2, "Hand Tool Cleaning."
05 5113	1.2.B.2	DELETE: "2. Section 057313...railings" in its entirety.
05 5213	1.2.B.1	DELETE: "055112", ADD: "055113".
07 0150.19	1.2.B	DELETE: "1. Section 011000...phasing requirements." in its entirety.
08 3500	1.2.B.2	DELETE: "083100", ADD: "083113".
08 5113	2.3.A	ADD: "6. Quaker Windows and Doors"
08 8000	1.2.B	DELETE: "1. Section 084126...Storefronts".
11 5123	1.2.B	DELETE: "1. Section 105613...uses." DELETE: "2. Section 105626...system."
11 5313	1.2.B.1	DELETE: "061053 Miscellaneous", ADD: "061000"
12 3216	2.4.A	ADD: "3. Stevens Cabinet Company, Inc."
12 3553.19	2.3.C	DELETE: "Rift cut/sawn", ADD: "Plain sliced/sawn"
12 3553.19	2.3.D.2	DELETE: "Provide veneers for each elevation...and running matched" in its entirety. DELETE: "a. Provide continuous matching...of adjacent cabinets" in its entirety.
12 3553.19	2.6.A.3	DELETE: "As selected...full range." ADD: "Black."
14 2123.16	1.2.B.7	DELETE: "271500 Communications Horizontal Cabling", ADD: "270500 Telecommunications Pathway and Spaces"
14 2123.16	1.2.B.8	DELETE: "283111 Digital, Addressable Fire-Alarm System", ADD: "283100 Fire Detection and Alarm"
31 2319	1.2.B	DELETE: "2. 334600 Subdrainage...drainage."
31 6615	3.5	DELETE: paragraph 3.5.D in its entirety.

REVISIONS TO DRAWING SHEETS

Drawing	Location	Change
C1.21		ADD Note: "Provide piping and connection for a foundation drain from the northwest building corner to inlet I-21, inverts to remain the same."
C1.22		ADD Note: "Provide piping and connection for a foundation drain from the west corner of the new gym to inlet I-11. Adjust upstream"

		invert of pipe I11-MH3 to 206.92, downstream invert to remain the same.”
C1.33	Greenhouse 2	DELETE FFE of Greenhouse 2 “209.30” ADD FFE of Greenhouse 2: “239.30”
C1.52	As-Built Data for Filters Micro-Bioretentation Facility 1	REVISE Filter Bed Area from “846 SF” to “810 SF”
L1.01	Detail 2 Landscape Curb	ADD: Reinforcing as shown on LAD 2.01, attached.
L1.03	Dtls. 1 & 2	REVISE: Elevation information as shown on LAD 2.02, attached.
L1.04	Detail 5	REVISE as shown on LAD 2.03, attached.
L1.04	Detail 6	REVISE as shown on LAD 2.04, attached.
L1.05	Detail 4	REVISE as shown on LAD 2.05, attached.
L1.06	Detail 9	REVISE as shown on LAD 2.06, attached.
L1.07	Detail 3	REVISE as shown on LAD 2.07, attached.
A004		REVISE Partition Types and Notes as shown on A 004, Partition Types, reissued, dated 4/22/16.
A101		ADD: “Note: Provide membrane waterproofing at all existing and new exterior below grade walls as shown on wall sections on sheets A401, A406, and A407.
A 113	1	ADD Dimensions and Notes to slab on grade in crawl space as shown on the attached sketch AAD 2.01.
A113	1 – Mechanical 019	ADD Access Panel as shown on the attached sketch AAD 2.02
A113	3/Bldg. C – L0 Floor Plan	ADD Note: “Provide waterproofing membrane, protection board, drainage panel, and drain tile along walls lines F and 5.”
A121	Gymnasium Roof	ADD Kitchen MAU walk-in box units and re-route walkway pads as shown on the attached sketch AAD 2.03.
A201	2/Bldg. B - West	ADD: “ <u>Note</u> : Select one existing parapet section between embrasures as a mock-up and proceed with demolition and restoration work described to verify condition of existing masonry and feasibility of an acceptable restoration.”
A401	10/Pipe Penetration Dtl.	At third penetration type REVISE name as shown on the attached sketch AAD 2.04.
A407	5/Bldg. C at Bldg. B	ADD Membrane Waterproofing to existing exterior wall as shown on attached sketch AAD 2.09.
A430	12	DELETE Reveal as shown on the attached sketch AAD 2.05.
A440		ADD: Drawing 13, Mailbox Unit Elevation as shown on the attached sketch AAD 2.10.
A442		REVISE Drawings 1, 4, and 9 as shown on attached sketches AAD 2.11, AAD 2.12, and AAD 2.13, all attached.
A501	8/Stair A2 – Cross Section	ADD: “ <u>Note</u> : Patch existing plaster walls, guard wall and stair soffit to match adjacent and prepare for finish paint.”
A502, A502	4/Stair B2 – Longitudinal Section, 5/Stair B2 – Cross Section	ADD: “Carefully remove existing textured wallcovering from existing original plaster finish. Following removal of wall covering from walls, guard wall, stair soffit, etc.; patch and repair plaster to match original finish and prepare for finish paint. Typical through-out stair.”
A506	4/Collaboration Learning Stair – Level 3	REVISE material at column enclosures 6F and 15K from M1 to P1 as shown on the attached sketch AAD 2.06.

A510	7/Elevator 1 & 2 Section	ADD waterproofing as shown on the attached sketch AAD 2.07.
A511	7/Greenhouse 2	ADD door tag 160 to door.
A542	1/L1 – Career Technology Education	At Rooms 123 Gateway CR and 124 Cisco Lab, ADD note: “Plastic Laminate Countertop, typ.”
A544	28/CTE Display Wall	DELETE note: “Intermittent stud frame bracing” in its entirety. ADD note: “4” brick on 5/8” cement backer board on 3-5/8” metal studs at 16” oc. Brace to existing wall as required, third points minimum.”
A546	A/Physics – L3C	Revise the partitions wrapping column E3 from type B1 to type A2.
A551	2/Theater/Dance - East	DELETE Ballet Barre from project.
A563	A/Toilet 225	REVISE the construction of the wall behind the toilet and lavatory from A3 to M3 as shown on the attached sketch AAD 2.08.
A604	7/Window Head & Sill at Additions	REVISE the location of Horizontal Joint Reinforcing to not pierce through wall flashing.
S111		ADD Note 6 and references as shown on ADD S2.01, attached.
S113		ADD Notes as shown on ADD S2.02, attached.
S114		ADD Notes as shown on ADD S2.03, attached.
S115		ADD Notes as shown on ADD S2.04, attached.
S116		ADD Notes as shown on ADD S2.05, attached.
S117		ADD Notes as shown on ADD S2.06, attached.
S117		REVISE as shown on ADD S2.07, attached.
S118		ADD Notes as shown on ADD S2.08, attached.
S119		ADD Notes as shown on ADD S2.09, attached.
S402		ADD Detail as shown on ADD S2.10, attached.
S504		ADD Detail as shown on ADD S2.11, attached.
S501		REVISE Detail as shown on ADD S2.12, attached.
M114	New Work First Floor Plan B – Mechanical Piping	REVISE as shown on the attached sheet
M118	New Work Third Floor Plan B – Mechanical Piping	REVISE as shown on the attached sheet
M119	New Work Third Floor Plan C – Mechanical Piping	REVISE as shown on the attached sheet
M211	New Work Basement & First Floor Plan A – Ductwork	REVISE as shown on the attached sheet
M212	New Work Second & Roof Plan A – Ductwork	REVISE as shown on the attached sheet
M213	New Work Basement Plan B – Ductwork	REVISE as shown on the attached sheet
M215	New Work First Floor Plan C – Ductwork	REVISE as shown on the attached sheet
M219	New Work Third Floor Plan C – Ductwork	REVISE as shown on the attached sheet
M502	Details – Mechanical	REVISE as shown on the attached sheet

M503	Details – Mechanical	REVISE as shown on the attached sheet
P022	Demo Basement Floor Plan B – Plumbing	REVISE as shown on the attached sheet
P113	New Work Basement Plan B – Plumbing	REVISE as shown on the attached sheet
P401	Enlarged Plans – Plumbing	REVISE as shown on the attached sheet
E111	New Work Basement & First Floor Plan A – Lighting	REVISE as shown on the attached sheet
E113	New Work Basement Plan B – Lighting	REVISE as shown on the attached sheet
E117	New Work Second Floor Plan C – Lighting	REVISE as shown on the attached sheet
E118	New Work Third Floor Plan B – Lighting	REVISE as shown on the attached sheet
E119	New Work Third Floor Plan C – Lighting	REVISE as shown on the attached sheet
E313	New Work Basement Plan B – Mechanical Power	REVISE as shown on the attached sheet
E401	Enlarged Floor Plans – Electrical	REVISE as shown on the attached sheet
E600	Electrical Panel Schedules	REVISE as shown on the attached sheet
E601	Electrical Panel Schedules	REVISE as shown on the attached sheet
E602	Electrical Panel Schedules	REVISE as shown on the attached sheet
E603	Electrical Panel Schedules	REVISE as shown on the attached sheet
E604	Electrical Panel Schedules	REVISE as shown on the attached sheet
E605	Electrical Panel Schedules	REVISE as shown on the attached sheet
E606	Electrical Panel Schedules	REVISE as shown on the attached sheet
E608	Electrical Panel Schedules	REVISE as shown on the attached sheet
E610	Lighting Control Schedule	REVISE as shown on the attached sheet
T100		REVISE sheet as shown on the attached sheet including note for service provider conduits and ADD Conduit to Greenhouse as shown on the attached sheet.

END OF ADDENDUM 2

TABLE OF CONTENTS

DIVISION 00 - BIDDING REQUIREMENTS (See separate CAM Construction Bid Manual)

00 0200	NOTICE TO BIDDERS
00 0300	FORM OF PROPOSAL
00 00820	LIST OF BID PACKAGES
00 1015	CAM GENERAL REQUIREMENTS
00 1020	BID PACKAGES
00 1025	MBE REQUIREMENTS
00 1035	WORKFORCE DEVELOPMENT PROGRAM
00 1045	PRELIMINARY PROJECT SCHEDULE
00 1050	WAGE SCALE

VOLUME 1

DIVISION 01 - GENERAL REQUIREMENTS

01 2100.....	ALLOWANCES	3/31/16	3
01 2200.....	UNIT PRICES	3/31/16	3
01 2300.....	ALTERNATES	3/31/16	5
01 2500	SUBSTITUTION PROCEDURES	4/22/16	4
01 2600	CONTRACT MODIFICATION PROCEDURES	4/22/16	3
012900	PAYMENT PROCEDURES	4/22/16	5
013100	PROJECT MANAGEMENT AND COORDINATION	4/22/16	12
013300	SUBMITTAL PROCEDURES	4/22/16	10
01 3516	ALTERATION PROJECT PROCEDURES	4/22/16	5
01 3591.....	HISTORIC TREATMENT PROCEDURES	3/31/16	9
01 4000	QUALITY REQUIREMENTS	4/22/16	10
01 4200	REFERENCES	4/22/16	8
01 5000	TEMPORARY FACILITIES AND CONTROLS	4/22/16	10
01 5639	TEMPORARY TREE AND PLANT PROTECTION	4/22/16	11
01 6000	PRODUCT REQUIREMENTS	4/22/16	5
01 7300	EXECUTION	4/22/16	9
01 7419.....	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.....	3/31/16	10
01 7823	OPERATION AND MAINTENANCE DATA	4/22/16	8
01 7839	PROJECT RECORD DOCUMENTS	4/22/16	5
01 7900	DEMONSTRATION AND TRAINING	4/22/16	6
01 8113	SUSTAINABLE DESIGN REQUIREMENTS	4/22/16	18
01 8119	INDOOR AIR QUALITY REQUIRMENTS	4/22/16	9
01 9113.....	COMMISSIONING GENERAL REQUIREMENTS.....	3/31/16	16

DIVISION 02 - EXISTING CONDITIONS

02 4116.....	STRUCTURE DEMOLITION	3/31/16	7
02 4119.....	SELECTIVE DEMOLITION	3/31/16	8

DIVISION 03 - CONCRETE

03 3000.....	CAST-IN-PLACE CONCRETE.....	3/31/16	20
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DIVISION 04 - MASONRY

04 0310.....	HISTORIC MASONRY CLEANING.....	3/31/16	8
04 0320.....	HISTORIC UNIT MASONRY REPOINTING.....	3/31/16	10
04 0340.....	HISTORIC UNIT MASONRY REPAIR.....	3/31/16	14
04 2000.....	UNIT MASONRY	3/31/16	24
04 4200.....	EXTERIOR STONE TRIM	3/31/16	12
04 7200.....	CAST STONE MASONRY.....	3/31/16	8

DIVISION 05 - METALS

05 0371.....	HISTORIC DECORATIVE METAL CLEANING AND REPAIR.....	3/31/16	6
05 0374.....	HISTORIC DECORATIVE METAL REPLICATION	3/31/16	6
05 1200.....	STRUCTURAL STEEL FRAMING	3/31/16	9
05 3100.....	STEEL DECKING.....	3/31/16	6
05 4000.....	COLD-FORMED METAL FRAMING.....	3/31/16	10
05 5000.....	METAL FABRICATIONS.....	3/31/16	12
05 5113.....	METAL PAN STAIRS	3/31/16	8
05 5213.....	PIPE AND TUBE RAILINGS.....	3/31/16	9
05 5813.....	COLUMN COVERS.....	3/31/16	4

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 1000.....	ROUGH CARPENTRY	3/31/16	8
06 1063.....	EXTERIOR ROUGH CARPENTRY	3/31/16	5
06 2023.....	INTERIOR FINISH CARPENTRY.....	3/31/16	7
06 2530.....	SLOTTED WALL PANEL SYSTEMS.....	3/31/16	8
06 4113.....	WOOD-VENEER-FACED ARCHITECTURAL CABINETS	3/31/16	8

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 0150.19	PREPARATION FOR REROOFING.....	3/31/16	5
07 1326.....	SELF-ADHERING SHEET WATERPROOFING.....	3/31/16	6
07 2100.....	THERMAL INSULATION	3/31/16	4
07 2119.....	FOAMED-IN-PLACE INSULATION	3/31/16	2
07 2600.....	VAPOR RETARDERS	3/31/16	2
07 2726.....	FLUID-APPLIED MEMBRANE AIR BARRIERS	3/31/16	8
07 3113.....	ASPHALT SHINGLES	3/31/16	6
07 4113.16	STANDING-SEAM METAL ROOF PANELS	3/31/16	10
07 5423.....	THERMOPLASTIC POLYOLEFIN (TPO) ROOFING	3/31/16	12
07 6200.....	SHEET METAL FLASHING AND TRIM	3/31/16	10

07 7100.....	ROOF SPECIALTIES	3/31/16	8
07 7200.....	ROOF ACCESSORIES	3/31/16	8
07 8413.....	PENETRATION FIRESTOPPING.....	3/31/16	6
07 8443.....	JOINT FIRESTOPPING	3/31/16	6
07 9200.....	JOINT SEALANTS	3/31/16	9
07 9219.....	ACOUSTICAL JOINT SEALANTS	3/31/16	3
07 9513.13	INTERIOR EXPANSION JOINT COVER ASSEMBLIES.....	3/31/16	6
07 9513.16	EXTERIOR EXPANSION JOINT COVER ASSEMBLIES	3/31/16	4

DIVISION 08 - OPENINGS

08 1113.....	HOLLOW METAL DOORS AND FRAMES.....	3/31/16	10
08 1416.....	FLUSH WOOD DOORS	3/31/16	6
08 3113.....	ACCESS DOORS AND FRAMES.....	3/31/16	4
08 3313.....	COILING COUNTER DOORS	3/31/16	5
08 3323.....	OVERHEAD COILING DOORS	3/31/16	5
08 4113.....	ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS	3/31/16	10
08 4413.....	GLAZED ALUMINUM CURTAIN WALLS	3/31/16	10
08 5113.....	ALUMINUM WINDOWS.....	3/31/16	8
08 7100.....	DOOR HARDWARE	3/31/16	23
08 7113.....	AUTOMATIC DOOR OPERATORS	3/31/16	8
08 8000.....	GLAZING	3/31/16	12
08 8300.....	MIRRORS.....	3/31/16	5
08 9119.....	FIXED LOUVERS.....	3/31/16	6

DIVISION 09 - FINISHES

09 0320.....	HISTORIC TREATMENT OF PLASTER.....	3/31/16	12
09 2116.23	GYPSUM BOARD SHAFT WALL ASSEMBLIES.....	3/31/16	4
09 2216.....	NON-STRUCTURAL METAL FRAMING	3/31/16	7
09 2900.....	GYPSUM BOARD	3/31/16	9
09 3013.....	CERAMIC TILING	3/31/16	8
09 5113.....	ACOUSTICAL PANEL CEILINGS	3/31/16	10
09 5133.....	ACOUSTICAL METAL PAN CEILINGS.....	3/31/16	8
09 6413.....	WOOD FLOORING REFINISHING	3/31/16	6
09 6466.....	WOOD ATHLETIC FLOORING.....	3/31/16	6
09 6513.....	RESILIENT BASE AND ACCESSORIES	3/31/16	6
09 6519.....	RESILIENT TILE FLOORING.....	3/31/16	6
09 6614	RESTORATION OF TERRAZZO FLOORS	3/31/16	4
09 6623.....	RESINOUS MATRIX TERRAZZO FLOORING	3/31/16	7
09 6723.....	RESINOUS FLOORING	3/31/16	6
09 7200.....	PRESENTATION DRY ERASE WALL COVERING.....	3/31/16	4
09 8433.....	SOUND-ABSORBING WALL UNITS	3/31/16	7
09 9113.....	EXTERIOR PAINTING	3/31/16	6
09 9123.....	INTERIOR PAINTING	3/31/16	8

09 9600.....	HIGH-PERFORMANCE COATINGS.....	3/31/16	6
09 9726	EXTERIOR CEMENTITIOUS COATING ON EXISTING CONCRETE	3/31/16	8

DIVISION 10 - SPECIALTIES

10 1100.....	VISUAL DISPLAY UNITS	3/31/16	6
10 1419.....	DIMENSIONAL LETTER SIGNAGE.....	3/31/16	6
10 1423.....	PANEL SIGNAGE	3/31/16	6
10 2113.....	TOILET COMPARTMENTS	3/31/16	4
10 2123.....	CUBICLE CURTAINS AND TRACK.....	3/31/16	4
10 2800.....	TOILET AND BATH ACCESSORIES.....	3/31/16	6
10 4413.....	FIRE EXTINGUISHER CABINETS	3/31/16	4
10 4416.....	FIRE EXTINGUISHERS.....	3/31/16	3
10 5113.....	METAL LOCKERS.....	3/31/16	8
10 5613	METAL STORAGE SHELVING	4/22/16	5
10 7300	TRANSLUCENT CANOPY SYSTEMS	3/31/16	6
10 7516.....	GROUND-SET FLAGPOLES.....	3/31/16	4

DIVISION 11 - EQUIPMENT

11 0000.....	MISCELLANEOUS EQUIPMENT	3/31/16	2
11 3100.....	RESIDENTIAL APPLIANCES.....	3/31/16	5
11 3113.....	COMMERCIAL LAUNDRY EQUIPMENT	3/31/16	4
11 4000	FOOD SERVICE EQUIPMENT	3/31/16	71
11 5123.....	LIBRARY STACK SYSTEMS	3/31/16	5
11 5213.....	PROJECTION SCREENS	3/31/16	4
11 5313.....	LABORATORY FUME HOODS.....	3/31/16	8
11 6143.....	STAGE CURTAINS.....	3/31/16	6
11 6623.....	GYMNASIUM EQUIPMENT.....	3/31/16	9
11 6653.....	GYMNASIUM DIVIDERS	3/31/16	5

DIVISION 12 - FURNISHINGS

12 2413.....	ROLLER WINDOW SHADES	3/31/16	6
12 3216.....	MANUFACTURED PLASTIC-LAMINATE-FACED CASEWORK	3/31/16	8
12 3553.13	METAL LABORATORY CASEWORK	3/31/16	6
12 3553.19	WOOD LABORATORY CASEWORK.....	3/31/16	11
12 3623.13	PLASTIC-LAMINATE-CLAD COUNTERTOPS.....	3/31/16	6
12 3661.16	SOLID SURFACING COUNTERTOPS.....	3/31/16	4
12 4813.....	ENTRANCE FLOOR MATS AND FRAMES.....	3/31/16	3
12 6600.....	TELESCOPING STANDS	3/31/16	6
12 9300	SITE FURNISHINGS	4/22/16	9

DIVISION 13 - SPECIAL CONSTRUCTION

13 0123..... GREENHOUSE 3/31/16 6

DIVISION 14 - CONVEYING EQUIPMENT

14 2123.16 MACHINE-ROOM-LESS ELECTRIC TRACTION PASSENGER 3/31/16 10
ELEVATORS

VOLUME 2

DIVISION 21 – FIRE SUPPRESSION

21 0500 COMMON WORK RESULTS FOR FIRE SUPPRESSION 3/31/16 20
21 1313 AUTOMATIC SPRINKLER SYSTEM 3/31/16 17
21 3000 FIRE PUMPS 3/31/16 9

DIVISION 22 - PLUMBING

22 0513 COMMON MOTOR REQUIREMENTS FOR PLUMBING 3/31/16 2
EQUIPMENT
22 0517 SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING 3/31/16 4
22 0518 ESCUTCHEONS FOR PLUMBING PIPING 3/31/16 2
22 0519 METERS AND GAGES FOR PLUMBING PIPING 3/31/16 5
22 0523 GENERAL-DUTY VALVES FOR PLUMBING PIPING 3/31/16 11
22 0529 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND 3/31/16 10
EQUIPMENT
22 0553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT 3/31/16 6
22 0719 PLUMBING PIPING INSULATION 3/31/16 12
22 1113 FACILITY WATER DISTRIBUTION PIPING 3/31/16 7
22 1116 DOMESTIC WATER PIPING 3/31/16 12
22 1119 DOMESTIC WATER PIPING SPECIALTIES 3/31/16 9
22 1123.13 DOMESTIC WATER PACKAGED BOOSTER PUMPS 3/31/16 6
22 1123 DOMESTIC WATER PUMPS 3/31/16 5
22 1223 FACILITY INDOOR POTABLE – WATER STORAGE TANKS 3/31/16 5
22 1313 FACILITY SANITARY SEWERS 3/31/16 7
22 1316 SANITARY WASTE AND VENT PIPING 3/31/16 12
22 1319 SANITARY WASTE PIPING SPECIALTIES 3/31/16 10
22 1413 FACILITY STORM DRAINAGE PIPING 3/31/16 9
22 1423 STORM DRAINAGE PIPING SPECIALTIES 3/31/16 4
22 1429 SUMP PUMPS 3/31/16 6
22 3600 DOMESTIC WATER GEOTHERMAL WATER-SOURCE HEAT 3/31/16 8
PUMPS
22 4200 COMMERCIAL PLUMBING FIXTURES 3/31/16 25
22 4716 PRESSURE WATER COOLERS 3/31/16 4

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

23 0000 MECHANICAL GENERAL PROVISIONS 3/31/16 8

23 0100	BASIC MECHANICAL MATERIALS AND METHODS	3/31/16	13
23 0513	COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT	3/31/16	3
23 0516	EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING	3/31/16	7
23 0517	SLEEVES AND SLEEVE SEALS FOR HVAC PIPING	3/31/16	5
23 0518	ESCUTCHEONS FOR HVAC PIPING	3/31/16	3
23 0519	METERS AND GAGES FOR HVAC PIPING	3/31/16	11
23 0523	GENERAL-DUTY VALVES FOR HVAC PIPING	3/31/16	9
23 0529	HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT	3/31/16	12
23 0548	VIBRATION AND SEISMIC CONTROL FOR HVAC PIPING AND EQUIPMENT	3/31/16	10
23 0553	IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT	3/31/16	7
23 0593	TESTING, ADJUSTING, AND BALANCING FOR HVAC	3/31/16	21
23 0713	DUCT INSULATION	3/31/16	18
23 0716	HVAC EQUIPMENT INSULATION	3/31/16	13
23 0719	HVAC PIPING INSULATION	3/31/16	19
23 0900	INSTRUMENTATION AND CONTROL FOR HVAC	3/31/16	30
23 1123	FACILITY NATURAL GAS PIPING	3/31/16	20
23 2113.34	THERMAL ENHANCED BENTONITE GROUT	3/31/16	3
23 2113	HYDRONIC PIPING	3/31/16	19
23 2114	GROUND-LOOP HEAT-PUMP PIPING	3/31/16	7
23 2123	HYDRONIC PUMPS	3/31/16	6
23 2300	REFRIGERANT PIPING	3/31/16	14
23 2500	HVAC WATER TREATMENT	3/31/16	9
23 3113	METAL DUCTS	3/31/16	18
23 3300	AIR DUCT ACCESSORIES	3/31/16	17
23 3423	HVAC POWER VENTILATORS	3/31/16	8
23 3713	DIFFUSERS, REGISTERS AND GRILLES	3/31/16	6
23 3813	COMMERCIAL-KITCHEN HOODS	3/31/16	11
23 7333	INDOOR INDIRECT FUEL FIRED HEATING AND VENTILATING UNITS	3/31/13	10
23 7413	OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS	3/31/16	20
23 7433	DEDICATED OUTDOOR AIR UNITS	3/31/16	17
23 8126	SPLIT SYSTEM AIR CONDITIONERS	3/31/16	7
23 8146	WATER SOURCE UNITARY HEAT PUMPS	3/31/16	10
23 8233	CONVECTORS	3/31/16	4
23 8239	UNIT HEATERS	3/31/16	5
DIVISION 26 – ELECTRICAL			
26 0500	GENERAL REQUIREMENTS FOR ELECTRICAL WORK	3/31/16	12
26 0510	ELECTRICAL DEMOLITION FOR RENOVATIONS	3/31/16	4
26 0519	BUILDING WIRE AND CABLE	3/31/16	8
26 0526	GROUNDING AND BONDING	3/31/16	8

26 0529	SUPPORTING DEVICES	3/31/16	5
26 0533	CONDUIT	3/31/16	9
26 0534	BOXES	3/31/16	6
26 0535	SURFACE RACEWAYS	3/31/16	3
26 0553	ELECTRICAL IDENTIFICATION	3/31/16	4
26 0574	ELECTRICAL SYSTEM TESTS	3/31/16	13
26 0920	CONTACTORS	3/31/16	3
26 0933	LIGHTING – PRESET AND DIMMING CONTROL EQUIPMENT	3/31/16	20
26 0934	LIGHTING CONTROL PANELBOARDS	3/31/16	11
26 2200	DRY TYPE TRANSFORMERS	3/31/16	5
26 2413	DISTRIBUTION SWITCHBOARDS	3/31/16	10
26 2416	PANELBOARDS	3/31/16	9
26 2700	ELECTRIC SERVICE	3/31/16	3
26 2726	WIRING DEVICES AND WALL PLATES	3/31/16	11
26 2813	FUSES	3/31/16	3
26 2814	CABINETS AND ENCLOSURES	3/31/16	3
26 2816	DISCONNECT SWITCHES	3/31/16	4
26 2817	CIRCUIT BREAKER ENCLOSURES	3/31/16	6
26 2818	MOLDED CASE CIRCUIT BREAKERS	3/31/16	4
26 2913	ENCLOSED MOTOR CONTROLLERS	3/31/16	5
26 2930	EQUIPMENT WIRING SYSTEMS	3/31/16	9
26 3213	PACKAGED ENGINE GENERATOR SYSTEMS	3/31/16	9
26 3600	AUTOMATIC TRANSFER SWITCH	3/31/16	7
26 4113	LIGHTNING PROTECTION SYSTEMS	3/31/16	4
26 4313	SURGE PROTECTION DEVICES	3/31/16	6
26 5100	LIGHTING	3/31/16	15
26 5561	THEATRICAL LIGHTING AND CONTROLS	3/31/16	11
DIVISION 27 - TECHNOLOGY			
27 0500	TELECOMMUNICATIONS PATHWAYS AND SPACES	3/31/16	8
27 4100	AUDIO VISUAL AND SOUND SYSTEMS	3/31/16	10
27 5000	INTERCOM AND CLOCK	3/31/16	8
DIVISION 28 - SECURITY			
28 1000	ACCESS CONTROL AND INTRUSION DETECTION	3/31/16	8
28 2300	VIDEO SURVEILLANCE SYSTEM	3/31/16	6
28 3100	FIRE DETECTION AND ALARM	3/31/16	30
DIVISION 31 – EARTHWORK			
31 1000	SITE CLEARING	3/31/16	7
31 2000	EARTH MOVING	3/31/16	16
31 2319	DEWATERING	3/31/16	5
31 5000	EXCAVATION SUPPORT AND PROTECTION	4/22/16	5

31 6615 DRILLED HELICAL PILES 3/31/16 8

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 1216 ASPHALT PAVING 3/31/16 9
32 1313 CONCRETE PAVING 3/31/16 15
32 1373 CONCRETE PAVING JOINT SEALANTS 3/31/16 5
32 1400 UNIT PAVING 4/22/16 15
32 1540 CRUSHED STONE PAVING 4/22/16 6
32 1713 PARKING BUMPERS 3/31/16 2
32 1723 PAVEMENT MARKINGS 3/31/16 3
32 1726 TACTILE WARNING SURFACE 3/31/16 3
32 3113 CHAIN LINK FENCE AND GATES 4/22/16 8
32 3119 DECORATIVE METAL FENCE AND GATES 4/22/16 5
32 9113 SOIL PREPARATION 4/22/16 10
32 9200 TURF AND GRASSES 4/22/16 8
32 9300 PLANTS 4/22/16 19

DIVISION 33 - UTILITIES

33 0500 COMMON WORK RESULTS FOR UTILITIES 3/31/16 9
33 4100 STORM UTILITY DRAINAGE PIPING 3/31/16 9

VOLUME 3

APPENDICES (PROVIDED FOR THE CONVENIENCE OF BIDDERS)

A-1 GEOTECHNICAL REPORT 8/28/15
A-2 HAZMAT REPORT – EXISTING BUILDING 7/28/15
A-3 HAZMAT REPORT – EXISTING MODULAR CLASSROOMS 8/4/15
END OF TABLE OF CONTENTS

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012300 "Alternates" for products selected under an alternate.
 - 3. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

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

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that specified product provided for compliance with LEED requirements.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 30 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

- b. Requested substitution does not require extensive revisions to the Contract Documents.
- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Requested substitution provides sustainable design characteristics that specified product provided for compliance with LEED requirements.
- e. Substitution request is fully documented and properly submitted.
- f. Requested substitution will not adversely affect Contractor's construction schedule.
- g. Requested substitution has received necessary approvals of authorities having jurisdiction.
- h. Requested substitution is compatible with other portions of the Work.
- i. Requested substitution has been coordinated with other portions of the Work.
- j. Requested substitution provides specified warranty.
- k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect and Construction Manager.
- 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 4. Section 018113 "Sustainable Design Requirements" LEED 2009 for Schools for administrative requirements governing submittal of cost breakdown information required for sustainable design documentation.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect through Construction Manager at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Contractor's name and address.
 - c. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703.
 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to Architect. The period covered by each Application for Payment is one month, ending on the last day of the month.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- D. Application for Payment Forms: Use AIA Document G702/CMA and AIA Document G703 as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- G. Transmittal: Submit the number requested by the Construction Manager, at least three, signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Sustainable design submittal for project materials cost data.
 4. Contractor's construction schedule (preliminary if not final).

5. Products list (preliminary if not final).
 6. Sustainable design action plans.
 7. Schedule of unit prices.
 8. Submittal schedule (preliminary if not final).
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
- J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project Web site.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
 - 3. Section 019113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.

2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
3. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
 - a. Construction Manager will perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Digital Data Software Program: Drawings are available in Revit 2016.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI to the Construction Manager in the form specified.
 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect and Construction Manager.
 6. RFI number assigned by the Construction Manager, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.

13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect or Construction Manager after 1:00 p.m. will be considered as received the following working day.
 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
 1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect and Construction Manager.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's and Construction Manager's response was received.

- F. On receipt of Architect's and Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.
 - 1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 - 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three days of the meeting.
- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
 - 1. Conduct the conference to review responsibilities and personnel assignments.
 - 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Sustainable design requirements.
 - m. Preparation of record documents.
 - n. Use of the premises.
 - o. Work restrictions.

- p. Working hours.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.
 - x. First aid.
 - y. Security.
 - z. Progress cleaning.
4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Sustainable Design Coordination Conference: Construction Manager will schedule and conduct a sustainable design coordination conference before starting construction, at a time convenient to Owner, Construction Manager, Architect, and Contractor.
- 1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent and sustainable design coordinator; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect meeting sustainable design requirements, including the following:
 - a. Sustainable design Project checklist.
 - b. General requirements for sustainable design-related procurement and documentation.
 - c. Project closeout requirements and sustainable design certification procedures.
 - d. Role of sustainable design coordinator.
 - e. Construction waste management.
 - f. Construction operations and sustainable design requirements and restrictions.
 - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- D. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, Construction Manager, and Owner's Commissioning Authority of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.

- b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- E. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.

- b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for completing sustainable design documentation.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - j. Submittal procedures.
 - k. Coordination of separate contracts.
 - l. Owner's partial occupancy requirements.
 - m. Installation of Owner's furniture, fixtures, and equipment.
 - n. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- F. Progress Meetings: Construction Manager will conduct progress meetings at biweekly intervals.
1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site utilization.

- 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- G. Coordination Meetings: Construction Manager will conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.

- 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 4. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and Construction Manager and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's and Construction Manager's final release or approval.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for purchasing.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in Revit 2016 and AutoCad.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
 - d. The following digital data files will be furnished for each appropriate discipline:

- 1) Floor plans.
 - 2) Reflected ceiling plans.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect and Construction Manager reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., Poole-061000.01).

Resubmittals shall include an alphabetic suffix after another decimal point (e.g., Poole-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect and Construction Manager.
 4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name of Contractor.
 - d. Name of firm or entity that prepared submittal.
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Related physical samples submitted directly.
 - m. Indication of full or partial submittal.
 - n. Transmittal number.
 - o. Submittal and transmittal distribution record.
 - p. Other necessary identification.
 - q. Remarks.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Construction Manager on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's and Construction Manager's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's and Construction Manager's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Submit electronic submittals via email as PDF electronic files or as directed by Construction Manager.
 - a. Architect, through Construction Manager, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:
 - a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
 4. BIM File Incorporation: Develop and incorporate Shop Drawing files into Building Information Model established for Project.
 - a. Prepare Shop Drawings in the following format: Same digital data software program, version, and operating system as the original Drawings Revit 2016.
 - b. Refer to Section 013100 "Project Management and Coordination" for requirements for coordination drawings.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Project Name
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect and Construction Manager will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.

5. Submit product schedule in the following format:
 - a. PDF electronic file.
- F. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."
- H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."
- I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."
- J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."
- L. Sustainable Design Submittals: Comply with requirements specified in Section 018113 "Sustainable Design Requirements - LEED 2009 for Schools."
- M. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- N. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- O. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- P. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- Q. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- R. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

- S. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- T. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. BIM File Incorporation: Incorporate delegated-design drawing and data files into Building Information Model established for Project.

1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect and Construction Manager.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S AND CONSTRUCTION MANAGER'S ACTION

- A. Action Submittals: Architect and Construction Manager will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect and Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Architect and Construction Manager will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect and Construction Manager will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect and Construction Manager].
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300

SECTION 013516 - ALTERATION PROJECT PROCEDURES

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 special procedures for alteration work.

1.3 DEFINITIONS

- A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. Consolidate: To strengthen loose or deteriorated materials in place.
- C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- K. Retain: To keep existing items that are not to be removed or dismantled.

- L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.4 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.
 - 1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed.

1.5 INFORMATIONAL SUBMITTALS

- A. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

1.6 QUALITY ASSURANCE

- A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
 - 1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
 - a. Construct new mockups of required work whenever a supervisor is replaced.
- B. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.
- C. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.7 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:
 - 1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.

2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F or more above the dew point.

E. Storage Space:

1. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.8 FIELD CONDITIONS

- A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of preconstruction photographs.
- B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
 - 3. Erect temporary barriers to form and maintain fire-egress routes.
 - 4. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 - 5. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
 - 6. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

- B. Temporary Protection of Materials to Remain:
 - 1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 - 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

- D. Utility and Communications Services:
 - 1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
 - 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
 - 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

- E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.
 - 1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.

2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION DURING APPLICATION OF CHEMICALS

- A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.
- B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.
- C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.
- E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.3 GENERAL ALTERATION WORK

- A. Have specialty work performed only by qualified specialists.
- B. Ensure that supervisory personnel are present when work begins and during its progress.
- C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs.
- D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
 1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 013516

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified

installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
 2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
 3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
 - 2. .

- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 - 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

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

- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, through Construction Manager, with copy to Contractor. Interpret tests and

inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Construction Manager.
 2. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- D. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. **Testing Agency Responsibilities:** Cooperate with Architect, Commissioning Authority, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect, Commissioning Authority, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify

agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, Commissioning Authority, , Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's, and Construction Manager's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

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

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC - Associated Air Balance Council; www.aabc.com
 - 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 - 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 - 7. ABMA - American Boiler Manufacturers Association; www.abma.com.
 - 8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
 - 9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 - 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 - 11. AF&PA - American Forest & Paper Association; www.afandpa.org.
 - 12. AGA - American Gas Association; www.aga.org.
 - 13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 - 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 - 15. AI - Asphalt Institute; www.asphaltinstitute.org.
 - 16. AIA - American Institute of Architects (The); www.aia.org.
 - 17. AISC - American Institute of Steel Construction; www.aisc.org.
 - 18. AISI - American Iron and Steel Institute; www.steel.org.
 - 19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 - 20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 - 21. ANSI - American National Standards Institute; www.ansi.org.
 - 22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 - 23. APA - APA - The Engineered Wood Association; www.apawood.org.
 - 24. APA - Architectural Precast Association; www.archprecast.org.
 - 25. API - American Petroleum Institute; www.api.org.
 - 26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).

27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.

70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.
84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarooft.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.
88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; www.iec.ch.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.

113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.
122. MBMA - Metal Building Manufacturers Association; www.mbma.com.
123. MCA - Metal Construction Association; www.metalconstruction.org.
124. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
125. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
126. MHIA - Material Handling Industry of America; www.mhia.org.
127. MIA - Marble Institute of America; www.marble-institute.com.
128. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
129. MPI - Master Painters Institute; www.paintinfo.com.
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
131. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
133. NADCA - National Air Duct Cleaners Association; www.nadca.com.
134. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
135. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
136. NBI - New Buildings Institute; www.newbuildings.org.
137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
138. NCMA - National Concrete Masonry Association; www.ncma.org.
139. NEBB - National Environmental Balancing Bureau; www.nebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
141. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
142. NEMA - National Electrical Manufacturers Association; www.nema.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.
145. NFPA - National Fire Protection Association; www.nfpa.org.
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; www.nfrc.org.
148. NHLA - National Hardwood Lumber Association; www.nhla.com.
149. NLGA - National Lumber Grades Authority; www.nlga.org.
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
151. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
152. NRCA - National Roofing Contractors Association; www.nrca.net.
153. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
154. NSF - NSF International; www.nsf.org.
155. NSPE - National Society of Professional Engineers; www.nspe.org.
156. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.

158. NWFA - National Wood Flooring Association; www.nwfa.org.
159. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
160. PDI - Plumbing & Drainage Institute; www.pdionline.org.
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
162. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
163. RFCI - Resilient Floor Covering Institute; www.rfci.com.
164. RIS - Redwood Inspection Service; www.redwoodinspection.com.
165. SAE - SAE International; www.sae.org.
166. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
167. SDI - Steel Deck Institute; www.sdi.org.
168. SDI - Steel Door Institute; www.steeldoor.org.
169. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; www.siaonline.org.
172. SJI - Steel Joist Institute; www.steeljoist.org.
173. SMA - Screen Manufacturers Association; www.smainfo.org.
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
175. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
176. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
177. SPIB - Southern Pine Inspection Bureau; www.spib.org.
178. SPRI - Single Ply Roofing Industry; www.spri.org.
179. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
180. SSINA - Specialty Steel Industry of North America; www.ssina.com.
181. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
182. STI - Steel Tank Institute; www.steeltank.com.
183. SWI - Steel Window Institute; www.steelwindows.com.
184. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
185. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
186. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
190. TMS - The Masonry Society; www.masonrysociety.org.
191. TPI - Truss Plate Institute; www.tpinst.org.
192. TPI - Turfgrass Producers International; www.turfgrasssod.org.
193. TRI - Tile Roofing Institute; www.tilerroofing.org.
194. UL - Underwriters Laboratories Inc.; www.ul.com.
195. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
196. USAV - USA Volleyball; www.usavolleyball.org.
197. USGBC - U.S. Green Building Council; www.usgbc.org.
198. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
199. WASTEC - Waste Equipment Technology Association; www.wastec.org.
200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
201. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.

202. WDMA - Window & Door Manufacturers Association; www.wdma.com.
203. WI - Woodwork Institute; www.wicnet.org.
204. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
205. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
 3. DSCC - Defense Supply Center Columbus; (See FS).
 4. FED-STD - Federal Standard; (See FS).
 5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
 6. MILSPEC - Military Specification and Standards; (See DOD).
 7. USAB - United States Access Board; www.access-board.gov.
 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 3. CDHS; California Department of Health Services; (See CDPH).
 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservation.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 321216 "Asphalt Paving" for construction and maintenance of asphalt pavement for temporary roads and paved areas.
 - 2. Section 321313 "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts.

- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide bases for supporting posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

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

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures".
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- H. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Connect temporary service to Owner's existing power source, as directed by Owner.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- J. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
 - 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine in each field office.
 - 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.
 - 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 321216 "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Provide temporary parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

- a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touchup signs so they are legible at all times.
 - H. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
 - I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
 - J. Temporary Elevator Use: Use of elevators is not permitted.
 - K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
 - L. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
 - M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.
- 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION
- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Section 011000 "Summary."
 - C. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Section 311000 "Site Clearing."
 - D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."
- G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- H. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use permanent HVAC system to control humidity.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

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 general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction. Work is to be coordinated with Site & Landscape Improvements and Tree Preservation Plans and details
- B. Related Requirements:
 - 1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
 - 2. Section 311000 "Site Clearing" for removing existing trees and shrubs.

1.3 DEFINITIONS

- A. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape or the average of the smallest and largest diameters at a height 54 inches above the ground line.
- B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Tree-service firm's personnel and equipment needed to make progress and avoid delays.
 - b. Arborist's responsibilities.
 - c. Quality-control program.
 - d. Coordination of Work and equipment movement with the locations of protection zones.
 - e. Trenching by hand or with air spade within protection zones.
 - f. Field quality control.

- g. Tree root protection matting and trunk protection.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Indicate extent of trenching by hand or with air spade within protection zones.
- C. Samples: For each type of the following:
 - 1. Organic Mulch: 1-quart volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
- D. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
 - 1. Species and size of tree.
 - 2. Location on site plan. Include unique identifier for each.
 - 3. Reason for pruning.
 - 4. Description of pruning to be performed.
 - 5. Description of maintenance following pruning.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For arborist and tree service firm.
 - 1. Contract Arborist shall submit project references from a minimum 3 high profile projects of tree preservation with mature trees within the Mid Atlantic region that demonstrates experience and competence with the full range of work of this Section.
- B. Tree Preservation Action Report: Certification from contract arborist for each Phase, pre-construction, mid construction and post construction, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- C. Tree Preservation Program: From contract arborist, Protection and Stress Reduction Measures and Coordination and Oversight of the Tree Protection and Preservation Program by the Project Arborist during construction and through the project plant and maintenance warranty period. This work shall include but is not limited to the following:
 - 1. Coordination of Temporary Tree and Plant Protection
 - 2. Selective tree removals for Removal by Arborist (RBA) within Plant Protection Areas (PPAs).
 - 3. Pruning and Supportive cabling.
 - 4. Root pruning.
 - 5. Temporary tree protection fencing(TPF)
 - 6. Tree protection sign installation

7. Temporary Mulching
8. Liquid subsurface fertilization Biostimulent / soil conditioners
9. Plant Growth Regulator (Paclobutizol)
10. Radial Aeration / Vertical Mulching
11. Soil Biological Testing and Multiple Amendments
12. Temporary Root Protection for construction access
13. Root Aeration Mat for permanent grade fills and walks
14. Seasonal Supplemental Watering (On-site water may be used.)
15. Monitor and Implement Tree Health Measures (2 visits during construction period and 2 visits during plant and maintenance warranty period. Recommendations shall be approved by the owner prior to implementation.)
16. Supersonic Air tool (SSAT) Excavation within TPAs
17. Contingency for Remedial Measures after construction

D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or video recordings including references for scale.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

E. The Project Arborist shall submit soil sample for analysis during May through June. Take representative soil samples and combine from soil inside extent of crown of tree. Samples and procedures as follows. Forward reports to Architect and Owner:

1. Soil Foodweb New York, Inc.
1645 Washington Ave.
Bohemia, NY 11716
Ph: 631-750-1553, Fax: 631-750-1554
soilfoodwebny@aol.com
2. Approved equal testing company that can perform and analyze soils similar to the Soil Foodweb New York Bacterial and Fungi assays tests
 - a. Test to include total active amounts of fungi and bacteria in soil sample.
 - b. The test is to provide recommendations to adjust soil imbalances.
 - c. Soil samples to include a minimum of three 1" diameter core samples of the upper 3' of soil.
 - d. Soil samples are to be mixed, placed in a gallon size sealable plastic bag, and sent via next day mail to testing lab.

F. Quality-control program.

1.7 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA and Maryland Licensed Tree Expert.

- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.8 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Permitting grading operations or geo thermal well drilling operations or cleaning operations to drain to and in the plant protection areas.
 - 2. Storage of construction materials, debris, or excavated material.
 - 3. Moving or parking vehicles or equipment.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
 - 8. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Backfill Soil: Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
 - 1. Planting Soil: Planting soil A as specified in Section 329113 "Soil Preparation"
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
 - 1. Type: Shredded hardwood or wood and bark chips from on-site tree removal operations.
 - 2. Size Range: 3 inches maximum, 1/2 inch minimum.

3. Aged a minimum of six months
 4. Color: Natural. Dyed Mulch will be rejected.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements: Previously used materials may be used when approved by Architect.
1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch-diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch-OD line posts, and 2-7/8-inch-OD corner and pull posts; with 1-5/8-inch-OD top rails or with 0.177-inch-diameter top tension wire and 0.177-inch-diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
 - a. Height: 72 inches and matching site construction fencing.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
1. Size and Text: As shown on Drawings.
 2. Lettering: black characters on white background.
- E. Temporary Trunk Protection: Wood boards wrapping the trunk of specified trees to remain and meeting the following requirements: Previously used materials may be used when approved by Architect.
1. Trunk Protection-Boards: Constructed of two 2-by-4-inch by 8' boards, abutting one another wrapping around the entire trunk firmly tied with rope in three equidistant places along the length of board.
 - a. The boards shall be sufficiently tight to protect the tree trunk during construction while loose enough to allow for tree movement and growth.
 - b. Boards shall be placed on the top of the root flare and extend up 8' or to the nearest branch.
- F. Root Aeration / Protection Matting: triple ply geo-composites consisting of inner permeable layer of high density polypropylene construction attached to outer layers of non-woven permeable fabric. Exact specifications or combinations of products to be determined by geotechnical professional in collaboration with qualified arborist based upon original soil characteristics and loading potential for use in specific tree preservation activities. Biaxial geo-grid layer may be added for additional stabilization upon recommendation by geotechnical professional.
1. Root Aeration Matting: material shall be AmerDrain® 700 perforated sheet drain or approved equivalent. (Manufacturer: American Wick Drain Corporation, 1209 Airport Road, Monroe, NC 28110; 1-800-242-WICK; www.americanwick.com)
 2. Root Protection Matting: material shall be Tenax Tendrain 750/2 tri-planar geonet or approved equivalent. (Manufacturer: Tenax Corporation, 4800 East Monument St., Baltimore, MD 21205; 1-800-356-8495; www.tenaxus.com)
 3. Biaxial Geogrid: several types of Tensar® Biaxial (BX) Geogrids or similar. Specific material to be determined by project engineer for specific applications. (Manufacturer: Tensar International Corporation, 5883 Glenridge Drive, Suite 200, Atlanta, GA 30328-5363, 1-888-828-5126; www.tensarcorp.com)

- G. Hardwood Borer Control: Imidacloprid such as *Merit* or equivalent.
- H. Subsurface Fertilization / Soil Biostimulant: “PHC for Trees, Nutrient Management System” or equivalent: 27-9-9, consisting of the following components: Nitrogen from Urea formaldehyde, Urea, Potassium Phosphate, Potassium Nitrate, Boric Acid, Iron EDTA, Manganese EDTA, Zinc EDTA, Copper EDTA, Ammonium Molybdate, Potential Acidity of 920 lbs of Calcium Carbonate equivalent per ton, Soluble Humates derived from Leonardite, Soluble Seaweed Extract, Natural Sugars, B-Vitamins, RZ-3 Surfactant, Rhizosphere Bacteria. Wetting agent or adjuvant must be included.
- I. Compost tea: A mixture of water, compost, and other additives conducive to the rapid reproduction of bacteria, fungi, and other organisms as defined below, brewed while being infused with air. Compost tea shall be made and applied by a contractor, approved by the Project Arborist, experienced in the production and application of compost tea for use in landscape applications.
1. Water shall be de-chlorinated by allowing the water to sit in an open topped vat for a minimum of 24 hours to allow the chlorine to evaporate.
 2. Compost and other additives shall be capable of producing the following levels of organisms after 24 hours of brewing. Levels of organisms in the tea shall be confirmed by assay performed by Soil Foodweb New York, Inc, phone 631 750 1553 or approved equivalent.
Decomposers
Active bacterial biomass 10 – 150 ug per ml
Total bacterial biomass 150 - 3000 ug per ml
Active fungal biomass 2 - 10 ug per ml
Total fungal biomass 2 - 20 ug per ml

Predators - Protozoa and Nematodes
Flagellates 1000 per ml
Amoebae 1000 per ml
Ciliates 20 - 50 per ml
Nematodes 2 - 10 per ml (no root feeders)
E-coli should be undetectable.
 3. Infuse air continuously thru the brewing liquid during the brewing and storage period. Maintain 6 ppm oxygen during the brew cycle and storage period.
 4. Tea should be applied no later than 8 hours after the completion of brewing.
 5. Brewed compost tea is a concentrated material and must be diluted as required in section “Installation of Compost Tea”.
- J. Liquid Kelp: Nature’s Essence LSC or equivalent; Nature’s Essence SEP powdered Seaweed extract
- K. Fish hydrolysate such as FH 2-3-1 or equivalent.
- L. Granular Humate such as Hum- Amend SG or equivalent
- M. Liquid Humate: Terra Vita SP-90 soluble humic acid powder or liquid form- Terra Vita LC-10 Plus 7 or equivalent.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. The project arborist shall prepare a written report listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a 1-inch blue vinyl tape around each tree trunk at 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
 - 1. Apply 4-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

3.3 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 - 1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
 - 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
 - 3. Access Gates: Install one set; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
 - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments or vibratory knife; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Cut Ends: Do not paint cut root ends.

3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 4. Cover exposed roots with burlap and water regularly.
 5. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune tree roots 12 inches outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches under direction of project arborist and as directed by arborist.
1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
 2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
 3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
 - a. Type of Pruning: Cleaning and raising where indicated.
- B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.
- C. Cut branches with sharp pruning instruments; do not break or chop.
- D. Do not paint or apply sealants to wounds.
- E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.
- F. Chip removed branches and spread over areas identified by Architect.

3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots less than ½” diameter. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 12 inches or less below elevation of finish grade, fill with planting soil mix. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.
- E. Root Protection Mat (RPM)
1. The purpose of the Root Protection Mat is to reduce compaction, rutting, and contamination of soils and root systems for specimen trees of high impact within the preservation area should staging, temporary stockpile, or equipment access be required due to extreme site constraints.
 2. Trees anticipated receiving temporary or repetitive materials staging, footing traffic, or equipment access within protected root zone are to receive triple ply root protection geonet mat. Wood chip mulch 2-4" is often incorporated under matting for high impact trees.
 3. If short duration access is needed such as one day or less, the use of "Alturamats", 3/4" plywood sheathing, or 1" steel plate may be needed to avoid rutting and compaction. These materials may be shifted and re-used as work progresses.
 4. All-weather staging, stockpile, or other repetitive construction operations may require 12" stone layer over RPM to allow heavy vehicles have the potential to cause dynamic compaction yet without rutting original surface soils and roots. In this situation the stone may be contained by silt fence or super silt fence where adjacent to or within a TPA.
 5. All temporary Root Protection Mat areas to be used beyond a single day or beyond continuous on site supervision of the Project Arborist shall be surrounded by temporary tree protection fence as per specifications. For temporary staging of soils beyond 24 hours "trenchless" silt fence fabric shall be installed on the lower / downhill side or as directed by the Project Arborist.

3.8 VERTICAL MULCHING

- A. Decompact extent of excavated pavement areas to be planted areas using a an air spade or soil auger within excavation limits defined in Section 31200 " Earth Moving" and in areas indicated on the documents.
1. Auger holes 12-18" deep, 2" diameter and 24" on center.
 2. Fill Auger holes with 50 sand and 50 backfill soil mixture.

3.9 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.10 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

- B. Trees: Remove and replace trees indicated to remain that are more than [25] percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
 - 1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 4 inches or smaller in caliper size.
 - 2. Large Trees: Provide an equivalent number of new tree(s) of 4-inch caliper size totaling the cumulative caliper inches of each tree being replaced that measures more than 4 inches in caliper size.
 - a. Species: As selected by Architect.
 - 3. Plant and maintain new trees as specified in Section 329300 "Plants."

- C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 4-inch uniform thickness to remain.

- D. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch-diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 015639

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012300 "Alternates" for products selected under an alternate.
 - 3. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 4. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting surveys.
 - 2. Section 017700 "Closeout Procedures" for recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 3. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
 - 4. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

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

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

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.

- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

- 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

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

3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

END OF SECTION 017300

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Section 019113 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.

1.3 DEFINITIONS

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

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file for draft and final submittals. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 2. Three paper copies for final submittal. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect, through Construction Manager, will return all copies.
- C. Initial Manual Submittal: Submit draft electronic copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.
1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve

on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

- a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 1. Instructions on stopping.

2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."

- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Section 017300 "Execution" .
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints and one of file prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit record digital data files and three set(s) of record digital data file plots.
 - 2) Plot each drawing file, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

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

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 2. Format: Annotated PDF electronic file.
 3. Refer instances of uncertainty to Architect through Construction Manager for resolution.
 4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Format: Annotated PDF electronic file.
 2. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect and Construction Manager.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 - 5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

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

2.4 MISCELLANEOUS RECORD SUBMITTALS

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

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.

- d. Name of Construction Manager.
- e. Name of Contractor.
- f. Date of video recording.
2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

- a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
2. Documentation: Review the following items in detail:
- a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
- a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
- a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.

- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
 - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
 - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
 - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
 - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.

- c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 017900

SECTION 01 8113 - SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general requirements and procedures for achieving the most environmentally conscious Work possible within the limits of the Construction Schedule, Contract Sum, and available materials, equipment, and products.
 - 1. Specific requirements for LEED are also included in other Sections.
 - 2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
 - 3. A copy of the LEED Project checklist is attached at the end of this Section for information only.
 - 4. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.

1.2 OBJECTIVES

- A. MSA has registered this project with the United States Green building Council (USGBC) to qualify for LEED™ (Leadership in Energy and Environmental Design) Certification. This rating system represents the most comprehensive, sustainable guideline available and the owner requested the project be designed and built to achieve a LEED Gold Level rating. LEED Certification Level requires a minimum of 50 points based on the LEED scorecard. Refer to the LEED Green Building Design & Construction version 2009 reference guide (available from the www.usgbc.org), and the project scorecard (*at the end of this section*) for specific credits to be achieved, design intention, and construction practices to be followed throughout the course of the project.
- B. To minimize the environmental impacts of the construction and operation, the Contractor during the construction phase of this project shall implement the following procedures singly or in combination:
 - 1. Select products that minimize consumption of non-renewable resources consume reduced amounts of energy and minimize amounts of pollution to produce, and employ recycled and/or recyclable materials.
 - 2. Control sources for potential IAQ pollutants by controlled selection of materials and processes used in project construction in order to attain superior IAQ.
 - 3. Products and processes that achieve the above objectives to the extent currently possible and practical have been selected and included in these Construction Documents. The Contractor is responsible to maintain and support these objectives in developing means and methods for performing the work of this Contract and in proposing product substitutions and/or changes to specified processes.

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
 - 1. Divisions 2 through 33 Sections for Sustainable Design Requirements specific to the Work of each of those Sections.
 - 2. 01 7419 Construction Waste Management
 - 3. 01 8119 Indoor Air Quality Requirements
 - 4. 01 9113 General Commissioning Requirements

1.4 DEFINITIONS

- A. Agrifiber Products: Composite panel products derived from agricultural fiber
- B. Biobased Content: The weight of the biobased material divided by the total weight of the product and expressed as a percentage by weight
- C. Biobased Product: As defined in the 2002 Farm Bill, a product determined by the Secretary to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials
- D. Certificates of Chain-of-Custody: Certificates signed by manufacturers certifying that wood used to make products has been tracked through its extraction and fabrication to ensure that it was obtained from forests certified by a specified certification program
- E. Composite Wood: A product consisting of wood fiber or other plant particles bonded together by a resin or binder
- F. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations. A construction waste management plan is to be provided by the Contractor as defined in Section 01 7419.
- G. LEED: The Leadership in Energy & Environmental Design green building rating systems developed and adopted by the U.S. Green Building Council (USGBC). The systems certify levels of environmental achievement based on a point and credit scoring system.
- H. LEED EB: The Leadership in Energy & Environmental Design green building rating system developed and adopted by the USGBC for operating and maintaining existing buildings
- I. LEED Schools: The Leadership in Energy & Environmental Design green building rating system developed and adopted by the USGBC for new construction and major renovations of academic buildings for K-12.
- J. Light Pollution: Light that extends beyond its source such that the additional light is wasted in an unwanted area or in an area where it inhibits view of the night sky.

- K. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use
- L. Pre-Consumer Recycled Content: Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream as per Section 5 of the FTC Act, Part 260 "Guidelines for the Use of Environmental Marketing Claims": www.ftc.gov/bcp/grnrule/guides980427
- M. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock
- N. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 500 miles from the Project site
- O. Salvaged or Reused Materials: Materials extracted from existing buildings in order to be reused in other buildings without being manufactured
- P. Sealant: Any material that fills and seals gaps between other materials
- Q. Type 1 Finishes: Materials and finishes which have a potential for short-term levels of off-gassing from chemicals inherent in their manufacturing process, or which are applied in a form requiring vehicles or carriers for spreading which release a high level of particulate matter in the process of installation and/or curing.
- R. Type 2 Finishes: "Fuzzy" materials and finishes which are woven, fibrous, or porous in nature and tend to adsorb chemicals off-gassed by Type 1 finishes or may be adversely affected by particulates. These materials become "sinks" for deleterious substances which may be released much later, or collectors of contaminants that may promote subsequent bacterial growth.
- S. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.

1.5 REFERENCED STANDARDS:

- A. ASHRAE/IESNA 90.1- 2007 Energy Standard for Buildings (www.ashrae.org)
- B. ASHRAE 62.1-2007 Ventilation for Acceptable Indoor Air Quality
- C. ASHRAE 55-2004, Thermal Environmental Conditions for Human Occupancy
- D. ASHRAE Reference Guide Chapter 11, for energy analysis
- E. SMACNA – IAQ Guidelines for Occupied Buildings Under Construction, 1995, chapter 3
- F. SCAQMD: South Coast Air Quality Management District Rule #1168, Adhesives, Sealants, Primers

- G. GreenSeal Standard 36 (GS-36) October, 2000, Commercial Adhesive
- H. GreenSeal Standard GS-11, Paint
- I. GreenSeal Standard GS-3, Anti-corrosive Paints
- J. Carpet and Rug Institute Green Label Plus Testing Program
- K. FloorScore
- L. South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings
- M. USDOE IPMVP – International Performance Measurement
- N. USGBC: United States Green Building Council, the governing body that is responsible for certifying, recording and tracking LEED rated projects

1.6 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site. Review LEED requirements and action plans for meeting requirements.

1.7 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect and the USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application. Document responses as informational submittals.
- B. Submit documentation to USGBC and respond to questions and requests from USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application.
 - 1. Document correspondence with USGBC as informational submittals.

1.8 SUBMITTALS

- A. General: Additional Sustainable Design submittal requirements are included in other sections of the Specifications.
- B. Sustainable Design Submittals:
 - 1. SS7.2 Heat Island Effect:
 - a. Roofing Materials: Submittals for roofing materials must include manufacturer's cut sheets or product data highlighting the Solar Reflectance Index (SRI) of the material.
 - 2. WEp1 and WEc 3 - Water Conserving Fixtures: Submittals must include manufacturer's cut sheets for all water-consuming plumbing fixtures and fittings (toilets, urinals, faucets, showerheads, etc.) highlighting maximum flow rates and/or flush rates. Include cut sheets for any automatic faucet-control devices.
 - 3. Process Water Use: Provide manufacturer's cut sheets for all water-consuming commercial equipment (clothes washers, dishwashers, ice machines, etc.), highlighting water consumption performance. Include manufacturer's cut sheets or product data for any cooling towers, highlighting water consumption estimates, water use reduction measures,

- and corrosion inhibitors.
4. Elimination of CFCs AND HCFCs: Provide manufacturer's cut sheets for all cooling equipment with manufacturer's product data, highlighting refrigerants; ; provide manufacturer's cut-sheets for all polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation, highlighting the blowing agent(s).
 5. Appliances and Equipment: Provide copies of manufacturer's product data for all Energy Star eligible equipment and appliances, , and commercial food service equipment (excluding HVAC and lighting components), verifying compliance with EPA's Energy Star program.
 6. EAc5 - Measurement and Verification Systems: Provide cut sheets and manufacturer's product data for all controls systems, highlighting electrical metering and trending capability components.
 7. MRc4 - Recycled Content: Submittals for all materials with recycled content (excluding MEP systems equipment and components) must include the following documentation:
 - a. Cost of each material or product, excluding cost of labor and equipment for installation
 - b. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product
 - c. The USGBC BD+C Material and Resource Calculator that tabulates the Project's total materials cost and combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value) expressed as a percentage of total materials cost. This spreadsheet shall be submitted every month with the Contractor's Certificate and Application for Payment. It should indicate, on an ongoing basis, line items for each material, including cost, pre-consumer recycled content, post-consumer recycled content, and combined recycled content value.
 8. MRc5 - Regional Materials: Submittals for all products or materials expected to contribute to the regional calculation (excluding MEP systems equipment and components) must include the following documentation:
 - a. Cost of each material or product, excluding cost of labor and equipment for installation
 - b. Location of product manufacture and distance from point of manufacture to the Project Site
 - c. Location of point of extraction, harvest, or recovery for each raw material in each product and distance from the point of extraction, harvest, or recovery to the Project Site
 - d. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of manufacture for each regional material
 - e. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of extraction, harvest, or recovery for each regional material or product, including, at a minimum, gravel and fill, planting materials, concrete, masonry, and GWB
 - f. The USGBC BD+C Material and Resource Calculator that tabulates the Project's total materials cost and regional materials value, expressed as a percentage of total materials cost. This spreadsheet shall be submitted every third month with the Contractor's Certificate and Application for Payment. It

should indicate on an ongoing basis, line items for each material, including cost, location of manufacture, distance from manufacturing plant to the Project Site, location of raw material extraction, and distance from extraction point to the Project Site.

9. MRc7 - Biobased Products:
 - a. Certified Wood: Submittals for all wood-based materials must include a statement indicating the cost of each product containing FSC Certified wood, exclusive of labor and delivery costs, and third party verification of certification from one of the following:
 - 1) Certificates of chain-of-custody from manufacturers certifying that specified certified wood products were made from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2 "Principles and Criteria." Letter from approved Canadian Standards Association (CSA) supplier for verifying compliance with CSA Standard Z809-02 and Standard CSA Plus 1163.
 - 2) Documentation from the supplier verifying that 100% of the wood-based content originates from SFI third-party certified forest lands, identifying the company or companies that performed the SFI third-party certification for both the forest land management and the certified product content.
10. IEQc1 - Outdoor Air Delivery Monitoring: Provide manufacturer's cut sheets highlighting the installed carbon dioxide monitoring system components and sequence of controls shop drawing documentation, including CO₂ differential set-points and alarm capabilities.
11. IEQc4.1 - Interior Adhesives and Sealants: Submittals for all field-applied adhesives and sealants, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content.
 - a. Provide manufacturers' documentation verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain no urea-formaldehyde.
12. IEQc4.2 - Interior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content
13. IEQc4.2 - Exterior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on ambient air quality, must include manufacturer's MSDSs or other manufacturer's Product Data highlighting VOC content.
14. IEQc4.3 - Floorcoverings:
 - a. Carpet Systems: Submittals for all carpet must include the following:
 - 1) Manufacturer's product data verifying that all carpet systems meet or exceed the testing and product requirements of the Carpet and Rug Institute Green Label Plus program.
 - b. Resilient Flooring: Submittals for all resilient floorcovering must include manufacturer's product data verifying certification under either the Greenguard for Children & Schools or FloorScore indoor emissions testing program.
15. IEQc4.4 - Composite Wood and Agrifiber Binders: Submittals for all composite wood and agrifiber products (including but not limited to particleboard, wheatboard, strawboard, agriboard products, engineered wood components, solid-core wood doors, OSB, MDF, and plywood products) must include manufacturer's product data verifying that these products contain no urea-formaldehyde resins.

16. IEQc5 - Entryway Systems: Provide manufacturer's cut sheets for all walk-off systems installed to capture particulates, including permanently installed grates, grilles, slotted systems, direct glue-down walk-off mats, and non-permanent roll-out mats.
 17. IEQc3.1 - Air Filtration: Provide manufacturer's cut sheets and product data highlighting the following:
 - a. Minimum Efficiency Reporting Value (MERV) for filtration media in all air handling units (AHUs)
 - b. Minimum Efficiency Reporting Value (MERV) for filtration media installed at return air grilles during construction if permanently installed AHUs are used during construction
 18. Mercury in Lighting: Provide manufacturer's cut sheets or product data for all fluorescent or HID lamps highlighting mercury content.
 19. IEQc6.2 - Lighting Controls: Provide manufacturer's cut sheets and shop drawing documentation highlighting all lighting controls systems components.
 20. IEQc7.1 - Thermal Comfort Controls: Provide manufacturer's cut sheets and shop drawing documentation highlighting all thermal comfort-control systems components.
 21. MRc4 - Blended Cement: It is the intent of this specification to reduce CO₂ emissions and other environmentally detrimental effects resulting from the production of portland cement by requiring that all concrete mixes, in aggregate, utilize blended cement mixes to displace 40% of the portland cement typically included in conventional construction.
 - a. Provide the following submittals:
 - 1) Copies of concrete design mixes for all installed concrete
 - 2) Copies of typical regional baseline concrete design mixes for all compressive strengths used on the Project
 - 3) Quantities in cubic yards of each installed concrete mix
 22. Gypsum Wall Board: Provide manufacturer's cut sheets or product data verifying that all gypsum wallboard products are moisture and mold-resistant.
 23. Fiberglass Insulation: Provide manufacturer's cut sheets or product data verifying that fiberglass batt insulation contains no urea- formaldehyde.
 24. Duct Acoustical Insulation: Provide manufacturer's cut sheets or product data verifying that mechanical sound insulation materials in air distribution ducts consists of an impervious, non-porous coatings that prevent dust from accumulating in the insulating materials.
- C. Project Materials Cost Data: Provide a spreadsheet in an electronic file indicating the total cost for the Project and the total cost of building materials used for the Project, as follows:
1. Not more than 60 days after the Preconstruction Meeting, the General Contractor shall provide to the LEED Consultant and Architect a preliminary schedule of materials costs for all materials used for the Project organized by specification section. Exclude labor costs and all mechanical, electrical, and plumbing (MEP) systems materials and labor costs. Include the following:
 - a. Identify each reused or salvaged material, its cost, and its replacement value.
 - b. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product's weight, its cost, its combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value), and the total combined recycled content value for all materials as a percentage of total materials costs.
 - c. Identify each regional material, its cost, its manufacturing location, the distance

of this location from the Project site, the source location for each raw material component of the material, the distance of these extraction locations from the Project site, and the total value of regional materials as a percentage of total materials costs.

- d. Identify each biobased material, its source, its cost, and the total value of biobased materials as a percentage of total materials costs. .
 - e. Identify each wood-based material, its cost, the total wood- based materials cost, each FSC Certified wood material, its cost, and the total value of FSC Certified wood as a percentage of total wood-based materials costs.
2. Provide final versions of the above spreadsheets to the LEED Consultant and Architect not more than 14 days after Substantial Completion.
- D. Construction Waste Management: See Section 01 7419 “Construction Waste Management” for submittal requirements.
- E. Construction Indoor Air Quality (IAQ) Management: See Section 01 8119 “Indoor Air Quality Requirements” for submittal requirements.
- F. Commissioning: See Section 01 9100 “General Commissioning Requirements” for submittal requirements.
- G. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports for the following:
1. Construction Waste Management: Waste reduction progress reports and logs complying with the requirements of Section 01 7419 “Construction Waste Management”.
 2. Construction IAQ Management: IAQ Photos, logs, and cutsheets complying with the requirements of Section 01 8119 “Indoor Air Quality Requirements”.

1.9 QUALITY ASSURANCE

- A. General: Perform the work of this Section as a supplement and in accordance with applicable requirements of Division 1.
- B. Preconstruction Meeting: After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with the LEED Consultant, Owner, Architect, and all Subcontractors to discuss the Construction Waste Management Plan, the required Construction Indoor Air Quality (IAQ) Management Plan, and all other Sustainable Design Requirements. The purpose of this meeting is to develop a mutual understanding of the Project’s Sustainable Design Requirements and coordination of the Contractor’s management of these requirements with the Contracting Officer and the Construction Quality Manager.
- C. Construction Job Conferences: The status of compliance with the Sustainable Design Requirements of these specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.

PART 2 – PRODUCTS

2.1 PRODUCT ENVIRONMENTAL REQUIREMENTS

- A. Site Clearing: Topsoil shall be provided by the Contractor from on-site material which has been

stockpiled for reuse. Off-site borrow should only be used when on-site sources are exhausted. Chip and/or compost on site all vegetated material identified for removal.

- B. Do not burn rubbish, organic matter, etc. or any material on the site. Dispose of legally in accordance with Specifications Sections 01 74 19.
- C. Roofing Materials: All roofing systems, other than vegetated roof systems and standing seam metal roof, must comply with the following requirements:
 - 1. Low-Sloped roofing less than or equal to 2:12 slope must have an SRI of at least 78.
 - 2. Steep-Sloped roofing greater than 2:12 slope must have an SRI of at least 29.
- D. Exterior Lighting Fixtures:
 - 1. Exterior lighting cannot exceed 80% of the lighting power densities defined by ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.
- E. Herbicides and Pest Control: Herbicides shall not be permitted, and pest control measures shall utilize EPA-registered biopesticides only.
- F. Water-Conserving Fixtures: Plumbing fixtures and fittings shall use in aggregate at least 40% less water than the water use baseline calculated for the building after meeting the Energy Policy Act of 1992 fixture performance requirements. Flow and flush rates shall not exceed the following:
 - 1. Toilets: dual flush 1.1/1.6 gallons per flush, and have documented bowl evacuation capability per MaP testing of at least 400 grams.
 - 2. Urinals: no more than 0.125 gallons per flush or use
 - 3. Lavatory Faucets: 0.35 gpm with automatic faucet controls
 - 4. Kitchen Sink Lavatories: 0.5 gpm
 - 5. Showerheads: no more than 1.5 gpm
- G. Process Water Use: Employ strategies that in aggregate result in 20% less water use than the process water use baseline for the building after meeting the commercial equipment and HVAC performance requirements as listed in the Table below. For equipment not addressed by EPACT 2005 or the list below, additional equipment performance requirements may be proposed provided documentation supporting the proposed benchmark or industry standard is submitted.
 - 1. Clothes Washer: 7.5 gallons/cubic foot/cycle
 - 2. Dishwasher with Racks: 1.0 gallons/rack
 - 3. Ice Machine: 20 gallons/100 pounds ice for machines making over 175 pounds of ice per day; 30 gallons/100 pounds ice for machines making less than 175 ice per day. No water-cooled machines.
 - 4. Food Steamer: 2 gallons/hour. Use only boilerless steamers.
 - 5. Pre-Rinse Spray Valves: 1.4 gallons/minute
- H. Elimination of CFCs AND HCFCs:
 - 1. Zero use of CFC-based refrigerants in HVAC&R systems.
 - 2. Ozone Protection: Base building cooling equipment shall contain no refrigerants other than the following: HCFC-123, HFC-134a, HFC-245fa, HFC-407c, or HFC 410a.
 - 3. Extruded polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation shall not be manufactured with hydro-chlorofluorocarbon (HCFC) blowing agents.

- I. Appliances and Equipment: All Energy Star eligible equipment and appliances, including commercial food service equipment (excluding HVAC and lighting components), shall be qualified by EPA's Energy Star program.
- J. HVAC Distribution Efficiency:
 - 1. All duct systems shall be constructed of galvanized sheet metal, aluminum, or stainless steel as deemed appropriate based on the application requirements. No fiberglass duct board shall be permitted.
 - 2. All medium- and high-pressure ductwork systems shall be pressure- tested in accordance with the current SMACNA standards.
 - 3. All ductwork shall be externally insulated. No interior duct liner other than that required for acoustical performance shall be permitted.
 - 4. Where possible, all air terminal connections shall be hard-connected with sheet metal ductwork. If flexible ductwork is used, no flexible duct extension shall be more than six feet in length.
 - 5. All HVAC equipment shall be isolated from the ductwork system with flexible duct connectors to minimize the transmittance of vibration.
 - 6. All supply and return air branch ducts shall include the appropriate style of volume damper. Air terminal devices such as grilles, registers, and diffusers shall be balanced at duct branch dampers, not at terminal face.
- K. Measurement and Verification: Install controls and monitoring devices as required by division 15 and 16.
- L. Salvaged or Reused materials: There shall be no substitutions for specified salvaged and reused materials and products.
- M. MRc4 - Recycled Content of Materials:
 - 1. Provide building materials with recycled content such that post- consumer recycled content value plus half the pre-consumer recycled content value constitutes a minimum of 20% of the cost of materials used for the Project for divisions 3-10, 31.60.00, 32.10.00, 32.30.00, and 32.90.00 exclusive of labor, and delivery costs. The Contractor shall make all attempts to maximize the procurement of materials with recycled content.
 - a. The post-consumer recycled content value of a material shall be determined by dividing the weight of post-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
 - b. The pre-consumer recycled content value of a material shall be determined by dividing the weight of pre-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
 - c. Do not include mechanical and electrical components in the calculations.
 - d. Do not include labor and delivery costs in the calculations.
 - e. Utilize all on-site existing paving materials that are scheduled for demolition as granulated fill, and include the cost of this material had it been purchased in the calculations for recycled content value.
 - f. At a minimum, the materials in the following list must contain the minimum recycled content indicated:

Category	Minimum Recycled Content
Compost/mulch	100% post-consumer
Asphaltic Concrete Paving	25% post-consumer

Cast-in-Place Concrete	6% pre-consumer
CMU: Gray Block	20% pre-consumer
Steel Reinforcing Bars	90% combined
Structural Steel Shapes	90% combined
Steel Joists	75% combined
Steel Deck	75% combined
Steel Fabrications	60% combined
Steel Studs	30% combined
Steel Roofing	30% post-consumer
Aluminum Fabrications	35% combined
Rigid Insulation	20% pre-consumer
Batt insulation	30% combined
Cellulose Insulation	90% combined
Rock Wool Insulation	75% pre-consumer
Fireproofing	20% combined
Steel Doors and Frames	35% combined
Gypsum Wallboard	100% combined
Carpet	40% combined
Rubber Flooring and Base	60% combined
Acoustical Ceiling Tile (ACT)	40% post-consumer
ACT Suspension System	90% post-consumer
Toilet Partitions	60% post-consumer

N. MRc5 - Regional Materials: Provide a minimum of 20 percent of building materials (by cost) that are manufactured and extracted/harvested within a 500 mile radius of the project site, exclusive of labor and delivery costs. The Contractor shall make all attempts to maximize the procurement of materials within this specified 500 mile radius.

O. Biobased Products:

1. Use only biobased concrete form-release products.
2. All Wood Products: All new solid-wood-based materials will be certified as “FSC 100%” by an independent third party in accordance with FSC Forest Stewardship Council “Principles and Criteria” and will have received Chain-of-Custody Certification as certified by an accredited certification group such as Smartwood or Scientific Certification Systems (SCS).
3. Preservative-treated lumber with chromated copper arsenate (CCA) treatments is not permitted, and lumber with copper-based treatments (such as ACQ) is permitted only for ground-contact applications.
4. Wood-based materials include but are not limited to the following materials (when made from wood), engineered wood products, or wood-based panel products:
 - a. Rough carpentry
 - b. Miscellaneous carpentry
 - c. Particleboard
 - d. Plywood
 - e. Finish carpentry
 - f. Architectural woodwork
 - g. Wood paneling

- h. Wood flooring
 - i. Wood cabinets
 - j. Wood doors
 - k. Non-rented temporary construction, including bracing, concrete formwork, pedestrian barriers, and temporary protection
- P. Outdoor Air Delivery Monitoring:
- 1. All spaces with an occupant density greater than 1 person per 40 square feet must include at least one CO₂ monitor located between 3 feet and 6 feet above the finished floor.
 - 2. All spaces with occupant density less than 1 person per 40 square feet must include a direct outdoor airflow monitor, capable of measuring the minimum outdoor airflow rate within 15% accuracy.
 - 3. Monitoring equipment must be configured to generate a building automation system alarm and a visual or audible alert when CO₂ concentrations vary by 10% or more from set point.
- Q. Adhesives and Sealants: See Section 01 81 19 “Indoor Air Quality Requirements” for requirements.
- R. Paints and Coatings: See Section 01 81 19 “Indoor Air Quality Requirements” for requirements.
- S. Floorcoverings: See Section 01 81 19 “Indoor Air Quality Requirements” for requirements.
- T. Composite Wood and Agrifiber Binders: See Section 01 81 19 “Indoor Air Quality Requirements” for requirements.
- U. Entryway Systems: Walk-off systems to capture particulates shall be installed at least 10 feet long in the direction of entry travel at all entryways directly connected to the outdoors that are used as regular entry points by building users. Acceptable entryway systems include:
- 1. Permanently installed grates, grilles, or slotted systems that allow for cleaning beneath them.
- V. Air Filtration: Install air filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 13 or better in all air handling units for processing both return and outside air that is delivered to the air supply system. Replace all filtration media after the completion of construction and prior to occupancy.
- W. Mercury in Lighting:
- 1. Provide only low-mercury fluorescent or HID lamps with mercury content limited to the following:
 - a. T-5 and T-8 fluorescent lamps: 80 picograms per lumen hour
 - 2. Measurement Standards: Lumens to be measured according to IES LM9 for linear fluorescent lamps, IES LM66 for compact fluorescent lamps, and LM51 for HID lamps; mercury content to be measured according to U.S. EPA “Total Mercury by Cold Vapor Absorption Method” 7471A.
- X. Lighting Controls: Install and calibrate controls as specified by Division 26 – Electrical in order to comply with LEED IAQ lighting controllability requirements.
- Y. Thermal Comfort: Install and calibrate controls as specified in Division 23 – Heating, Ventilation, and Air-Conditioning.

- Z. Gypsum Wallboard: See Section 01 81 19 “Indoor Air Quality Requirements” for requirements.
- AA. Fiberglass Insulation: See Section 01 81 19 “Indoor Air Quality Requirements” for requirements.
- BB. Duct Acoustical Insulation: See Section 01 81 19 “Indoor Air Quality Requirements” for requirements.
- CC. Green Housekeeping:
 - 1. Utilize cleaning products that meet the requirements of the Green Seal GS-37 standard or comply with the requirements and maximum VOC limits of Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8.5, Article 2, Regulation for Reducing VOC Emissions from Consumer Products (September 2001).
 - 2. Utilize janitorial paper products and trash bags that meet the minimum percentages of post-consumer recycled content and recovered content requirements of EPA’s Comprehensive Procurement Guidelines.

PART 3 – EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT

- A. See Section 01 7419 “Construction Waste Management” for requirements.

3.2 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT


- A. See Section 01 8119 “Indoor Air Quality Requirements” for requirements.

3.3 COMMISSIONING

- A. Commissioning: All building energy-related systems and building envelope components shall be commissioned in accordance with the requirements of Specification Section 01 91 00 “Commissioning Requirements” and related commissioning sections in other divisions in order to verify and ensure that fundamental building elements and systems are installed, constructed, calibrated to operate, and perform according to the Owner’s Project Requirements, Basis of Design, and Construction Documents.

END OF SECTION 01 8113

LEED Material Submittal Sheet

LEED™ Material Submittal Sheet		
1.) This Submittal Sheet must be completed by all contractors .		
2.) The cost of each product contributing to a LEED credit must be provided -minus labor (this is the cost the contractor is paying, not what the manufacture has paid).		
3.) Supporting documentation MUST accompany this form to support the claim.		
Sub-contractor's Name: _____		
Manufacturer's Name: _____		
Name of Material/ Product: _____		
Division # : _____		
Material Cost Only (exclude labor): _____		
MRc4, Recycled Content		
Does the manufacturer claim this material contains recycled content (RC)?		
Yes _____ No _____		
If yes, please provide the following:		
% Post-consumer RC: _____ %		
% Pre-consumer RC: _____ %		
MRc5, Regional Materials		
Was this material EXTRACTED within 500 miles of the project site?		
Yes _____ No _____		
If yes, provide the City and State of Extraction. City, State: _____		
Was this material MANUFACTURED within 500 miles of the project site?		
Yes _____ No _____		
If yes, provide the City and State of Manufacturer. City, State: _____		
If the material was both EXTRACTED and MANUFACTURED within 500 miles of the project site, please provide percentage regional material.		
% regionally extracted/recovered: _____ %		
MRc6, Rapidly Renewable		
Does the manufacturer claim any portion of this material is from a rapidly renewable source (i.e. bamboo, wheat, cotton, linomium, etc...)?		
Yes _____ No _____		
If yes, what percent of the material is from a rapidly renewable source? _____ %		

All information provided is proprietary.

MRc7, Certified Wood			
Is the wood provided for this project FSC certified?			
Yes	_____	No	_____
If the answer is yes OR no, an invoice for all wood products must be provided, and must list the cost of the material, and if applicable, the percent of wood that is FSC certified and the Chain-of-Custody (COC) number.			
If yes, please provide the following:			
Percent New Wood	_____	%	
% New Wood, FSC Certified	_____	%	
COC number: _____			
Vendor Invoice Provided	Yes	_____	No _____
Is this material a composite wood (i.e. plywood, particleboard, door core, etc...)?			
Yes	_____	No	_____
If yes, please see IEQc4.			
If yes, please confirm this product does <i>not</i> contain any added urea-formaldehyde.			
Yes	_____	No	_____
IEQc4, Low Emitting Materials			
Is this material an adhesive, sealant, paint, coating, flooring, wall or ceiling system, or a furniture or furnishing?			
If so, please complete the following.			
IEQc4.1	Adhesives & Sealants	Type: _____	VOC content _____ g/l
	Meets GreenSeal 11?	Yes _____	No _____
IEQc4.2	Paints & Coatings	Type: _____	VOC content _____ g/l
	Meets GreenSeal 11?	Yes _____	No _____
IEQc4.3	Flooring Systems	Type: _____	
	Meets CRI's Green Label Plus or Floorscore?	Yes _____	No _____
IEQc4.4	Composite Wood & Agrifiber	Type: _____	
	Meets No Added Urea-Formaldehyde (NAUF)?	Yes _____	No _____
IEQc4.5	Furnitures & Furnishings	Type: _____	
	Is Greenguard Children and Schools certified?	Yes _____	No _____
IEQc4.6	Ceiling & Wall Systems	Type: _____	
	Meets CA Dept of Health Testing of VOC Emissions?	Yes _____	No _____
Please refer to the LEED Low-Emitting Log to verify compliance of this material/product.			

LEED for Schools v2009 Scorecard

Possible		Yes	Y2	N2	No	RP	Assignee	Comments	PC	LEED Phase	Compliance Verified	LEED Online Status	Quality Control	GBCI Response
0	Required	1	1	0	0									
Project Information														
Required	P1	1	1	0	0		Lorax							
Required	P2	1	1	0	0		Team							
Required	P3	1	1	0	0		Team							
Required	P4	1	1	0	0		Team							
24	12	10	1	1	1									
Sustainable Sites														
Required	Prereq 1	1	1	0	0		Architect	Phase I, Phase II if contamination is suspected						
Required	Prereq 2	1	1	0	0		Architect	Phase I, Phase II if contamination is suspected						
Required	Prereq 3	1	1	0	0		Architect	Phase II and remediation, can pursue with asbestos abatement						
Required	Prereq 4	1	1	0	0		Architect							
Required	Prereq 5	1	1	0	0		Architect							
Required	Prereq 6	1	1	0	0		Architect							
Required	Prereq 7	1	1	0	0		Architect							
Required	Prereq 8	1	1	0	0		Architect							
Required	Prereq 9	1	1	0	0		Architect							
Required	Prereq 10	1	1	0	0		Architect							
Water Efficiency														
Required	Prereq 1	1	1	0	0		Plumb Eng	Projects should target a minimum of 35%, Dual Flush 1.1/1.6 gpf, Urinals 0.125 gpf, Lavatories 0.35 gpm, Sinks 0.5 gpm						
Required	Credit 1	4	4	2	2		Plumb Eng	See WE-E1						
Required	Credit 2	2	2	1	1		Plumb Eng	No equipment using once-thru cooling with potable water.						
Required	Credit 3	3	3	1	1		Plumb Eng	No garbage disposals.						
Required	Credit 4	1	1	0	0		Plumb Eng	Clothes washer 7.5 gal/cycle; Dishwasher w/racks 1.0 gal/rack; Ice Machine (no water cooled machines) lbs/day >175/20 gal/100 lbs OR lbs/day <175/30 gal/100 lbs; Food Steamers (boilerless only) 2 gal/hr; Pretire Spray Valves 1.4 gal/min						
Energy & Atmosphere														
Required	Prereq 1	1	1	0	0		Cx Authority	CxA is procured by MS&J/City Schools for each project						
Required	Prereq 2	1	1	0	0		Mech Eng							
Required	Prereq 3	1	1	0	0		Mech Eng							
Required	Prereq 4	1	1	0	0		Mech Eng							
Required	Prereq 5	1	1	0	0		Mech Eng/Owner							
Required	Prereq 6	1	1	0	0		Mech Eng							
Required	Prereq 7	1	1	0	0		Cx Authority	Included in CxA scope, including envelope						
Required	Prereq 8	1	1	0	0		Cx Authority							
Required	Prereq 9	1	1	0	0		Mech Eng							
Required	Prereq 10	1	1	0	0		Lorax Owner							
Required	Prereq 11	1	1	0	0		Lorax Owner							
Required	Prereq 12	1	1	0	0		Lorax Owner							
Required	Prereq 13	1	1	0	0		Lorax Owner							
Required	Prereq 14	1	1	0	0		Lorax Owner							
Required	Prereq 15	1	1	0	0		Lorax Owner							
Required	Prereq 16	1	1	0	0		Lorax Owner							
Required	Prereq 17	1	1	0	0		Lorax Owner							
Required	Prereq 18	1	1	0	0		Lorax Owner							
Required	Prereq 19	1	1	0	0		Lorax Owner							
Required	Prereq 20	1	1	0	0		Lorax Owner							
Required	Prereq 21	1	1	0	0		Lorax Owner							
Required	Prereq 22	1	1	0	0		Lorax Owner							
Required	Prereq 23	1	1	0	0		Lorax Owner							
Required	Prereq 24	1	1	0	0		Lorax Owner							
Required	Prereq 25	1	1	0	0		Lorax Owner							
Required	Prereq 26	1	1	0	0		Lorax Owner							
Required	Prereq 27	1	1	0	0		Lorax Owner							
Required	Prereq 28	1	1	0	0		Lorax Owner							
Required	Prereq 29	1	1	0	0		Lorax Owner							
Required	Prereq 30	1	1	0	0		Lorax Owner							
Required	Prereq 31	1	1	0	0		Lorax Owner							
Required	Prereq 32	1	1	0	0		Lorax Owner							
Required	Prereq 33	1	1	0	0		Lorax Owner							
Required	Prereq 34	1	1	0	0		Lorax Owner							
Required	Prereq 35	1	1	0	0		Lorax Owner							
Required	Prereq 36	1	1	0	0		Lorax Owner							
Required	Prereq 37	1	1	0	0		Lorax Owner							
Required	Prereq 38	1	1	0	0		Lorax Owner							
Required	Prereq 39	1	1	0	0		Lorax Owner							
Required	Prereq 40	1	1	0	0		Lorax Owner							
Required	Prereq 41	1	1	0	0		Lorax Owner							
Required	Prereq 42	1	1	0	0		Lorax Owner							
Required	Prereq 43	1	1	0	0		Lorax Owner							
Required	Prereq 44	1	1	0	0		Lorax Owner							
Required	Prereq 45	1	1	0	0		Lorax Owner							
Required	Prereq 46	1	1	0	0		Lorax Owner							
Required	Prereq 47	1	1	0	0		Lorax Owner							
Required	Prereq 48	1	1	0	0		Lorax Owner							
Required	Prereq 49	1	1	0	0		Lorax Owner							
Required	Prereq 50	1	1	0	0		Lorax Owner							

Lorax Partnerships LLC
"Building Solutions for a Healthy Environment"

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8/22/2015



Baltimore City School Project Name

LEED for Schools v2009 Project Scorecard

0/22/2015

13	6	2	2	3	Materials & Resources	pc	Assignee	Comments	pc	LEED phase	Compliance Verified	LEED Online Status	Quality Control	GBCI Response
Required														
2	1	1			Storage & Collection of Recyclables		Architect	City Schools provided recommended recycling supply list		Design				
1			1		Building Reuse, 75%-95% Structural		Architect			Constr				
2			2		Construction Waste Management Divert 50%/75%		QM			Constr				
2			2		Material Reuse		QM			Constr				
2			2		Recycled Content, 10%-20%		QM			Constr				
2			2		Local/Regional Materials, 10%-20%		QM			Constr				
1			1		Rapidly Renewable Materials, 2.5%		QM			Constr				
1			1		Certified Wood - 50%		QM			Constr				
19	10	8	1	2	Indoor Environmental Quality									
Required														
Prereq 1					Minimum IAQ Performance		Mech. Eng			Design				
Prereq 2					Environmental Tobacco Smoke (ETS) Control		Lorax	City Schools is working on district-wide no smoking policy for 50ft within school property		Design				
Required														
Prereq 3					Min. Acoustical Performance		Mech. Eng/ Arch			Design				
1			1		Outdoor Air Delivery Monitoring		Mech. Eng			Design				
1			1		Increase Ventilation: 30% over ASHRAE 62.1-2007		Mech. Eng			Design				
1			1		Construction IAQ Management Plan During Construction		QM			Design				
1			1		Construction IAQ Management Plan Before Occupancy		QM			Constr				
1			1		Low-Emitting Materials Adhesives & Sealants		QM			Constr				
1			1		Low-Emitting Materials, Paints		QM			Constr				
1			1		Low-Emitting Materials, Flooring Systems		QM			Constr				
4			1		Low-Emitting Materials, Composite Wood		QM			Constr				
1			1		Low-Emitting Materials, Furniture and Furnishings		QM			Constr				
1			1		Low-Emitting Materials, Ceiling and Wall Systems		QM			Constr				
1			1		Indoor Chemical & Pollutant Source Control		QM			Constr				
1			1		Controllability of Systems, Thermal Comfort		Mech. Eng/ Arch	Evaluated on school by school basis with the location of operable windows. Per City Schools, staff and students will not have ability to control thermostats		Design				
1			1		Controllability of Systems, Lighting		Mech. Eng			Design				
1			1		Thermal Comfort, Design ASHRAE 55-2004		Mech. Eng			Design				
1			1		Thermal Comfort, Verification		Lorax	Standardized plan template. Looking for Cx to administer as part of 10 month follow-up		Design				
1			1		Daylight & Views, Identify 75% of Spaces		Architect			Design				
3	1	2			Daylight & Views, Views for 90% of Spaces		Architect			Design				
1			1		Enhanced Acoustical Performance		Mech. Eng/ Arch			Design				
1			1		Mold Prevention		Mech. Eng/ Arch			Design				
6	5	1	0	0	Innovation & Design Process									
1			1		Innovation in Design: High Performance Cleaning Program		Lorax	City Schools working on district-wide program		Varies				
1			1		Innovation in Design: Integrated Pest Management Plan		Lorax	City Schools has approved USGBC plan used for Waverly. May need slight modifications		Varies				
1			1		Innovation in Design: Building Exterior and Hardscape Mgmt. Plan		Lorax	City Schools working on district-wide plan		Varies				
1			1		Innovation in Design: Green Public Education		Lorax/ Architect	Options for signage, brochures, and tours. We recommend students designing signage		Varies				
1			1		Innovation in Design: Integrative Process		Team	This credit is outlined in the Program, but project team may replace with other ID initiatives		Varies				
1			1		LEED™ Accredited Professional School as a Teaching Tool		Lorax			Constr				
1			1				Lorax/ Owner/ Arch			Constr				

Lorax Partnerships LLC
"Building Solutions for a Healthy Environment"

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Baltimore, MD 21201

PH: 443-708-5196
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LEED for Schools v2009 Project Scorecard

8/22/2015

Possible		Yes	Y?	N?	No	Regional Priority Credits	RP	Assignee	Comments	P.C. LEED Phase	Compliance Verified	LEED Online Status	Quality Control	GBCI Response
4	6	0	0	0	0	Credit 1.2 Regional Priority Credit:				Varies				
1	1					Credit 1.1 Regional Priority Credit:				Varies				
1	1					Credit 1.4 Regional Priority Credit:				Varies				
110	50	31	4	24		Credit 1.3 Regional Priority Credit:				Varies				
Color Key:						40-49 LEED Certified Silver								
Not Pursuing						50-59 LEED Certified Gold								
						60-79 LEED Certified Gold								
						80+ LEED Certified Platinum								
Project Schedule: Planning Schematic Design Design Development Construction Docs Bid Construction Occupancy														
Project Team: Owner: MSA/ City Schools Architect: Civil: MEP: Energy Modeler: Commissioning: General Contractor:														
Credit Point Summary Design: 31 Construction: 13 Innovation: 6 Regional: 0 Total: 50														
General Project Info: Project Name: Baltimore City School Project Project Number: 110 Project Location:														
GBCI Certification Status Pre-requisites: 0 Design: 0 Const.: 0 Innov.: 0 RP: 0 Anticipated: 0 Earned: 0 Denied: 0 Deferred: 0 Total Points Earned: 0														

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SECTION 01 81 19 INDOOR AIR QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. The Section includes the LEED Submittal Requirements for this section, indoor air quality procedures and control measures including HVAC Protection, Source Control, Pathway Interruption, Housekeeping and Scheduling.

1.2 OBJECTIVES

- A. Minimize air concentrations of certain pollutants in completed project at time of occupancy. Maximum allowable indoor air concentrations of certain pollutants have been established. Concentrations must be at or below these standards prior to building acceptance.
- B. Occupied spaces of facility shall comply with the following levels:
 - 1. Carbon Monoxide: Not to exceed 9 PPM.
 - 2. Carbon Dioxide: Not to exceed 800 PPM.
 - 3. Airborne Mold and Mildew: Simultaneous indoor and outdoor readings.
 - 4. Maximum Air Concentration Standards: Indoor room air concentration levels, emission rates and qualities of contaminants shall not exceed the following limits at time of substantial completion prior to occupancy of facility and installation of office furniture.

1.3 RELATED REQUIREMENTS

- B. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.
- C. Related Sections include the following:
 - 1. Section 01 8113 Sustainable Design Requirements
 - 2. Section 01 7419 Construction Waste Management

1.4 DEFINITIONS

- A. LEED: The Leadership in Energy & Environmental Design green building rating systems developed and adopted by the U.S. Green Building Council (USGBC). The systems certify levels of environmental achievement based on a point and credit scoring system.
- B. LEED EB: The Leadership in Energy & Environmental Design green building rating system developed and adopted by the USGBC for operating and maintaining existing buildings.
- C. LEED Schools: The Leadership in Energy & Environmental Design green building rating system developed and adopted by the USGBC for new construction and major renovations of academic buildings for K-12.

- D. Sealant: Any material that fills and seals gaps between other materials.
- E. Type 1 Finishes: Materials and finishes which have a potential for short- term levels of off gassing from chemicals inherent in their manufacturing process, or which are applied in a form requiring vehicles or carriers for spreading which release a high level of particulate matter in the process of installation and/or curing.
- F. Type 2 Finishes: "Fuzzy" materials and finishes which are woven, fibrous, or porous in nature and tend to adsorb chemicals off-gassed by Type 1 finishes or may be adversely affected by particulates. These materials become "sinks" for deleterious substances which may be released much later, or collectors of contaminants that may promote subsequent bacterial growth.
- G. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.

1.5 REFERENCED STANDARDS

- A. Sheet Metal and Air Conditioning Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, chapter 3. – SMAC National Association, Inc. 4201 Lafayette Center Drive, Chantilly, VA 20151-1209. www.smacna.org.
- B. ANSI/ASHRAE 52.2-1999: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
- C. US Green Building Council LEED Green Building Design and Construction version 2009.

1.6 SUBMITTALS

- A. General: Additional Sustainable Design submittal requirements are included in other sections of the Specifications.
- B. Indoor Air Quality Submittals:
 - 1. Not more than 30 days after the Preconstruction Meeting, prepare and submit for the Architect and LEED Consultant's approval, an electronic copy of the draft Construction IAQ Management Plan (CIAQMP) in an electronic file including, but not limited to, descriptions of the following:
 - a. Construction procedures for meeting or exceeding the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 1995, Chapter 3, including procedures for HVAC Protection, Source Control, Pathway Interruption, Housekeeping, and Scheduling.
 - b. Construction procedures for protecting absorptive materials stored on-site or installed from moisture damage.
 - c. Schedule of submission to the LEED Consultant of photographs of on-site construction IAQ management measures such as protection of ducts and on-site stored oil installed absorptive materials.
 - d. Construction procedures if air handlers must be used during construction,

- including a description of filtration media to be used at each return air grille.
- e. Construction procedure for replacing all air-filtration media immediately prior to occupancy after completion of construction, including a description of filtration media to be used at each air handling or air supply unit.
2. Not more than 30 days following receipt of the approved draft CIAQMP, submit an electronic copy of the approved CIAQMP in an electronic file, along with the following:
 - a. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for all filtration media to be installed at return air grilles during construction if permanently installed AHUs are used during construction.
 - b. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for filtration media in all air handling units (AHUs).
 3. Not more than 14 days after Substantial Completion provide the following:
 - a. Documentation verifying required replacement of air filtration media in all air handling units (AHUs) after the completion of construction and prior to occupancy and, if applicable, required installation of filtration during construction.
 - b. A minimum of 18 Construction photographs: Six date-stamped photographs taken on three different occasions during construction of the SMACNA approaches employed, along with a brief description of each approach, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.
 - c. A copy of the report from testing and inspecting agency documenting the results of IAQ testing, demonstrating conformance with IAQ testing procedures and requirements.

1.7 QUALITY ASSURANCE

- A. General: Perform the work of this Section as a supplement and in accordance with applicable requirements of Division 1.
- B. Preconstruction Meeting: After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with LEED Consultant, Owner, Architect, and all Subcontractors to discuss the Construction Waste Management Plan, the required Construction Indoor Air Quality (IAQ) Management Plan, and all other Sustainable Design Requirements. The purpose of this meeting is to develop a mutual understanding of the Project's Sustainable Design Requirements and coordination of the Contractor's management of these requirements with the Contracting Officer and the Construction Quality Manager.
- C. Construction Job Conferences: The status of compliance with the Sustainable Design Requirements of these specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.

PART 2 PRODUCTS

2.1 LOW-EMITTING MATERIALS

A. Adhesives and Sealants:

1. All adhesives and sealants used inside the building's thermal envelope must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
 - a. Provide a cut sheet and a Material Safety Data Sheet (MSDS) or Technical Data Sheet (TDS) that highlights the VOC limits, and states the above requirements are met.
2. All adhesives and sealants, regardless of where they are used, must comply with the following limits for VOC content as required by SCAQMD Rule #1168:
 - a. Carpet Adhesives: 50 g/L
 - b. Carpet Pad Adhesives: 50 g/L
 - c. Wood Flooring Adhesives: 100 g/L
 - d. Rubber Floor Adhesives: 60 g/L
 - e. Subfloor Adhesives: 50 g/L
 - f. Ceramic Tile Adhesives: 65 g/L
 - g. VCT and Sheet Vinyl Adhesives: 50 g/L
 - h. Drywall and Panel Adhesives: 50 g/L
 - i. Cove Base Adhesives: 50 g/L
 - j. Multipurpose Construction Adhesives: 70 g/L
 - k. Structural Glazing Adhesives and Compounds: 100 g/L
 - l. PVC Welding Compounds: 510 g/L
 - m. CPVC Welding Compounds: 490 g/L
 - n. ABS Welding Compounds: 325 g/L
 - o. Plastic Cement Welding Compounds: 250 g/L
 - p. Adhesive Primer for Plastic: 550 g/L
 - q. Contact Adhesive: 80 g/L
 - r. Special Purpose Contact Adhesive: 250 g/L
 - s. Special Wood Member Adhesive: 140 g/L
 - t. Sheet Applied Rubber Lining Operations: 850 g/L
 - u. Top and Trim Adhesive: 250 g/L
 - v. Metal to Metal Adhesive: 30 g/L
 - w. Plastic Foam Adhesive: 50 g/L
 - x. Porous Material (except wood) Adhesive: 50 g/L
 - y. Wood Adhesive: 30 g/L
 - z. Fiberglass Adhesive: 80 g/L
 - aa. Architectural Sealant: 250 g/L
 - bb. Non-membrane Roof Sealant: 300 g/L
 - cc. Roadway Sealant: 250 g/L
 - dd. Single-Ply Roof Membrane Sealant: 450 g/L
 - ee. Other Sealants: 420 g/L
 - ff. Architectural, non-porous, Sealant Primer: 250 g/L
 - gg. Architectural, porous, Sealant Primer: 775 g/L
 - hh. Other Sealant Primers: 750 g/L
 - ii. General Purpose Mist Spray: 65% by weight
 - jj. General Purpose Web Spray: 55% by weight
 - kk. Special Purpose Aerosol Adhesives (all types): 70% by weight

3. Interior sealants shall not contain: mercury, butyl rubber, neoprene, SBR (styrene butadiene rubber), or nitrile.
4. Sealants and glazing compounds formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure) fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components shall not be used.
5. Adhesives used to apply laminates, whether shop-applied or field- applied, shall contain no urea-formaldehyde.

B. Paints and Coatings:

1. All paints and coatings used inside the building's thermal envelope must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
 - a. Provide a cut sheet and a Material Safety Data Sheet (MSDS) or Technical Data Sheet (TDS) that highlights the VOC limits, and states the above requirements are met.
2. All paints and coatings, regardless of where they are used, must comply with the following limits for VOC content as required by GS-11, GC-03, or SCAQMD Rule #1113:
 - a. Flats Paint: 50 g/L
 - b. Non-Flats Paint: 150 g/L
 - c. Anti-corrosive/rust to ferrous metal Substrates: 250 g/L
 - d. Lacquer: 550 g/L
 - e. Pigmented Lacquer: 550 g/L
 - f. Sanding Sealer: 350 g/L
 - g. Varnish: 350 g/L
 - h. Clear Brushing Lacquer: 680 g/L
 - i. Floor Coatings: 100 g/L
 - j. Sealers and Undercoats: 200 g/L
 - k. Shellac, Clear: 730 g/L
 - l. Shellac, Pigmented: 550 g/L
 - m. Stain: 250 g/L
 - n. Concrete Curing Compounds: 350 g/L
 - o. Japans/ Faux Finishing Coatings: 350 g/L
 - p. Magnesite Cement Coatings: 450 g/L
 - q. Water proofing sealers: 250 g/L
 - r. Water proofing concrete/ masonry sealers: 400 g/L
 - s. Wood Preservatives: 350 g/L
 - t. Low-Solids Coatings: 120 g/L
 - u. Other: 350 g/L

C. Flooring Systems:

1. All flooring systems used inside the building's thermal envelope must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

- a. Provide a cut sheet and a Material Safety Data Sheet (MSDS) or Technical Data Sheet (TDS) that states the above requirements are met.
 2. All carpet systems, including adhesives, must meet or exceed the Carpet and Rug Institute Green Label Plus Indoor Air Quality Test Program.
 3. Carpet cushion shall not contain brominated flame retardants.
 4. Carpet tile applications shall be self-adhering.
 5. All resilient floorcovering must be certified under the Greenguard or FloorScore indoor emissions testing programs.
 6. Engineered wood flooring and bamboo flooring must be certified under the Greenguard or FloorScore indoor emissions testing programs.
- D. Composite Wood:
1. Composite Wood and Agrifiber Binders: All composite wood, agrifiber products, and wood doors shall contain no added urea-formaldehyde resins.
 - a. Provide a cut sheet and a MSDS sheet for each composite wood product used highlighting the chemical composition of the material.
- E. Systems Furniture and Seating:
1. All systems furniture and seating meet the requirements of one of the following:
 - a. Greenguard certification
 - b. SCS Indoor Advantage certification
 - c. SCS Indoor Advantage Gold certification
 - d. BIFMA Standard X7.1-2005, as tested to BIFMA method M7.1-2005 and as verified by an independent laboratory
 - e. Calculated indoor air concentration limits for furniture systems and seating determined by the U.S. EPA's Environmental Technology Verification Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol as conducted in an independent air quality testing laboratory.
 2. Systems furniture and seating made with coatings or sealants that contain any of the following solvents are not permitted: naphtha, benzene, toluene, xylene, hexavalent chromium.
- F. Ceiling and Wall Systems:

1. All gypsum board, insulation, acoustical ceiling systems and wall coverings installed inside the building's thermal envelope must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
 - a. Provide a cut sheet and a Material Safety Data Sheet (MSDS) or Technical Data Sheet (TDS) that states the above requirements are met.

2.2 INDOOR AIR QUALITY TESTING EQUIPMENT

A. Passive Testing Equipment

1. Passive monitoring test kit to measure formaldehyde levels and total VOC levels, list three primary VOCs detected, and identify mold and other particulates collected. Include analysis and written report of tested air.
 - a. Acceptable Product: IAQ Test Kit, Air Quality Sciences, Atlanta, GA, 770-993-063

B. Active Testing Equipment

1. As recommended and provided by Air Quality Testing Consultant.

PART 3 EXECUTION

3.1 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

- A. Develop and implement a Construction IAQ Management Plan (CIAQMP) to prevent indoor air quality problems resulting from construction activities, including, at minimum, the following:
 1. Construction activities must meet or exceed the minimum requirements of the SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995.
 2. During construction, protect all absorptive materials stored on-site or installed from moisture damage as described in the Construction IAQ Management Plan (CIAQMP) defined above. Specifically:
 - a. Exercise special care at all times in the storage of materials to prevent exposure to moisture.
 - b. Avoid installation of gypsum wallboard and other porous materials until the building is weather-tight.
 - c. All standing water which accumulates on interior floors shall be removed on the day that it is observed.
 - d. Any drywall that has retained more than 20% moisture after 48 hours following exposure to moisture, or that has evidence of mold, must be disposed of in accordance with Specification Section 01 74 19 "Construction Waste Management."
 - e. The contractor shall identify and remove all porous building materials that become wet or damaged by moisture within 7 calendar days of such exposure.
 3. During construction and HVAC system installation, provide the LEED Consultant with photographs of IAQ management measures (such as protection of ducts and on-site or installed absorptive materials), including six photographs on three different occasions depicting implemented SMACNA approaches.
 4. Sequence installation of finishes to minimize cross-contamination. Special construction scheduling involves defined and controlled sequencing of finishes applications to ensure dissipation of emissions from finishes that off-gas significant quantities of deleterious

material during curing ("Type 1 Finishes"), to separate these effects from the installation of adsorptive materials ("Type 2 Finishes") that may act as a "sink" for storage and subsequent release of these unwanted substances into building spaces and mechanical systems after project occupancy.

- a. Identify finish materials by type. Type 1 materials include, but are not limited to the following:
 - 1) Composite wood products, specifically including particleboard from which millwork, wood paneling, doors or furniture may be fabricated.
 - 2) Adhesives, sealants, and glazing compounds, specifically those with petrochemical vehicles or carriers.
 - 3) Wood preservatives, finishes, and paint.
 - 4) Control and/or expansion joint fillers.
 - 5) All hard finishes requiring adhesive installation.
 - 6) Gypsum board and associated finish processes.
 - b. Type 2 finishes include, but are not limited to the following:
 - 1) Carpet and padding
 - 2) Fabric wallcovering
 - 3) Insulation exposed to the airstream
 - 4) Acoustic ceiling materials
 - 5) Fabric covered acoustic wall panels
 - 6) Upholstered furnishings
 - c. Materials that can be categorized as both Type 1 and Type 2 materials shall be considered to be Type 1 materials.
 - d. Include in the Construction Indoor Air Quality Management Plan a schedule of construction showing compliance with requirements of this section. Show sequence of finishes applications and allowances for curing times. Within each air zone (defined as a part of any floor area served by a single air handling unit) identify finishes, indicating their type classifications.
 - e. As part of the Preconstruction Meeting, discuss the sequence of installations required under this section. The purpose of this agenda item is to assure understanding of the importance of sequencing of finishes to the overall Indoor Air Quality of the facility and to secure preliminary approval of the Contracting Officer for scheduling and installation requirements for on-site work.
- B. Air Filtration:
1. Install air filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 13 or better in all air handling units for processing both return and outside air that is delivered to the air supply system; replace all filtration media after the completion of construction and prior to occupancy.
 2. Install air filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 8 or better for filtration media installed at return air grilles during construction if permanently installed AHUs are used during construction. Inspect weekly and replace as required.
- C. Discuss CIAQMP procedures and measures as an agenda item at all regular job meetings conducted during the course of work at the site, and record progress in meeting minutes.
- D. Engage an independent testing and inspecting agency to conduct a baseline indoor air quality testing program after the completion of construction and prior to occupancy.

3.2 SYSTEMS START-UP

- A. General Requirements: Comply with Section 01 91 00 – Commissioning.

3.3 CLOSEOUT ACTIVITIES

- A. LEED EQ credit 3.2 – IAQ Management Plan, Before Occupancy:

1. Option 1 – Flush-out

- a. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu.ft. of outdoor air per sq.ft. of floor area while maintaining an internal temperature of at least 60°F and relative humidity no higher than 60%.
- b. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. of outdoor air per sq. ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. of outside of outside air or the design minimum outside air rate determined in EQ Prerequisite 1, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to the occupancy and continue during occupancy. These conditions shall be maintained until a total of 14000 cu. Ft./sq. ft. of outside air has been delivered to the space.

2. Option 2 – Air Quality Testing

- a. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the United States Environmental Protection Agency (EPA) Compendium of Methods for the Determination of Air Pollutants in Indoor Air and as detailed in the LEED-NC 2009 reference guide.
- b. Demonstrate that the contamination maximum concentrates listed below are not exceeded.
 - 1) Formaldehyde – 50 parts per billion
 - 2) Particulates (PM10) – 50 micrograms per cubic meter
 - 3) Total VOC – 500 micrograms per cubic meter
 - 4) *4-Phenylcyclohexene (4-PCH) – 6.5 micrograms per cubic meter
 - 5) Carbon Monoxide (CO) – 9 parts per million and no greater than 2 parts per million above outdoor levels

**This test is only required if carpet and fabrics with styrene butadiene rubber (SBR) latex backing material are installed as part of the base building systems.*

END OF SECTION 01 81 19

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes modular carpet tile.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for removing existing floor coverings.
 - 2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- B. 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.
 - 3. Laboratory Test Reports: For flooring products, indicating compliance with requirements for testing and product requirements of CRI's "Green Label Plus" testing program.
 - 4. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of insets and borders.

9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

- D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet Tile: Full-size Sample.
 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.
- E. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- F. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

1.9 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bentley Prince Street, Inc.
 - 2. J&J Invision; J&J Industries, Inc.
 - 3. Mannington Mills, Inc.
 - 4. Milliken & Company.
 - 5. Mohawk Group (The); Mohawk Carpet, LLC.
- B. Color: As selected by Architect from manufacturer's full range.
- C. Fiber Content: 100 percent nylon 6, 6.

- D. Pile Characteristic: Level-loop pile.
- E. Surface Pile Weight: 26 oz./sq. yd..
- F. Total Weight: 71.20 oz./sq. yd. for finished carpet tile.
- G. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- H. Size: 24 by 24 inches.
- I. Applied Treatments:
 - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
 - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
- J. Sustainable Design Requirements:
 - 1. Sustainable Product Certification: Gold level certification according to ANSI/NSF 140.
 - 2. Carpet and cushion shall comply with testing and product requirements of CRI's "Green Label Plus" testing program.
 - 3. Flooring products shall comply with the 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."
- K. Performance Characteristics:
 - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.
 - 2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
 - 3. Dry Breaking Strength: Not less than 100 lbf according to ASTM D 2646.
 - 4. Tuft Bind: Not less than 20lbf according to ASTM D 1335.
 - 5. Delamination: Not less than 4 lbf/in. according to ASTM D 3936.
 - 6. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
 - 7. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
 - 8. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
 - 9. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) according to AATCC 16, Option E.
 - 10. Electrostatic Propensity: Less than 2 kV according to AATCC 134.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less.
 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 105613 - METAL STORAGE SHELVING

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. Post-and-beam metal storage shelving (Utility Shelves on Drawings).
- B. Related Requirements:
 - 1. Section 114000 "Foodservice Equipment" for metal shelving in kitchen, pantry, and refrigerated spaces.
 - 2. Section 115123 "Library Stack Systems" for library shelving systems including cantilever-bracket shelving supported by wall-mounted standards.

1.3 COORDINATION

- A. Coordinate sizes and locations of blocking and backing required for installation of metal storage shelving attached to wall and ceiling assemblies.
- B. Coordinate locations and installation of metal storage shelving that may interfere with ceiling systems including lighting, HVAC, speakers, sprinklers, access panels, electrical switches or outlets, and floor drains.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal storage shelving.
- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- C. Shop Drawings: For metal storage shelving.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include installation details of connectors, lateral bracing, and special bracing.
- D. Product Schedule: For metal storage shelving.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of metal storage shelving.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal storage shelving to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install metal storage shelving until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sustainable Design Performance:
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 POST-AND-BEAM METAL STORAGE SHELVING (S11, S12, S13A)

- A. Post-and-Beam Metal Shelving: Complying with MH 28.2; field-assembled from factory-formed components. Shelves are supported by beams that span between supporting corner posts that allow beam-height adjustment over full height of shelving unit. Provide fixed top and bottom beams, adjustable intermediate beams, and accessories indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lyon Workspace Products, LLC.
 - b. Penco Products, Inc.
 - c. Republic Storage Systems, LLC.
- B. Load-Carrying Capacity per Shelf: 400 lb, uniformly distributed.
- C. Posts: Fabricated from cold-rolled steel; in manufacturer's standard shape; with perforations at 1-1/2 inches o.c. to receive beam-to-post connectors.

1. Unit Configuration: Configure shelving units as individual, freestanding assemblies.
 2. Steel Thickness, Nominal: 0.075 inch.
 3. Post Base: Cold-rolled steel floor plate, drilled for floor anchors.
- D. Beams: Fabricated from cold-rolled steel; in channel or flanged shape. Provide beam at each side of each shelf, with center supports as required for load-carrying capacity of shelf.
1. Steel Thickness, Nominal: 0.075 inch.
 2. Beam-to-Post Connectors: Projecting manufacturer's standard at each end that engage posts.
 - a. Top and Bottom Shelf Beams: Provide with single beam-to-post connectors.
 - b. Intermediate Shelf Beams: Provide with single beam-to-post connectors.
 3. Beam Quantity: As required for number of shelves indicated per shelving unit.
- E. Flat Metal Shelves: Fabricate fronts, backs, and sides of shelves with box-formed edges, with corners lapped and welded from the following material:
1. Steel Sheet: Nominal thickness 0.059 inch.
- F. Shelf Quantity: Six shelves per shelving unit in addition to top and bottom shelf.
- G. Overall Unit Width: As shown on schedule, inclusive of two end posts.
- H. Overall Unit Depth: As shown on schedule.
- I. Overall Unit Height: 84 inches.
- J. Accessories:
1. Tie Plates: Cold-rolled steel, finished to match posts; designed for joining posts of adjacent shelving units.
 2. Supports: Back-to-wall type that bolt to posts; as required for shelving unit stability.
- K. Steel Finish: Baked enamel or powder coat.
1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.3 ANCHORS

- A. Floor Anchors: Galvanized-steel, post-installed expansion anchors power-actuated fasteners or threaded concrete screws. Provide number per unit recommended by manufacturer unless additional anchors are indicated in calculations.
- B. Wall Anchors: Manufacturer's standard, galvanized-steel anchors designed to secure metal storage shelving to adjacent wall. Provide one per shelving unit for each shelving unit adjacent to a wall unless additional anchors are indicated in calculations.

2.4 FABRICATION

- A. Fabricate metal storage shelving components to provide field-assembled units that are square and rigid, with posts plumb and true and shelves flat and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.

1. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
 2. Build in straps, plates, brackets, and other reinforcements as needed to support shelf loading.
 3. Cut, reinforce, drill, and tap metal fabrications to receive hardware, fasteners, and similar items.
- B. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- C. Form edges and corners free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a hem on the concealed side; ease edges of metal plate to radius of approximately 1/32 inch. Shear and punch metals cleanly and accurately. Remove burrs.
- D. Weld corners and seams continuously to develop strength, minimize distortion, and maintain the corrosion resistance of base metals. At exposed locations, finish welds and surfaces smooth and blended so surface is smooth after finishing and contour of welded surface matches that of adjacent surface. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces before finishing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine floors for suitable conditions where metal storage shelving will be installed.
- C. Examine walls to which metal storage shelving will be attached for properly located blocking, grounds, or other solid backing for attachment of support fasteners.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Vacuum and clean finished floor over which metal storage shelving is to be installed.

3.3 INSTALLATION

- A. Install metal storage shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.
 1. Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.

2. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.
3. Adjust post-base bolt leveler to achieve level and plumb installation.
4. Anchor shelving units to floor with floor anchors through floor plate. Shim floor plate to achieve level and plumb installation.
5. Install seismic restraints.
6. Connect side-to-side shelving units together.
7. Install shelves in each shelving unit at equal spacing.
 - a. Post-and-Beam Metal Storage Shelving: Install beams with beam-to-post connectors fully engaged in post perforations.

3.4 ERECTION TOLERANCES

- A. Erect post-and-beam metal storage shelving to a maximum tolerance from vertical of 1/4 inch in 84 inches of height.

3.5 ADJUSTING

- A. Adjust metal storage shelving so that connectors and other components engage accurately and securely.
- B. Touch up marred finishes or replace metal storage shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal storage shelving manufacturer.
- C. Replace metal storage shelving components that have been damaged beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 105613

SECTION 129300 - SITE FURNISHINGS

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. Seating.
2. Bicycle racks.
3. Trash receptacles.
4. Planters.
5. Bollards.
6. Rain Barrels
7. Chalk Board

- B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing pipe sleeves cast, installing anchor bolts cast, and formed voids in concrete footings.
2. Section 061063 "Exterior Rough Carpentry" for Wood construction
3. Section 312000 "Earth Moving" for excavation for installing concrete footings.

1.3 ACTION SUBMITTALS

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

- B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.

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

- D. Samples for Initial Selection: For units with factory-applied finishes.

- E. Samples for Verification: For each type of exposed finish, not less than 6-inch-long linear components and 4-inch-square sheet components.

- F. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For site furnishings manufactured with preservative-treated wood.
 - 1. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For site furnishings to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Trash Receptacle Inner Containers: Five full-size units for each size indicated, but no fewer than two units.

PART 2 - PRODUCTS

2.1 SEATING B1 (Backless)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Victor Stanley, Inc; CM-214 6' bench with Recycled plastic slats or a comparable product by one of the following:
 - 1. Columbia Cascade Company- Restoration
 - 2. Landscape Forms- Plainwell
- B. Frame: Cast iron.
- C. Seat and Back:
 - 1. Material:
 - a. Recycled Plastic Planks: Evenly spaced, parallel. Grey
 - 2. Seat Height: 17-3/4".
 - 3. Seat Surface Shape: Contoured or dished.
 - 4. Overall Width: 6 feet.
 - 5. Overall Depth: 22-1/4".
 - 6. Arms: each end.
 - a. Arm Material: Match frame.

7. Warranty: 10 years.
8. Seating Configuration.
 - a. Straight shape.

2.2 SEATING Wooden Seat Block

- A. Frame: Cedar.
- B. Seat :
 1. Material:
 - a. Wood Planks: Evenly spaced, parallel.
 2. Seat Height: As indicated.
 3. Overall Height: As indicated on plans.
 4. Overall Width: As indicated on plans.
 5. Overall Depth: As indicated on plans.

2.3 BICYCLE RACKS BR

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Landscape Forms; Ride or a comparable product by one of the following:
 1. Columbia Cascade Company.
 2. Urban Accessories, Inc.
 3. Forms+Surfaces
- B. Bicycle Rack Construction:
 1. Frame: Aluminum.
 2. Style: Double-side parking.
 - a. Overall Height: 26 Inches.
 - b. Overall Width: 3 ½ Inches.
 - c. Overall Depth: 28 Inches.
 - d. Capacity: Designed to accommodate no fewer than two bicycles.
 3. Security: Designed to lock wheel and frame.
 4. Installation Method: Surface flange anchored below finished grade to substrate indicated
Cast in concrete Bolted to cast-in anchor bolts.
- C. Aluminum Finish: Color coated.
 1. Color: As selected by Architect from manufacturer's full range.

2.4 LITTER AND RECYCLING RECEPTACLES LR

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Victor Stanley, Inc; S-42 Litter and Recycling Receptacle or a comparable product by one of the following:
 - 1. Columbia Cascade Company.
 - 2. Forms+Surfaces.
 - 3. Landscape Forms.
- B. Steel Facing Surrounds: Evenly patterned, parallel flat steel straps, bars, or tubular shapes.
- C. Support Frames: Steel; welded.
- D. Trash Receptacles:
 - 1. Receptacle Shape and Form: Round cylinder; with opening for depositing trash in lid or top.
 - 2. Lids and Tops: Matching facing panels secured by cable or chain, hinged, swiveled, or permanently secured.
 - a. Description: Flat rim ring lid with center opening.
 - 3. Receptacle Height: 38-5/8".
 - 4. Overall Width: 19".
 - 5. Inner Container: Rigid plastic container with drain holes lift-out handles; designed to be removable and reusable.
 - 6. Disposable Liners: Provide receptacle designed to accommodate disposable liners.
 - 7. Capacity: Not less than 36 gal..
 - 8. Service Access: Rmovable lid or top; inner container and disposable liner lift or slide-out for emptying; .
- E. HDPE Color: Black.
- F. Graphics: Surface-applied copy, content, and style according to manufacturer's standard.
 - 1. Copy: Litter and Recycle.

2.5 PLANTERS GP

- A. Wood Facing Surrounds: Evenly spaced cedar slats.
- B. Support Frames: Cedar post;
- C. Planter Shape and Form: As indicated.
- D. Overall Height: As indicated on plans.
- E. Overall Width: As indicated on plans.
- F. Overall Depth: As indicated on plans.

- G. Installation Method: Freestanding.
- H. Wood Finish: Sanded Unfinished.

2.6 RAIN BARREL RB

- A. Materials: Plastic.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Spruce Creek Rain Barrel 54 gallon capacity recycled content food grade UV stabilized polyethylene or a comparable product by one of the following:
 - 1. Rain Water Solutions.
 - 2. Obis – System NPL 315
- C. Overall Height: 36”.
- D. Overall Width: 22” diameter.
- E. Wall thickness: 3/16”
- F. Weight: 20 lbs.
- G. Installation Method: Freestanding.
- H. Accessories:
 - 1. Overflow fitting drain plus screw on covet
 - 2. Spigot at 4” height from base
 - 3. Insect screen
 - 4. T Connector

2.7 BOLLARDS BL

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Landscape Forms, Annapolis standard Bollard.or comparable product by one of the following:
 - 2. Creative Pipe, Inc.
 - 3. Urban Accessories, Inc.
- B. Bollard Construction:
 - 1. Structural steel tube, ASTM A 500, grade B.
 - 2. Bollard Top: Aluminum Casting
 - 3. Plastic Sleeve: Low density polyethylene, .22” thick, 26.625 inches long, textured
 - 4. Style: Manufacturer's standard Ornamental cap.
 - 5. Overall Height: 33”.
 - 6. Overall Width: 6” diameter.
 - 7. Installation Method: Embedded.
 - 8. Color: Black.

2.8 CHALK BOARD

- A. Basis-of-Design Product: Subject to compliance with requirements, provide salvage slate chalk board by Recycling the Past Architectural Salvage (609)660.9790 or a comparable product by one of the following:
1. Marsh Industries. WS-408-0000 2 with 2-3/4" aluminum frame.
 2. Billy Boards, Frameless Magnetic Porcelain Steel Chalkboard
 3. Wall Décor Store, MT 107 Oversize Magnetic Chalk Board
- B. Thickness: 1/2"
- C. Support Frames: 1/4" thick Aluminum frame
- D. Square Corners
- E. Edges: Manufacturer Painted to match front and back face or natural color of slate
- F. Core: Exterior Rated. If porcelain steel
- G. Color: Black, clear if slate. Green or White if Porcelain Steel
- H. Finish: Honed Finish for natural slate. Smooth for Porcelain Steel
- I. Installation Method: Surface mounted to concrete wall with vandal proof, corrosion resistant fasteners.

2.9 MATERIALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:
1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B 211.
 2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B 221.
 3. Structural Pipe and Tube: ASTM B 429/B 429M.
 4. Sheet and Plate: ASTM B 209.
 5. Castings: ASTM B 26/B 26M.
- B. Steel and Iron: Free of surface blemishes and complying with the following:
1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
 2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53/A 53M, or electric-resistance-welded pipe complying with ASTM A 135/A 135M.
 3. Tubing: Cold-formed steel tubing complying with ASTM A 500/A 500M.
 4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513/A 513M, or steel tubing fabricated from steel complying with ASTM A 1011/A 1011M and complying with dimensional tolerances in ASTM A 500/A 500M; zinc coated internally and externally.

5. Sheet: Commercial steel sheet complying with ASTM A 1011/A 1011M.
- C. Wood: Surfaced smooth on four sides with eased edges; kiln dried, free of knots, solid stock of species indicated.
 1. Wood Species:
 - a. Eastern White or Red or Yellow Cedar: Select Grade or better.
 - b. Redwood: Construction heart or better, free-of-heart center.
 - c. Teak (*Tectona Grandis*): Clear Grade.
- D. Certified Wood: Wood products shall be certified as "FSC Pure" according to FSC STD-01-00 and FSC STD-40-004.
 1. Finish: Manufacturer's standard transparent wood-preservative treatment and sealer.
- E. Slate Dimensional Stone: ASTM C 629/C 629M-15
- F. Fiberglass: Multiple laminations of glass-fiber-reinforced polyester resin with UV-light stable, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat, and with manufacturer's standard finish.
- G. Plastic: Color impregnated, color and UV-light stabilized, and mold resistant.
 1. Polyethylene: Fabricated from virgin plastic HDPE resin.
 2. Polyethylene with Recycled Content: Fabricated from HDPE and other resins with postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- H. Anchors, Fasteners, Fittings, and Hardware: Galvanized steel or Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality, tamperproof, vandal and theft resistant.
 1. Angle Anchors: For inconspicuously bolting legs of site furnishings to on-grade substrate; one per leg.
 2. Antitheft Hold-Down Brackets: For securing site furnishings to substrate; two per unit].
- I. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M; recommended in writing by manufacturer, for exterior applications.
- J. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound; resistant to erosion from water exposure without needing protection by a sealer or waterproof coating; recommended in writing by manufacturer, for exterior applications.
- K. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:

1. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent zinc pigmented coating, not less than 0.3 mil thick.
2. Hot-Dip Galvanizing: According to ASTM A 123/A 123M, ASTM A 153/A 153M, or ASTM A 924/A 924M.

2.10 FABRICATION

- A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.
- B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended, so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.
- C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- D. Preservative-Treated Wood Components: Complete fabrication of treated items before treatment if possible. If cut after treatment, apply field treatment complying with AWWA M4 to cut surfaces.
- E. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.
- F. Factory Assembly: Factory assemble components to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.11 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 ALUMINUM FINISHES

- A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.13 STEEL AND GALVANIZED-STEEL FINISHES

- A. Powder-Coat Finish: Manufacturer's standard polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.
- B. PVC Finish: Manufacturer's standard, UV-light stabilized, mold-resistant, slip-resistant, matte-textured, dipped or sprayed-on, PVC-plastisol finish, with flame retardant added; complying with coating manufacturer's written instructions for pretreatment, application, and minimum dry film thickness.

2.14 IRON FINISHES

- A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.
- D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

END OF SECTION 129300

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

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 temporary excavation support and protection systems.
- B. Related Sections:
 - 1. Division 31 Section "Dewatering" for dewatering system for excavations.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
 - 1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
 - 4. Monitor vibrations, settlements, and movements.

1.4 SUBMITTALS

- A. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Other Informational Submittals:
 - 1. Photographs or Videotape: Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems. Submit before Work begins.
 - 2. Record Drawings: Identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.

- a. Note locations and capping depth of wells and well points.

1.5 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project Site.

1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:
 - a. Geotechnical report.
 - b. Existing utilities and subsurface conditions.
 - c. Proposed excavations.
 - d. Proposed equipment.
 - e. Monitoring of excavation support and protection system.
 - f. Working area location and stability.
 - g. Coordination with waterproofing.
 - h. Abandonment or removal of excavation support and protection system.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Owner's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.

1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
2. The geotechnical report is referenced elsewhere in the Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Construction Manager if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36, ASTM A 690, or ASTM A 992.
- C. Steel Sheet Piling: ASTM A 328/, ASTM A 572, or ASTM A 690; with continuous interlocks.
 - 1. Corners: Roll-formed corner shape with continuous interlock.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.
- E. Shotcrete: Comply with Division 03 Section "Shotcrete" for shotcrete materials and mixes, reinforcement, and shotcrete application.
- F. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- G. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- H. Tiebacks: Steel bars, ASTM A 722.
- I. Tiebacks: Steel strand, ASTM A 416.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.

- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 SOLDIER PILES AND LAGGING

- A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
- C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS

- A. Tiebacks: Drill, install, grout, and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.
 - 1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
 - 2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

3.5 BRACING

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Construction Manager.

2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
 2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earth Moving."
 3. Repair or replace, as approved by Construction Manager, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 315000

SECTION 321400 - UNIT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Brick pavers set in bituminous setting beds.
2. Detectable warning unit pavers set in mortar setting beds.
3. Steel and Aluminum edge restraints.
4. Cast-in-place concrete edge restraints.
5. Salvage Stone cobbles set in mortar setting beds.
6. Trench grates set over runnels in sidewalk.

- B. Related Requirements:

1. Section 321216 "Asphalt Paving" for asphalt base under unit pavers.
2. Section 321313 "Concrete Paving" for concrete base under unit pavers and for cast-in-place concrete curbs and gutters serving as edge restraints for unit pavers.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For materials other than water and aggregates.

- B. Product Data: For the following:

1. Pavers.
2. Bituminous setting materials.
3. Mortar and grout materials.
4. Edge restraints.
5. Trench grates.

- C. Sustainable Design Submittals:

1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
- D. Sieve Analyses: For aggregate setting-bed materials, according to ASTM C 136.
- E. Samples for Initial Selection:
 1. Joint materials involving color selection.
 2. Each type of unit paver specified. Provide a minimum of 3 full size pavers to demonstrate range of color and texture.
 3. Exposed edge restraints involving color selection.
 4. Each type of trench grate specified. Provide a minimum 6" length of product showing finish and pattern.
 5. Provide product information for trench grate mounting.
- F. Samples for Verification: For full-size units of each type of unit paver indicated. Assemble no fewer than five Samples of each type of unit on suitable backing and grout joints. Include Samples of the following:
 1. Joint materials.
 2. Exposed edge restraints.

1.5 INFORMATIONAL SUBMITTALS

- A. Adhesion and Compatibility Test Reports: From latex-additive manufacturer for mortar and grout containing latex additives.
- B. Material Certificates: For unit pavers. Include statements of material properties indicating compliance with requirements, including compliance with standards. Provide for each type and size of unit.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for unit pavers, indicating compliance with requirements.
 1. For solid interlocking paving units, include test data for freezing and thawing according to ASTM C 67.

1.6 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Submit to latex-additive manufacturer, for testing as indicated below, Samples of flooring materials that will contact or affect mortar and grout that contain latex additives.
 - 1. Use manufacturer's standard test methods to determine whether mortar and grout materials will obtain optimal adhesion with, and will be nonstaining to, installed brick and other materials constituting brick flooring installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquids in tightly closed containers protected from freezing.
- E. Store asphalt cement and other bituminous materials in tightly closed containers.

1.9 FIELD CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- B. Weather Limitations for Bituminous Setting Bed:
 - 1. Install bituminous setting bed only when ambient temperature is above 40 deg F and when base is dry.
 - 2. Apply asphalt adhesive only when ambient temperature is above 50 deg F and when temperature has not been below 35 deg F for 12 hours immediately before application. Do not apply when setting bed is wet or contains excess moisture.
- C. Weather Limitations for Mortar and Grout:
 - 1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6. Provide artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and higher.

- a. When ambient temperature exceeds 100 deg F, or when wind velocity exceeds 8 mph and ambient temperature exceeds 90 deg F, set pavers within 1 minute of spreading setting-bed mortar.

1.10 WARRANTY

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 TACTILE WARNING SURFACING, GENERAL

- A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for tactile warning surfaces.
 1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Regional Materials: Products shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- D. Source Limitations: Obtain each type of unit paver, joint material and, setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.3 DETECTABLE WARNING UNIT PAVERS (P2, Paver A, D) Base Bid

- A. Detectable Warning Concrete Unit Pavers: Solid paving units, made from normal-weight concrete with a compressive strength of not less than 5000 psi, water absorption of not more than 5 percent according to ASTM C 140, and no breakage and not more than 1 percent mass loss when tested for freeze-thaw resistance according to ASTM C 67, with accessible detectable warning truncated domes on exposed surface of units.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Vehicular Pine Hall Brick, ADA Truncated Dome or comparable product by one of the following:
 - a. Whitacre Greer ADA
 - b. GlenGery ADA
 2. Shapes and Sizes:
 - a. Thickness: 2-1/4 inches at field of tile.
 - b. Face Size: Nominal 4 by 8 inches.
 3. Dome Spacing and Configuration: Manufacturer's standard compliant spacing, in manufacturer's standard pattern.
 4. Color: As selected by Architect from manufacturer's full range. Red(A) next to concrete paving, tan or light color (D) next to red brick paving.
- B. Mortar Setting Bed:
1. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
 2. Sand: ASTM C 33/C 33M.
 3. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed, and not containing a retarder.
 4. Thinset Mortar: Latex-modified portland cement mortar complying with ANSI A118.4.
 5. Water: Potable.

2.4 BRICK PAVERS

- A. Regional Materials: Brick shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Regional Materials: Brick shall be manufactured within 500 miles of Project site.
- C. Brick Pavers(P2, Paver B): Light-traffic paving brick; ASTM C 902, Class SX, Type I, Application PX. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Pine Hall Brick, English Edge Red or comparable product by one of the following:

- a. Belden Brick Company, Regimental Red
 - b. GlenGery Extruded, York Red
2. Thickness: 2-1/4 inches.
 3. Face Size: 4 by 8 inches. Square edge.
 4. Color: Medium red As selected by Architect from manufacturer's full range.
- D. Brick Pavers(P2, Paver C): Light-traffic paving brick; ASTM C 902, Class SX, Type I, Application PX. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Vehicular Pine Hall Brick, English Edge Full Range Red or comparable product by one of the following:
 - a. Belden Brick Company, Regimental Red
 - b. GlenGery Extruded, York Flashed
 2. Thickness: 2-1/4 inches.
 3. Face Size: 4 by 8 inches. Square edge
 4. Color: Medium red As selected by Architect from manufacturer's full range.
- E. Brick Pavers (P3): Heavy vehicular paving brick; ASTM C 1272, Type F, Application PX. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Vehicular Pine Hall Brick, English Edge Red or comparable product by one of the following:
 - a. Belden Brick Company, Regimental Full Range Red
 - b. GlenGery Extruded Repressed Chamfered edge, York Flashed
 2. Thickness: 2-3/4 inches.
 3. Face Size: 4 by 8 inches with chamfered edge
 4. Color: Medium red As selected by Architect from manufacturer's full range.
- F. Efflorescence: Brick shall be rated "not effloresced" when tested according to ASTM C 67.
- G. Temporary Protective Coating: Precoat exposed surfaces of brick pavers with a continuous film of a temporary protective coating that is compatible with brick, mortar, and grout products and can be removed without damaging grout or brick. Do not coat unexposed brick surfaces; handle brick to prevent coated surfaces from contacting backs or edges of other units. If, despite these precautions, coating does contact bonding surfaces of brick, remove coating from bonding surfaces before setting brick.

2.5 CURBS AND EDGE RESTRAINTS

- A. Steel Edge Restraints: Manufacturer's standard painted steel edging 1/4 inch thick by 5 inches high with loops pressed from or welded to face to receive stakes at 36 inches o.c. and steel stakes 15 inches long for each loop.

1. Color: Black.
- B. Aluminum Edge Restraints: Manufacturer's standard straight, 3/16-inch-thick by 5.5-inch-high L-shaped, 3/16-inch-thick by 2-1/4-inch-high extruded-aluminum edging with loops pressed from face to receive stakes at 12 inches o.c. and aluminum stakes 12 inches long for each loop.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brickstop Corporation.
 - b. Curv-Rite, Inc.
 - c. Permaloc Corporation.
 - d. Sure-loc Edging Corporation.
- C. Job-Built Concrete Edge Restraints: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mixed concrete with minimum 28-day compressive strength of 3000 psi.
- D. Salvaged Stone Curbs, Setts and Cobbles: On -site loose laid stone setts and cobbles, in random lengths
 1. Color and Grain: Light gray and Buff varied Colors with varied grain.
 2. Top Width: Varies.
 3. Face Height: Varies.
 4. Total Height: Varies.

2.6 TRENCH GRATES (R Condition C)

- A. Cast iron trench grate: Manufacturer's cast iron form 100% recycled content. ADA compliant. Castings shall display a uniform pattern and quality free from blowholes, hard spots, shrinkages, distortion or other defects. Castings shall be cleaned by shot blasting.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Ironsmith Model 9054-C Conquistador 1/4" opening wave pattern, 8" x 24' or 8"x12" or of a length to minimize the number of individual pieces in a sidewalk section. A comparable product may be provided by one of the following:
 2. Iron Age Designs, 8" River Rock, RRN8-20I04
 3. Urban Accessories- - 8" Urban Accessories, Title-24.
 4. Color: Natural patina.
 5. Grate: Cast ductile iron. ASTM A536, class 65-45-12
 6. Finish: Natural Unfinished
 7. Frames: Manufacturer's Steel Angle frame used with unit pavers as illustrated on plans.
 - a. Finish: Hot dipped galvanized after fabrication
 8. Lengths: 5' and 8'. Minimize number of sections in application locations.
 9. Height: .8125 Inches

- B. Warranty: 5 years.

2.7 ACCESSORIES

- A. Cork Joint Filler: Preformed strips complying with ASTM D 1752, Type II.
- B. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

2.8 BITUMINOUS SETTING-BED MATERIALS

- A. Primer for Base: ASTM D 2028/D 2028M, cutback asphalt, grade as recommended by unit paver manufacturer.
- B. Fine Aggregate for Setting Bed: ASTM D 1073, No. 2 or No. 3.
- C. Asphalt Cement: ASTM D 3381/D 3381M, Viscosity Grade AC-10 or Grade AC-20.
- D. Neoprene-Modified Asphalt Adhesive: Paving manufacturer's standard adhesive consisting of oxidized asphalt combined with 2 percent neoprene and 10 percent long-fibered mineral fibers containing no asbestos.
- E. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.
 - 1. Provide sand of color needed to produce required joint color.

2.9 BITUMINOUS SETTING-BED MIX

- A. Mix bituminous setting-bed materials at an asphalt plant in approximate proportion, by weight, of 7 percent asphalt cement to 93 percent fine aggregate unless otherwise indicated. Heat mixture to 300 deg F.

2.10 MORTAR SETTING-BED MATERIALS

- A. Regional Materials: Aggregate for mortar and grout[, **cement, and lime**] shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Regional Materials: Aggregate for mortar and grout[, **cement, and lime**] shall be manufactured within 500 miles of Project site.
- C. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
- D. Hydrated Lime: ASTM C 207, Type S.
- E. Sand: ASTM C 144.

- F. Latex Additive: Manufacturer's standard meeting Baltimore City Standards water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed, and not containing a retarder.
- G. Thin-Set Mortar for Bond Coat: Latex-portland cement mortar complying with ANSI A118.4.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Bonsal American, an Oldcastle company.
 - b. C-Cure.
 - c. Laticrete International, Inc.
- H. Water: Potable.

2.11 GROUT MATERIALS

- A. Regional Materials: Aggregate for mortar and grout shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Sand-Portland Cement Grout: ANSI A108.10, made of white or gray cement and white or colored aggregate as required to produce color indicated.
 - 1. Colored Mortar Pigments for Grout: Natural and synthetic iron and chromium oxides, compounded for use in mortar and grout mixes. Use only pigments that have proved, through testing and experience, to be satisfactory for use in portland cement grout.
 - a. To match building façade color
- C. High-Performance Cement Grout: ANSI A118.7, sanded.
- D. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Avantigrout.
 - b. Basf Building Systems.
 - c. Laticrete International, Inc.
 - 2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 - 3. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
- E. Grout Colors: As selected by Architect from manufacturer's full range to match building facade.
- F. Water: Potable.

2.12 MORTAR AND GROUT MIXES

- A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other

procedures needed to produce setting-bed and joint materials of uniform quality and with optimal performance characteristics. Discard mortars and grout if they have reached their initial set before being used.

- B. Mortar-Bed Bond Coat: Mix neat cement and latex additive to a creamy consistency.
- C. Latex-Modified, Portland Cement Setting-Bed Mortar: Proportion and mix portland cement, sand, and latex additive for setting bed to comply with written instructions of latex-additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.
- D. Latex-Modified, Portland Cement Bond Coat: Proportion and mix portland cement, aggregate, and liquid latex for bond coat to comply with written instructions of liquid-latex manufacturer.
- E. Job-Mixed Portland Cement Grout: Proportion and mix job-mixed portland cement and aggregate grout to match setting-bed mortar except omit hydrated lime and use enough water to produce a pourable mixture.
- F. Packaged Grout: Proportion and mix according to grout manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive unit paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions. Verify that installation of tactile warning surfacing will comply with accessibility requirements upon completion.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and waterproofing protection is in place.

3.2 PREPARATION

- A. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.
- B. Sweep concrete substrates to remove dirt, dust, debris, and loose particles.
- C. Proof-roll prepared subgrade according to requirements in Section 312000 "Earth Moving" to identify soft pockets and areas of excess yielding. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive subbase and base course for unit pavers.

3.3 INSTALLATION, GENERAL

- A. Do not use unit pavers with chips, cracks, voids, discolorations, or other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
 - 1. For concrete pavers, a block splitter may be used.
- D. Handle protective-coated brick pavers to prevent coated surfaces from contacting backs or edges of other units. If, despite these precautions, coating does contact bonding surfaces of brick, remove coating from bonding surfaces before setting brick.
- E. Joint Pattern: As indicated.
- F. Pavers over Waterproofing: Exercise care in placing pavers and setting materials over waterproofing so protection materials are not displaced and waterproofing is not punctured or otherwise damaged. Carefully replace protection materials that become displaced and arrange for repair of damaged waterproofing before covering with paving.
 - 1. Provide joint filler at waterproofing that is turned up on vertical surfaces unless otherwise indicated; where unfilled joints are indicated, provide temporary filler or protection until paver installation is complete.
- G. Tolerances: Do not exceed 1/32-inch unit-to-unit offset from flush (lippage) or 1/8 inch in 10 feet from level, or indicated slope, for finished surface of paving.
- H. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.
- I. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide compressible foam filler as backing for sealant-filled joints unless otherwise indicated; where unfilled joints are indicated, provide temporary filler until paver installation is complete. Install joint filler before setting pavers. Sealant materials and installation are specified in Section 079200 "Joint Sealants."
- J. Expansion and Control Joints: Provide cork joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.
- K. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
 - 1. Install edge restraints to comply with manufacturer's written instructions. Install stakes at intervals required to hold edge restraints in place during and after unit paver installation.
 - 2. For metal edge restraints with top edge exposed, drive stakes at least 1 inch below top edge.

3. Install job-built concrete edge restraints to comply with requirements in Section 033000 "Cast-in-Place Concrete."
 4. Where pavers set in mortar bed are indicated as edge restraints for pavers set in aggregate setting bed, install pavers set in mortar and allow mortar to cure before placing aggregate setting bed and remainder of pavers. Cut off mortar bed at a steep angle so it will not interfere with aggregate setting bed.
 5. Where pavers embedded in concrete are indicated as edge restraints for pavers set in aggregate setting bed, install pavers embedded in concrete and allow concrete to cure before placing aggregate setting bed and remainder of pavers. Hold top of concrete below aggregate setting bed.
- L. Provide steps made of pavers as indicated. Install paver steps before installing adjacent pavers.
1. Where pavers set in mortar bed are indicated for steps constructed adjacent to pavers set in aggregate setting bed, install steps and allow mortar to cure before placing aggregate setting bed and remainder of pavers. Cut off mortar bed at a steep angle so it will not interfere with aggregate setting bed.

3.4 INSTALLATION OF DETECTABLE WARNING UNIT PAVERS

A. Unit Paver Installation, General:

1. Setting-Bed and Unit Paver Installation: Comply with installation requirements in Section 321400 "Unit Paving."
2. Mix unit pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
3. Cut unit pavers with motor-driven masonry saw equipment to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.
4. Tolerances: Do not exceed 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

B. Mortar Setting-Bed Applications:

1. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.
2. Apply mortar-bed bond coat over surface of concrete subbase about 15 minutes before placing mortar bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch (1.6-mm) thickness for bond coat.
3. Apply mortar bed over bond coat; spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.
4. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Before placing pavers, cut back, bevel edge, and remove and discard setting-bed material that has reached initial set.
5. Place pavers before initial set of cement occurs. Immediately before placing pavers on mortar bed, apply uniform 1/16-inch- (1.5-mm-) thick bond coat to mortar bed or to back of each paver with a flat trowel.
6. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.

7. Spaced Joint Widths: Provide 3/8-inch (10-mm) nominal joint width with variations not exceeding plus or minus 1/16 inch (1.5 mm).
8. Grouted Joints: Grout paver joints complying with ANSI A108.10. Grout joints as soon as possible after initial set of setting bed.
 - a. Force grout into joints, taking care not to smear grout on adjoining surfaces.
 - b. Tool exposed joints slightly concave when thumbprint hard.
 - c. Cure grout by maintaining in a damp condition for seven days unless otherwise recommended by grout or liquid-latex manufacturer.
9. Remove excess grout from exposed paver surfaces; wash and scrub clean.
10. Protect installation from traffic until grout has set.

3.5 BITUMINOUS SETTING-BED APPLICATIONS

- A. Apply primer to concrete slab or binder course immediately before placing setting bed.
- B. Prepare for setting-bed placement by locating 3/4-inch-deep control bars approximately 11 feet apart and parallel to one another, to serve as guides for striking board. Adjust bars to subgrades required for accurate setting of paving units to finished grades indicated.
- C. Place bituminous setting bed where indicated, in panels, by spreading bituminous material between control bars. Spread mix at a minimum temperature of 250 deg F. Strike setting bed smooth, firm, even, and not less than 3/4 inch thick. Add fresh bituminous material to low, porous spots after each pass of striking board. After each panel is completed, advance first control bar to next position in readiness for striking adjacent panels. Carefully fill depressions that remain after removing depth-control bars.
 1. Roll setting bed with power roller to a nominal depth of 3/4 inch. Adjust thickness as necessary to allow accurate setting of unit pavers to finished grades indicated. Complete rolling before mix temperature cools to 185 deg F.
- D. Apply neoprene-modified asphalt adhesive to cold setting bed by squeegeeing or troweling to a uniform thickness of 1/16 inch. Proceed with setting of paving units only after adhesive is tacky and surface is dry to touch.
- E. Place pavers carefully by hand in straight courses, maintaining accurate alignment and uniform top surface. Protect newly laid pavers with plywood panels on which workers can stand. Advance protective panels as work progresses, but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of pavers. If additional leveling of paving is required, and before treating joints, roll paving with power roller after sufficient heat has built up in the surface from several days of hot weather.
- F. Joint Treatment: Place unit pavers with hand-tight joints. Fill joints by sweeping sand over paved surface until joints are filled. Remove excess sand after joints are filled.

3.6 MORTAR SETTING-BED APPLICATIONS

- A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.
- B. Apply mortar-bed bond coat over surface of concrete subbase about 15 minutes before placing mortar bed. Do not exceed 1/16-inch thickness for bond coat. Limit area of bond coat to avoid its drying out before placing setting bed.
- C. Apply mortar bed over bond coat; spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.
- D. Place reinforcing wire over concrete subbase, lapped at joints by at least one full mesh and supported so mesh becomes embedded in the middle of mortar bed. Hold edges back from vertical surfaces approximately 1/2 inch.
- E. Place mortar bed with reinforcing wire fully embedded in middle of mortar bed. Spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.
- F. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Before placing pavers, cut back, bevel edge, and remove and discard setting-bed material that has reached initial set.
- G. Wet brick pavers before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Place pavers before initial set of cement occurs. Immediately before placing pavers on mortar bed, apply uniform 1/16-inch-thick bond coat to mortar bed or to back of each paver with a flat trowel.
- I. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.
- J. Spaced Joint Widths: Provide 3/8-inch nominal joint width with variations not exceeding plus or minus 1/16 inch.
- K. Grouted Joints: Grout paver joints complying with ANSI A108.10.
- L. Grout joints as soon as possible after initial set of setting bed.
 - 1. Force grout into joints, taking care not to smear grout on adjoining surfaces.
 - 2. Clean pavers as grouting progresses by dry brushing or rubbing with dry burlap to remove smears before tooling joints.
 - 3. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

4. If tooling squeezes grout from joints, remove excess grout and smears by dry brushing or rubbing with dry burlap and tool joints again to produce a uniform appearance.
- M. Cure grout by maintaining in a damp condition for seven days unless otherwise recommended by grout or liquid-latex manufacturer.

3.7 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout. Point joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.
- C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.
 1. Remove temporary protective coating as recommended by coating manufacturer and as acceptable to paver and grout manufacturers.
 2. Do not allow protective coating to enter floor drains. Trap, collect, and remove coating material.
- D. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Architect. Replace using tactile warning surfacing installation methods acceptable to Architect.
- E. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

3.8 TRENCH GRATE INSTALLATION

- A. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- B. Install steel angle frame in accordance with details specified on plans and manufacturer's recommendations. Maintain flush and leveled with surrounding paving surface, maintain flush and leveled at all times.
- C. Install grates after danger of damage from construction traffic is past.
- D. If needed, grind pads on underside of trench grates to level and prevent grate rattle or rocking.

3.9 CLEAN-UP AND PROTECTION OF TRENCH GRATES

- A. Protect installed product until completion of project.

- B. Remove or protect trench grates if concrete or paver around trench perimeter is chemically treated or acid washed or if water run off from newly poured concrete could wash onto grates
- C. Touch up, repair or replace damaged products.

END OF SECTION 321400

SECTION 321540 – CRUSHED STONE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the material and installation of the decorative crushed stone.
- B. Related Requirements:
 - 1. Section 321313 "Concrete Paving" for concrete base under unit pavers and for cast-in-place concrete curbs and gutters serving as edge restraints for unit pavers.

1.3 SUBMITTALS

- A. Product Data: For each manufactured material and project indicated.
- B. Samples for Initial Selection:
 - 1. Decorative Crushed stone.
 - 2. Exposed edge restraints involving color selection.
- C. Design Mixes: For decorative crushed stone.
- D. Sustainable Design Submittals:
 - 1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
- E. Sieve Analyses: For aggregate setting-bed materials, according to ASTM C 136.

1.4 QUALITY ASSURANCE

- A. Mock up: Install 4' wide x 10' long mockup of decorative crushed stone at location as directed by Architect.
 - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- B. Do not install decorative crushed stone during rainy conditions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- B. Store liquids in tightly closed containers protected from freezing.

1.6 FIELD CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace work damaged by frost or freezing.

1.7 EXCESS MATERIALS

- A. Provide Owner with the following excess materials.
 - 1. Contractor shall deliver two 25-pound bags of extra material to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 CRUSHED STONE SCREENINGS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Decorative Stone Dust, Mall Mix #10 Screenings, from Stancills Inc., color tan or a comparable product by one of the following:
- B. Kafka Granite, LLC Stabilized Pathway Mix, Recycled Porcelain. 1-800-852-7415
- C. Luck Stone Center, Stone Dust 443-535-0543

2.3 SUB-BASE: #57 Crushed Stone

- A. Stone color to match stone dust/#10 screenings.

2.4 STABILIZER for stone screenings

- A. Manufactured by Stabilizer Solutions, Inc. 33 South 28th St., Phoenix, AZ 85034; phone (602) 225-5900, (800) 336-2468; fax (602) 225-5902; website stabilizersolutions.com; email info@stabilizersolutions.com

2.5 WATER: Potable.

2.6 PEA GRAVEL

- A. Pea Gravel: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of the following type, size range, and color:
1. Type: Crushed stone or gravel.
 2. Size Range: 1/2 inch maximum, 1/4 inch minimum.
 3. Color: Readily available natural gravel tan color range.

2.7 CRUSHED STONE EDGINGS

- A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Border Concepts, Inc.
 - b. Collier Metal Specialties, Inc.
 - c. J. D. Russell Company (The).
 - d. Sure-loc Edging Corporation.
 2. Edging Size: 1/4 inch thick by 5 inches deep.
 3. Stakes: Tapered steel, a minimum of 12 inches long.
 4. Accessories: Standard tapered ends, corners, and splicers.
 5. Finish: Manufacturer's standard paint.
 - a. Paint Color: Brown.
- B. Salvaged Stone Edging: Stone sets, cobbles and pavers salvaged from on site
1. Set in concrete cradle. Mortar between each unit.
 2. Color and type of mortar joint to match building.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Installation Requiring Stabilizer:

1. Preparation

- a. Prepare base material to depth specified in contract drawings
- b. Pre-soak base material with water and compact to 95%

2. Blending

- a. Stabilizer shall be thoroughly pre-mixed with crushed stone/sand mix at the rate from 15-lbs of Stabilizer per 1-ton of aggregate. Check with Stabilizer Solutions, Inc. for correct Stabilizer rate for your project and climate conditions. Drop spreading of Stabilizer over pre-placed aggregate or mixing by rototilling is not acceptable for vehicular access. Stabilizer shall be mechanically pre-mixed per manufacturer's recommendations using an approved mechanical blending unit that will adequately mix and blend Stabilizer with aggregate (Bucket blending is not an approved blending apparatus). Always blend the material DRY.

3. Placement

- a. Place the aggregate and stabilizer mixture on a prepared base, and rake smooth to desired grade and cross section. Place material to sufficient depth to allow 4" for residential or 5" for commercial after compaction

4. Watering

- a. Water heavily for full-depth moisture penetration of the stabilized profile. Water activates stabilizer, so it is important to saturate through total depth. To achieve saturation of stabilized pathway profile, 25 to 45-gallons of water per 1-ton must be applied. During water application, test moisture using a probing device reaching full depth.
- b. Contractor shall wait a minimum of 6-48 hours or until such time that the paving material is able to accept compaction from a 1 to 5 ton roller without separation, plowing or any other physical compromise of aggregate.

- c. If surface aggregate dries significantly quicker than subsurface material, lightly mist surface before compaction.
 - d. Compact the material with a compactor as specified below making 3 to 4 passes (do not use a vibratory unit). Upon thorough moisture penetration, compact aggregate screenings to 85% relative compaction by equipment such as a 2 to 4-ton double drum roller or a 1,000-lb. single drum roller. Do not begin compaction for 6 hours after placement and up to 48 hours. DO NOT use a vibratory plate compactor or vibration feature on roller, as vibration separates large aggregate particles.
 - 5. Compaction
 - a. Take care in compacting decomposed granite or crushed 3/8" or 1/4" minus aggregate screenings when adjacent to planting and irrigation systems. Hand tamping with 8" or 10" hand tamp recommended.
 - 1) Installation of Stabilized aggregate more than 3" must be installed in lifts. If 4" thick compacted (2) 2" lifts. If 5" thick compacted (2) 2.5" lifts. If Stabilized aggregate is pre-moistened before installation, entire 4" or 5" lift may be installed.
 - b. Water the surface area with a light spray following compaction. Contractor shall take care as to not disturb the aggregate surface with the spray action.
- B. Installation Not Requiring Stabilizer:
 - 1. Preparation
 - a. Prepare base material to depth specified in contract drawings.
 - b. Pre-soak base material with water and compact to 95%
 - 2. Placement
 - a. Upon thorough moisture penetration of stone in cement mixer, place decorative crushed stone/ stone dust to depth specified on contract drawings.
 - 3. Compaction
 - a. Hand tamp stone.
 - b. After compaction, check depth and add additional stone where needed.
- C. Repairs prior to approval. Remove and replace decorative crushed stone metal sections that become damaged, settle, and/or do not meet the requirements of this section.
 - 1. Excavate damaged area to the depth of the decorative crushed stone material being sure to leave filter fabric intact.
 - 2. If the area is dry, moisten portion lightly.
 - 3. Add water to the blended stone. Thoroughly moisten mix with 25 to 30 gallons per ton of blended mix or to approximately 10% moisture content.
 - 4. Apply moistened blended mix to excavated area to finish grade.

5. Compact with an 8" to 10" hand tamp or 250-300 pound roller.
 6. Keep traffic off the area for 24 hours after the repair has been completed.
- D. Post installation Repairs/Maintenance: Remove and replace decorative crushed stone material sections that, in the Architect's opinion, have become damaged, settle, and/or do not meet the requirements of this section.
1. Remove debris by mechanically blowing or hand raking the surface as needed.
 2. After the first year of substantial completion, the contractor shall redistribute the existing loose material over the entire surface as a minor amount of aggregate will become loose on the surface.
 3. Water thoroughly to a depth of 1" and compact with a power roller of no less than 1000 pounds.
 4. If cracking occurs in stone screenings, sweep fines into the cracks, water thoroughly and hand tamp with an 8" x 10" hand tamp plate.
 5. Fill and replace pea gravel in areas where settlement has occurred.

END OF SECTION 321540

SECTION 323113 - CHAIN LINK FENCES AND GATES

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. Chain-link fences.
- 2. Swing gates.

- B. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for cast-in-place concrete post footings.

1.3 PREINSTALLATION MEETINGS

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

- 1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.
- 2. Review required testing, inspecting, and certifying procedures.

1.4 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Fence and gate posts, rails, and fittings.
 - b. Chain-link fabric, reinforcements, and attachments.
 - c. Accessories: Privacy slats.
 - d. Gates and hardware.

- B. Shop Drawings: For each type of fence and gate assembly.

- 1. Include plans, elevations, sections, details, and attachments to other work.
- 2. Include accessories, hardware, gate operation, and operational clearances.

- C. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:
 - 1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.
- D. Delegated-Design Submittal: For structural performance of chain-link fence and gate frameworks and mounting, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer and testing agency.
- B. Product Certificates: For each type of chain-link fence.
- C. Product Test Reports: For framework strength according to ASTM F 1043, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing fence grounding; member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.
- B. Mockups: Build mockups to set quality standards for fabrication and installation.
 - 1. Build mockup for typical chain-link fence and gate, including accessories.
 - a. Size: 10-foot length of fence.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.8 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Failure to comply with performance requirements.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - c. Faulty operation of gate operators and controls.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design chain-link fence and gate frameworks.
- B. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.
 1. Design Wind Load: 110 Mph.
 - a. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

2.2 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
 1. Fabric Height: As indicated on Drawings.
 2. Steel Wire for Fabric: Wire diameter of 0.1494 inch.
 - a. Mesh Size: 2 inches.
 - b. Polymer-Coated Fabric: ASTM F 668, Class 2b over zinc-coated steel wire.
 - 1) Color: Black, according to ASTM F 934.
 - c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
 3. Selvage: Knuckled at both selvages.

2.3 FENCE FRAMEWORK

- A. Posts and Rails: ASTM F 1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 based on the following:
1. Fence Height: 72 inches.
 2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.
 - a. Line Post: 2.375 inches in diameter.
 - b. End, Corner, and Pull Posts: 2.875 inches in diameter.
 3. Horizontal Framework Members: Intermediate top and bottom rails according to ASTM F 1043.
 - a. Top Rail: 1.66 inches in diameter.
 4. Brace Rails: ASTM F 1043.
 5. Metallic Coating for Steel Framework:
 - a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating according to ASTM A 653/A 653M.
 6. Polymer coating over metallic coating.
 - a. Color: Black, according to ASTM F 934.

2.4 TENSION WIRE

- A. Metallic-Coated Steel Wire: 0.177-inch-diameter, marcelled tension wire according to ASTM A 817 or ASTM A 824, with the following metallic coating:
1. Type II: Zinc coated (galvanized) by hot-dip process, with the following minimum coating weight:
 - a. Class 4: Not less than 1.2 oz./sq. ft. of uncoated wire surface.

2.5 SWING GATES

- A. General: ASTM F 900 for gate posts and double swing gate types.
1. Gate Leaf Width: As indicated.
 2. Framework Member Sizes and Strength: Based on gate fabric height of more than 72 inches.
- B. Pipe and Tubing:

1. Zinc-Coated Steel: ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framework.
 2. Gate Posts: Round tubular steel.
 3. Gate Frames and Bracing: Round tubular steel.
- C. Frame Corner Construction: Welded or assembled with corner fittings.
- D. Hardware:
1. Hinges: 360-degree inward and outward swing.
 2. Latch: Permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
 3. Closer: Manufacturer's standard.

2.6 FITTINGS

- A. Provide fittings according to ASTM F 626.
- B. Post Caps: Provide for each post.
1. Provide line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
 2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails to posts.
- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.
- H. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:
 - a. Hot-Dip Galvanized Steel: 0.148-inch-diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.
- I. Finish:
1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. of zinc.

- a. Polymer coating over metallic coating.

2.7 PRIVACY SLATS

- A. Fiber-Glass-Reinforced Plastic Slats: UV-light-stabilized fiber-glass-reinforced plastic, not less than 0.06 inch thick, sized to fit mesh specified for direction indicated, with vandal-resistant fasteners and lock strips.
- B. Color: As selected by Architect from manufacturer's full range.
- C. Location: On gates and panels of trash enclosure.

2.8 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for a certified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F 567 and more stringent requirements specified.
 - 1. Install fencing on established boundary lines inside property line.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. Post Setting: Set posts in concrete and with brackets at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Exposed Concrete: Extend 1 inch above grade; shape and smooth to shed water.
- D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.
- E. Line Posts: Space line posts uniformly at 96 inches o.c.
- F. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
 - 1. Locate horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- G. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
 - 1. Extended along top and bottom of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.
- H. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- I. Intermediate and Bottom Rails: Secure to posts with fittings.

- J. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- K. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts, with tension bands spaced not more than 15 inches o.c.
- L. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
 - 1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.
- M. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.
- N. Privacy Slats: Install slats in direction indicated, securely locked in place.
 - 1. Vertically, for privacy factor of 70 to 75.

3.4 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests.
- B. Prepare test reports.

3.6 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

END OF SECTION 323113

SECTION 323119 - DECORATIVE METAL FENCES AND GATES

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. Decorative steel fences.

- B. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for concrete post concrete fill.
- 2. Section 281300 "Access Control" for access control devices installed at gates and provided as part of a security system.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

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

- B. Shop Drawings: For fence panels and mounting plates. Include plans, elevations, sections, details, and attachments to other work.

- C. Samples: For each fence material and for each color specified.

- 1. Provide Samples 12 inches in length for linear materials.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

- B. Product Test Reports: For decorative metallic-coated-steel tubular picket fences, including finish, indicating compliance with referenced standard and other specified requirements.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Include 8-foot length of fence complying with requirements.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 DECORATIVE STEEL FENCES

- A. Decorative Steel Fences: Fences made from steel tubing and shapes, hot-dip galvanized.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Ameristar Fence Products; an ASSA ABLOY company.
 - b. Jerith.
 - c. Master Halco.
- B. Posts: Square steel tubing.
 - 1. Line Posts: 2-1/2 by 2-1/2 inches with 1/8-inch wall thickness.
 - 2. End and Corner Posts: 2-1/2 by 2-1/2 inches with 1/8-inch wall thickness.
- C. Post Caps: Formed from steel sheet and hot-dip galvanized after forming.
- D. Rails:
 - 1. Steel Tube Rails: Square steel tubing 2 by 2 inches with 1/8-inch wall thickness.
 - 2. Steel Channel Rails: Steel channels 2 by 2 inch.
- E. Pickets: 1 inch square by 0.065-inch steel tubes.
 - 1. Terminate tops of pickets at top rail for flush top appearance.
 - 2. Picket Spacing: 4 inches clear, maximum.
- F. Fasteners: Stainless-steel carriage bolts and tamperproof nuts.
- G. Fabrication: Assemble fences into sections by welding pickets to rails.
 - 1. Fabricate sections with clips welded to rails for field fastening to posts.
 - 2. Drill posts and clips for fasteners before finishing to maximum extent possible.

- H. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.
- I. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A 123/A 123M. For hardware items, hot-dip galvanize to comply with ASTM A 153/A 153M.
 - 1. Hot-dip galvanize posts and rails.
 - 2. Hot-dip galvanize rail and picket assemblies after fabrication.
- J. Finish for Bar Grating Infill: Powder coating.
- K. Finish for Steel Items: High-performance coating.
- L. Finish for Metallic-Coated-Steel Items: High-performance coating.

2.2 STEEL AND IRON

- A. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Bars (Pickets): Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
- C. Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- D. Bar Grating: NAAMM MBG 531.
 - 1. Bars: Hot-rolled steel strip, ASTM A 1011/A 1011M, Commercial Steel, Type B.
 - 2. Wire Rods: ASTM A 510.
 - 3. Gray Iron: ASTM A 48/A 48M, Class 30.
 - 4. Malleable Iron: ASTM A 47/A 47M.

2.3 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Section 033000 "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi, 3-inch slump, and 1-inch maximum aggregate size or dry, packaged, normal-weight concrete mix complying with ASTM C 387/C 387M mixed with potable water according to manufacturer's written instructions.
- C. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M and specifically recommended by manufacturer for exterior applications.

2.4 STEEL FINISHES

- A. Surface Preparation: Clean surfaces according to [SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning]."
 - 1. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it.
- B. Powder Coating: Immediately after cleaning, apply two-coat finish consisting of epoxy primer and TGIC polyester topcoat, with a minimum total dry film thickness of not less than 8 mils. Comply with coating manufacturer's written instructions.
 - 1. Color and Gloss: Black and Glossy.
- C. Primer Application: Apply zinc-rich epoxy primer immediately after cleaning, to provide a minimum dry film thickness of 2 mils per applied coat, to surfaces that are exposed after assembly and installation, and to concealed surfaces.
- D. High-Performance Coating: Apply intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.
 - 1. Match approved Samples for color, texture, and coverage. Remove and refinish, or recoat work that does not comply with specified requirements.

2.5 METALLIC-COATED-STEEL FINISHES

- A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a zinc-phosphate conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.
- B. Powder Coating: Immediately after cleaning and pretreating, apply TGIC polyester powder-coat finish, with a minimum dry film thickness of 2 mils.
 - 1. Color and Gloss: Black , glossy .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.

- B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
 - 1. Construction layout and field engineering are specified in Section 017300 "Execution."

3.3 DECORATIVE FENCE INSTALLATION

- A. Install fences according to manufacturer's written instructions.
- B. Install fences by setting posts as indicated and fastening rails and infill panels to posts. Peen threads of bolts after assembly to prevent removal.
- C. Post Excavation: Drill or hand-excavate holes for posts in firm, undisturbed soil. Excavate holes to a diameter of not less than 4 times post size and a depth of not less than 24 inches plus 3 inches for each foot or fraction of a foot that fence height exceeds 4 feet.
- D. Post Setting: Set posts in concrete or with mechanical anchors at indicated on documents.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts and sleeves and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Exposed Concrete: Extend 1 inches above grade. Finish and slope top surface to drain water away from post.
 - 3. Posts Set in Concrete: Extend post to within 6 inches of specified excavation depth, but not closer than 3 inches to bottom of concrete.
 - 4. Posts Set on existing concrete walls: Factory attached and finish mounting plates as indicated on plans and to meet the code requirements and existing wall dimensions.
 - 5. Space posts uniformly at 8 feet o.c.

END OF SECTION 323119

SECTION 329113 - SOIL PREPARATION

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 planting soils specified by composition of the mixes for the site for areas to receive planting and defined by the top layer of soil in depths indicated.
- B. Related Requirements:
 - 1. Section 129300 "Site Furnishings" for placing planting soil in exterior unit planters.
 - 2. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
 - 3. Section 329200 "Turf and Grasses" for placing planting soil for grasses.
 - 4. Section 329300 "Plants" for placing planting soil for plantings.

1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

1.4 DEFINITIONS

- A. AAPFCO: Association of American Plant Food Control Officials.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
- C. CEC: Cation exchange capacity.
- D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- F. Imported Soil: Soil that is transported to Project site for use.
- G. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.

- H. **Manufactured Soil:** Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- I. **NAPT:** North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.
- J. **Organic Matter:** The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- K. **Planting Soil:** Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- L. **RCRA Metals:** Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- M. **SSSA:** Soil Science Society of America.
- N. **Subgrade:** Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- O. **Subsoil:** Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- P. **Surface Soil:** Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- Q. **USCC:** U.S. Composting Council.

1.5 PREINSTALLATION MEETINGS

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

1.6 ACTION SUBMITTALS

- A. **Product Data:** For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. **Material Certificates:** For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.

- b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
- c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Sustainable Design Submittals:

- 1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.

- C. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For each testing agency.
- B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.
- C. Field quality-control reports.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1.9 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil and imported soil.
 - 1. Notify Architect and Owner seven days in advance of the dates and times when laboratory samples will be taken.
- B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.
 - 1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.10 SOIL-SAMPLING REQUIREMENTS

- A. General: Extract soil samples according to requirements in this article.
- B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Architect under the direction of the testing agency.
 - 1. Number and Location of Samples: Minimum of three representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
 - 2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
 - 3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
 - 4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.11 TESTING REQUIREMENTS

- A. General: Perform tests on soil samples according to requirements in this article.
- B. Physical Testing:
 - 1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
 - a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
 - b. Hydrometer Method: Report percentages of sand, silt, and clay.
 - 2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 - 3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 - 4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).
- C. Chemical Testing:
 - 1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
 - 2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
 - 3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium,

- and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
- D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAFT NCR-13, including the following:
1. Percentage of organic matter.
 2. CEC, calcium percent of CEC, and magnesium percent of CEC.
 3. Soil reaction (acidity/alkalinity pH value).
 4. Buffered acidity or alkalinity.
 5. Nitrogen ppm.
 6. Phosphorous ppm.
 7. Potassium ppm.
 8. Manganese ppm.
 9. Manganese-availability ppm.
 10. Zinc ppm.
 11. Zinc availability ppm.
 12. Copper ppm.
 13. Sodium ppm and sodium absorption ratio.
 14. Soluble-salts ppm.
 15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
 16. Other deleterious materials, including their characteristics and content of each.
- E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
- F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.
1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inchdepth of soil.
 2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inchdepth of soil.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Regional Materials: Imported soil, manufactured planting soil and soil amendments and fertilizers shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

2.2 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Planting-Soil Type A- 2 Inch depth, B 6 Inch Depth, C 12 Inch Depth: Manufactured soil consisting of manufacturer's basic sandy loam according to USDA textures, blended in a manufacturing facility with sand, stabilized organic soil amendments, and other materials to produce viable planting soil.
 1. Additional Properties of Manufacturer's Basic Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 6 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
 2. Unacceptable Properties: Manufactured soil shall not contain the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 5 percent by dry weight of the manufactured soil.
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 1-1/2 inches in any dimension.
 3. Blend manufacturer's basic soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
 - a. Ratio of Loose Compost to Soil: 1:4 by volume.

- C. Planting-Soil Type D- Agricultural Planting Soil: Manufactured soil consisting of manufacturer's organic loam according to USDA textures, blended in a manufacturing facility, stabilized organic soil amendments, and other materials to produce viable planting soil.
1. Additional Properties of Manufacturer's Basic Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 10 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
 2. Unacceptable Properties: Manufactured soil shall not contain the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 5 percent by dry weight of the manufactured soil.
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 1-1/2 inches in any dimension.
 3. Blend manufacturer's basic soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
 - a. Ratios:
 - 1) Compost 1 part, 2 different sources mixed uniformly
 - 2) Rice Hulls: 1 part
 - 3) Leaf Compost: 1 part
 - 4) Loam Soil: 1 part

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
 2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
 3. Form: Provide lime in form of ground dolomitic limestone or mollusk shells.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Perlite: Horticultural perlite, soil amendment grade.

- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M.

2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
 - 1. Feedstock: Limited to leaves Rice Hulls, Coffee Grinds, Tea.
 - 2. Reaction: pH of 6 to 8.
 - 3. Soluble-Salt Concentration: Less than 1 dS/m.
 - 4. Moisture Content: 40 to 60 percent by weight.
 - 5. Organic-Matter Content: 50 to 60 percent of dry weight.
 - 6. Particle Size: Minimum of 98 percent passing through a 1/2-inch sieve.
- B. Wood Derivatives: Shredded and composted, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
- C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth. Certified organic sources only.

2.5 FERTILIZERS

- A. Organic fertilizers: Wet or Dry soil amendment derived from natural sources that indicates a minimum percentage of nitrogen phosphate and potash.
 - 1. Products approved by the Organic Materials Review Institute shall be used for the appropriate crop or plant type.
 - 2. Nutrient Composition for bidding purposes: 20 percent nitrogen, 0 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
 - 3. Nutrient Composition for application purposes: Based upon soil test report recommendations for each plant type.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.
- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

- C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Excavation: Excavate soil from designated area(s) to a depth of 2 inches and stockpile until amended.
- B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- C. Unsuitable Materials: Clean soil to contain a maximum of 5 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
- D. Screening: Pass unamended soil through a 2-inch sieve to remove large materials.

3.3 PLACING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply manufactured soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply approximately half the thickness of planting soil over prepared, loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.
- C. Application: Spread planting soil to total depth of 2 inches of 6 inches of 12 inches as indicated in soil type designations above, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Lifts: Apply planting soil in lifts not exceeding 6 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:

1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 1000 sq. ft. of in-place soil or part thereof.
- C. Soil will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.5 PROTECTION

- A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Vehicle traffic.
 4. Foot traffic.
 5. Erection of sheds or structures.
 6. Impoundment of water.
 7. Excavation or other digging unless otherwise indicated.
- C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.6 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.
 1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Meadow grasses and wildflowers.

- B. Related Requirements:

- 1. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.
 - 2. Section 334600 "Subdrainage" for below-grade drainage of landscaped areas.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.

- B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

- C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" and drawing designations for planting soils.

- E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer.
- B. Product Certificates: For fertilizers, from manufacturer.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of meadows during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful meadow establishment.
 - 1. Professional Membership: Installer shall be a member in good standing of either the Landscape Contractors Association of Md, Va and DC or the National Association of Landscape Professionals .
 - 2. Experience: Five years' experience in turf installation in addition to requirements in Section 014000 "Quality Requirements."
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Lawncare Technician.
 - 5. Pesticide Applicator: State licensed, commercial.
 - 6. Fertilizer Applicator: State licensed, commercial

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.9 FIELD CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
 1. Spring Planting: 2/1 to 4/30.
 2. Fall Planting: 8/1 to 10/31.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MEADOW GRASSES AND WILDFLOWERS

- A. Wildflower and Native-Grass Seed: Fresh, clean, and dry new seed, of mixed species:
 1. Basis of Design: Ernst Seed Low-Growing Wildflower and Grass Mix
 - a. 63.6% Sheep Fescue, Variety Not Stated (*Festuca ovina*, Variety Not Stated)
 - b. 17% Annual Ryegrass (*Lolium multiflorum* (L. perenne var. italicum))
 - c. 8% Perennial Blue Flax (*Linum perenne* ssp. lewisii)
 - d. 2% Blackeyed Susan, Coastal Plain NC Ecotype (*Rudbeckia hirta*, Coastal Plain NC Ecotype)
 - e. 2% Lanceleaf Coreopsis, Coastal Plain NC Ecotype (*Coreopsis lanceolata*, Coastal Plain NC Ecotype)
 - f. 2% Oxeye Daisy (*Chrysanthemum leucanthemum*)
 - g. 1% Shasta Daisy (*Chrysanthemum maximum*)
 - h. 1% Partridge Pea, PA Ecotype (*Chamaecrista fasciculata* (Cassia f.), PA Ecotype)
 - i. 1% Corn Poppy/Shirley Mix (*Papaver rhoeas*, Shirley Mix)
 - j. 0.5% Common Yarrow (*Achillea millefolium*)
 - k. 0.5% Aromatic Aster, PA Ecotype (*Aster oblongifolius* (*Symphotrichum oblongifolium*), PA Ecotype)
 - l. 0.5% Mistflower, VA Ecotype (*Eupatorium coelestinum* (*Conoclinium c.*), VA Ecotype)
 - m. 0.5% Spotted Beebalm, Coastal Plain SC Ecotype (*Monarda punctata*, Coastal Plain SC Ecotype)
 - n. 0.3% Butterfly Milkweed (*Asclepias tuberosa*)
 - o. 0.1% Slender Mountainmint (*Pycnanthemum tenuifolium*)

p. Total: 100%

- B. Seed Carrier: Inert material, sharp clean sand or perlite.

2.2 FERTILIZERS

- A. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
1. Composition for bidding purposes: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 2. Composition for installation: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- B. Organic fertilizers: Wet or Dry soil amendment derived from natural sources that indicates a minimum percentage of nitrogen phosphate and potash.
1. Products approved by the Organic Materials Review Institute shall be used for the appropriate crop or plant type.
 2. Nutrient Composition for bidding purposes: 20 percent nitrogen, 0 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
 3. Nutrient Composition for application purposes: Based upon soil test report recommendations for each plant type.

2.3 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
1. Organic Matter Content: 50 to 60 percent of dry weight.
- C. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- D. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

2.4 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as

required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.5 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 3. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.

2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.4 MEADOW

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

1. Before sowing, mix seed with seed carrier at a ratio of not less than four parts seed carrier to one part seed.

2. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

3. Do not use wet seed or seed that is moldy or otherwise damaged.

B. Sow seed at a total rate of 6 oz./1000 sq. ft..

C. Brush seed into top 1/16 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

E. Water newly planted areas and keep moist until meadow is established.

3.5 MEADOW MAINTENANCE

A. Maintain and establish meadow by watering, weeding, mowing, trimming, replanting, and performing other operations as required to establish a healthy, viable meadow. Roll, regrade,

and replant bare or eroded areas and remulch. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and meadow damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep meadow and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and meadow-watering equipment to convey water from sources and to keep meadow uniformly moist.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water meadow with fine spray at a minimum rate of 1/2 inch per week for eight weeks after planting unless rainfall precipitation is adequate.

C. First Growing Season Maintenance:

1. When meadow vegetation reaches an average height of 18"-24", mow with a string trimmer or mower to a height of 8". Do not use a lawn mower as the blade height will be too low and kill the seedlings. Cease mowing by mid-September
2. Spot spray with herbicide or hand remove unintended plant material once per month during the growing season.

D. Second Growing Season Maintenance:

1. If heavy infestation (more than 20% of coverage) of annual ryegrass, Sericea lespedeza ragweed or foxtail or other unintended vegetation occurs trim the meadow with a string trimmer or mower to a height of 8". Do not use a lawn mower as the blade height will be too low and kill the seedlings. Cease mowing by mid-September
2. Spot spray with herbicide or hand remove unintended plant material.

3.6 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.7 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.
- C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- D. Remove nondegradable erosion-control measures after grass establishment period.

3.8 MAINTENANCE SERVICE

- A. Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Meadow Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than maintenance period below.
 - 1. Maintenance Period: 24 months from date of planting completion.

END OF SECTION 329200

SECTION 329300 - PLANTS

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. Plants.
2. Tree stabilization.
3. Tree-watering devices.
4. Landscape edgings.
5. Engineered Mulch.

- B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. Section 329200 "Turf and Grasses" for meadow planting, hydroseeding, and erosion-control materials.

1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."
- B. Unit prices apply to additions to and deletions from the Work as authorized by Change Orders.

1.4 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

- D. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- E. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- F. Finish Grade: Elevation of finished surface of planting soil.
- G. Integrated Pest Management (IPM): A process that focuses on long-term prevention of pests while minimizing the risks to the environment and people. IPM process consists of: Pest Identification, Monitoring and evaluating pest quantities and damage, Enacting a guideline management policy as needed, preventing pests, and using a combination of biological, cultural physical/mechanical first order and chemical as a last order approach.
- H. Neonicotinoids: A class of neuro-active insecticides resembling nicotine. Clothianidin, thiamethoxam, and imadacloprid shall not be used.
- I. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- J. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- K. Planting Area: Areas to be planted.
- L. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.
- M. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- N. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- O. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- P. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.5 COORDINATION

- A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.6 PREINSTALLATION MEETINGS

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

1.7 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 - 2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For tree and shrub species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.
- B. Samples for Verification: For each of the following:
 - 1. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
 - 2. Mineral Mulch: 1 quart volume of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on-site; provide an accurate indication of color, texture, and makeup of the material.
- C. Maintenance Schedule: Submit a report on the types of maintenance practices to be undertaken and the frequency for site visits in a given year.

1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis of standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

1.9 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.10 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
 - 1. Professional Membership: Installer shall be a member in good standing of either the National Association of Landscape Professional or the Landscape Contractors Association of MD, VA , DC.
 - 2. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the National Association of Landscape Professionals:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Horticultural Technician.
 - 5. Pesticide Applicator: State licensed, commercial.
 - 6. Fertilizer Applicator: State licensed, commercial
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
 - 1. Selection of plants purchased under allowances is made by Architect, who tags plants at their place of growth before they are prepared for transplanting.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and

- container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

F. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

G. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

- H. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
 - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3. Do not remove container-grown stock from containers before time of planting.
 - 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.12 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: 3/15 to 5/31.
 - 2. Fall Planting: 9/1 to 11/30.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained and when the temperature is above 32 degrees F and soil is not frozen. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.13 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization edgings.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Periods: From date of planting completion.

- a. Trees, Shrubs, Vines, and Ornamental Grasses: 24 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 24 months.
3. Include the following remedial actions as a minimum:
- a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.
- E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 FERTILIZERS

- A. Organic fertilizers: Wet or Dry soil amendment derived from natural sources that indicates a minimum percentage of nitrogen phosphate and potash.
1. Products approved by the Organic Materials Review Institute shall be used for the appropriate crop or plant type.
 2. Nutrient Composition for bidding purposes: 20 percent nitrogen, 0 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
 3. Nutrient Composition for application purposes: Based upon soil test report recommendations for each plant type.

2.3 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
1. Type: Shredded hardwood.
 2. Size Range: 3 inches maximum, 1/2 inch minimum.
 3. Color: Natural.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through a 1-inch sieve; soluble-salt content of 0 to 4 dS/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
1. Organic Matter Content: 50 to 60 percent of dry weight.
- C. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of the following type, size range, and color:
1. Type: Crushed stone or gravel.
 2. Size Range: 3/4 inch maximum, 1/4 inch minimum.
 3. Color: Readily available natural gravel color range.
- D. Engineered Wood Fiber: ASTM F 2075; containing no bark, leaves, twigs, or foreign or toxic materials.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. Fibar Group LLC (The); Fibar System 200.
 - b. GameTime; a PlayCore, Inc. company; GT Impax Engineered Wood Fiber.
 - c. SofSolutions Inc.; SofFall.
 - d. Supreme Forest Products; Playground Safety Fiber.
 - e. Zeager Bros., Inc.; WoodCarpet.
 2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

3. Uncompressed Material Depth: Not less than as indicated on Drawings.
4. Accessibility Standard: Minimum surfacing performance according to ASTM 1292.

2.4 GEOSYNTHETIC ACCESSORIES

- A. Drainage/Separation Geotextiles: Comply with Section 312000 "Earth Moving."
- B. Drainage/Separation Geotextile: Nonwoven, needle-punched geotextile, manufactured for drainage applications and made from polyolefins or polyesters; with the following minimum properties:
 1. Weight: 4 oz./sq. yd.; ASTM D 5261.
 2. Water Flow Rate: 100 gpm/sq. ft. according to ASTM D 4491.
- C. Drainage Panel: Comply with Section 334600 "Subdrainage."
- D. Drainage Panel: Prefabricated, composite drainage panels made with drainage core and filter fabric.
 1. Drainage Core: Three-dimensional, nonbiodegradable, molded-plastic-sheet material designed to effectively drain water under maximum fill pressures.
 2. Fabric: Nonwoven, needle-punched geotextile, specifically manufactured as a filter geotextile and made from polyolefins or polyesters; with the following minimum properties:
 - a. Weight: 4 oz./sq. yd. according to ASTM D 5261.
 - b. Water Flow Rate: 100 gpm/sq. ft. according to ASTM D 4491.
 3. Minimum Flow Rate: 9 gpm/foot according to ASTM D 4491.

2.5 PESTICIDES

- A. General: Organic, pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as approved by the Organic Materials Resource Institute. Do not use restricted pesticides.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.6 TREE-STABILIZATION MATERIALS

- A. Trunk-Stabilization Materials:
 1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.

2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
4. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
5. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

B. Root-Ball Stabilization Materials:

1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated; stakes pointed at one end.
2. Wood Screws: ASME B18.6.1.

2.7 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Border Concepts, Inc.
 - b. Collier Metal Specialties, Inc.
 - c. J. D. Russell Company (The).
 - d. Sure-loc Edging Corporation.
2. Edging Size: 1/4 inch thick by 5 inches deep.
3. Stakes: Tapered steel, a minimum of 12 inches long.
4. Accessories: Standard tapered ends, corners, and splicers.
5. Finish: Manufacturer's standard paint.
 - a. Paint Color: Brown.

2.8 TREE-WATERING DEVICES

A. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period; manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic. 18 Gallon minimum size.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BIO-PLEX
 - b. Engineered Watering Solutions; PQ Partners, LLC.
 - c. Spectrum Products, Inc.

2. Color: Brown or Green.

2.9 TREE-GUARDS

- A. Biodegradable : Constructed of small branches and connected with biodegradable twine or jute.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. EcoDepot BioBark: 4' ht. for 2" caliper plus and 3' for less than 2" caliper.
 - b. Avintiv Oxo ShelterGuard
 - c. Tubex 12D Degradable Tree Shelters

2.10 MISCELLANEOUS PRODUCTS

- A. Wood Pressure-Preservative Treatment: AWWPA U1, Use Category UC4a; acceptable to authorities having jurisdiction, and containing no arsenic or chromium.
- B. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- C. Burlap: Non-synthetic, biodegradable.
- D. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.
- E. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.

3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."
- B. Placing Planting Soil: Place manufactured planting soil over exposed subgrade.
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- D. Application of Mycorrhizal Fungi: At time of planting, broadcast dry product uniformly in tree and shrub pits at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

2. Excavate approximately two times as wide as ball diameter for balled and burlapped container-grown stock.
 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 5. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 6. Maintain supervision of excavations during working hours.
 7. Keep excavations covered or otherwise protected overnight after working hours when unattended by Installer's personnel.
 8. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Application of Mycorrhizal Fungi: At time of planting, broadcast dry product uniformly in tree pits at application rate according to manufacturer's written recommendations.
- F. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
1. Backfill: Planting soil A, B, C as indicated on the documents. For trees, use excavated soil for backfill.
 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove

from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place mycorrhizal fungi next to roots in quantity recommended by manufacturer.
5. Place fertilizer based upon soil test recommendations uniformly distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - a. Quantity: As recommended from soil test reports and applied in rates recommended by manufacturer of organic product.
6. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Backfill: Planting soil A, B, C as indicated on the documents. For trees, use excavated soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place fertilizer based upon soil test recommendations uniformly distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - a. Quantity: As recommended from soil test reports and applied in rates recommended by manufacturer of organic product.
5. Place mycorrhizal fungi next to roots in quantity recommended by manufacturer.
6. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

- A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out and trees adjacent to sidewalks, parking areas and play areas. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 72 inches above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 2. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
- B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.
1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.
 - a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle or compression spring for each guy wire and tighten securely.
 - b. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide compression spring for each guy wire and tighten securely.
 - c. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle or compression spring. Allow enough slack to avoid rigid restraint of tree.
 - d. Attach flags to each guy wire, 30 inches above finish grade.
 2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.8 PLACING SOIL IN PLANTERS

- A. Layer branches half the height of the planter at the bottom of planter. Use branches cut to fit lengthwise in the planters and ranging in size from ½" to 2". Black Walnut, Cedar, and Black Locust branches shall not be used. Cover bottom tack filter fabric up on all sides to within 3" of top. Duct tape along the entire top edge of the filter fabric, to secure the filter fabric against the sides during the soil-filling process. Remove duct tape after filling.
- B. Fill planter with planting Soil D. Place soil in lightly compacted layers to an elevation mounded to 3 inches above top of planter, allowing natural settlement.

3.9 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.
- B. Use planting soils A, B, C as indicated on plans for backfill.

- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 24-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
 - 2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.
 - 3. Mineral Mulch in Planting Areas: Apply 3-inch average thickness of mineral mulch extending 12 inches beyond edge of individual planting pit or trench and over length of shrub planting in parking lot, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.11 EDGING INSTALLATION

- A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.
- B. Shovel-Cut Edging: Separate mulched areas from turf areas, curbs, and paving with a 45-degree, 4- to 6-inch-deep, shovel-cut edge.

3.12 INSTALLING SLOW-RELEASE WATERING DEVICE

- A. Provide one device for each tree.
- B. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.13 INSTALLING TREE GUARDS

- A. Provide one guard for each tree.
- B. Install guard on top of the mulch at base of tree stem and attach per manufacturer's recommendations.

3.14 INSTALLATION OF LOOSE-FILL SURFACING

- A. Apply components of loose-fill surfacing according to manufacturer's written instructions to produce a uniform surface.
- B. Edging: Place and permanently secure edging in place, and attach units to each other.
- C. Loose Fill: Place loose-fill materials to required depth. Include manufacturer's recommended amount of additional material to offset natural compaction over time.
- D. Grading: Uniformly grade loose fill to an even surface free from irregularities.
- E. Compaction: After initial grading, mechanically compact loose fill before finish grading.
- F. Finish Grading: Hand rake to a uniformly smooth finished surface and to required elevations.

3.15 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.
 - 1. Provide three IPM review visits per year. Provide a report on site findings and recommendations for implementation. Owner to approve implementation recommendations prior to application of biological and chemical controls.

3.16 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.17 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
 - 1. Species of Replacement Trees: Same species being replaced.

3.18 CLEANING AND PROTECTION

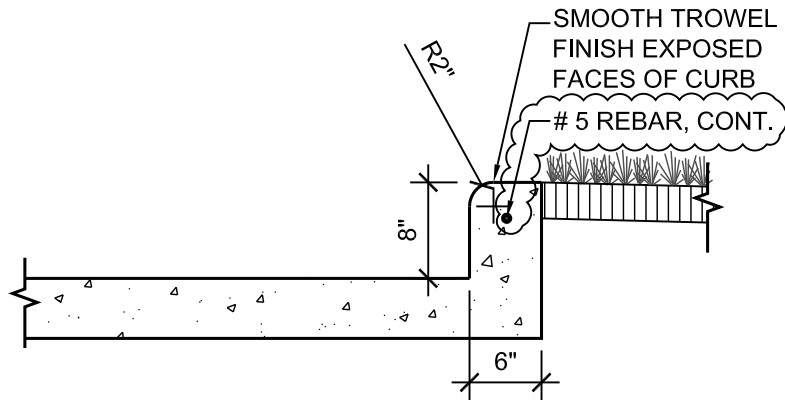
- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.
- E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.19 MAINTENANCE SERVICE

- A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 24 months from date of planting completion.
- B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 1. Maintenance Period: 24 months from date of planting completion.

END OF SECTION 329300



2

LANDSCAPE CURB

3/4"=1'-0"

MAHAN RYKIEL
ASSOCIATES INC
The Stieff Silver Building, 800 Wyman Park Drive,
Suite 100, Baltimore, MD 21211 410.235.6001

Baltimore City Public Schools

DATE: 04/22/16

CHANGE TO DRAWING:

L1.01

REV:

**Additions & Renovations at Robert Poole
Building #056**

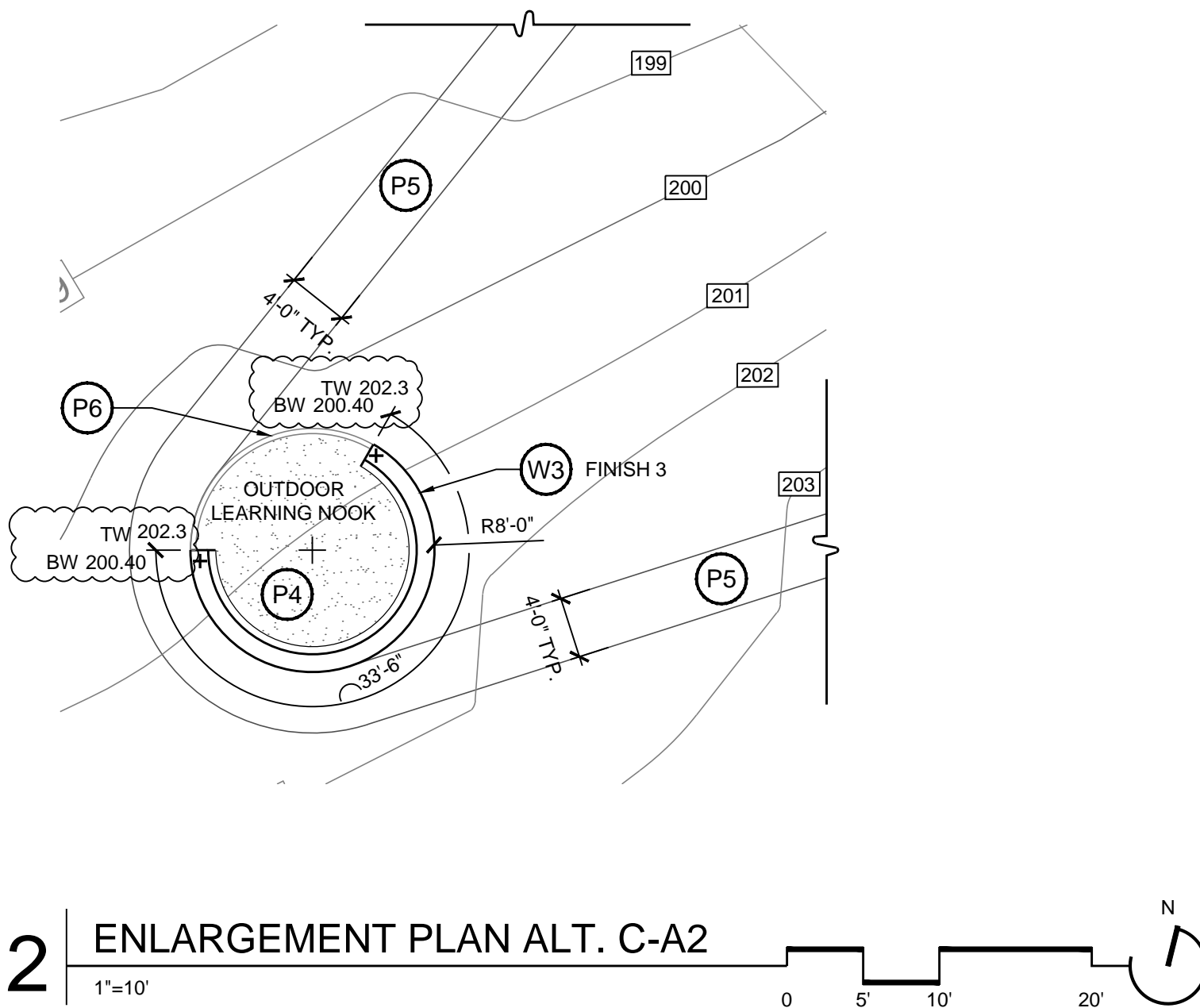
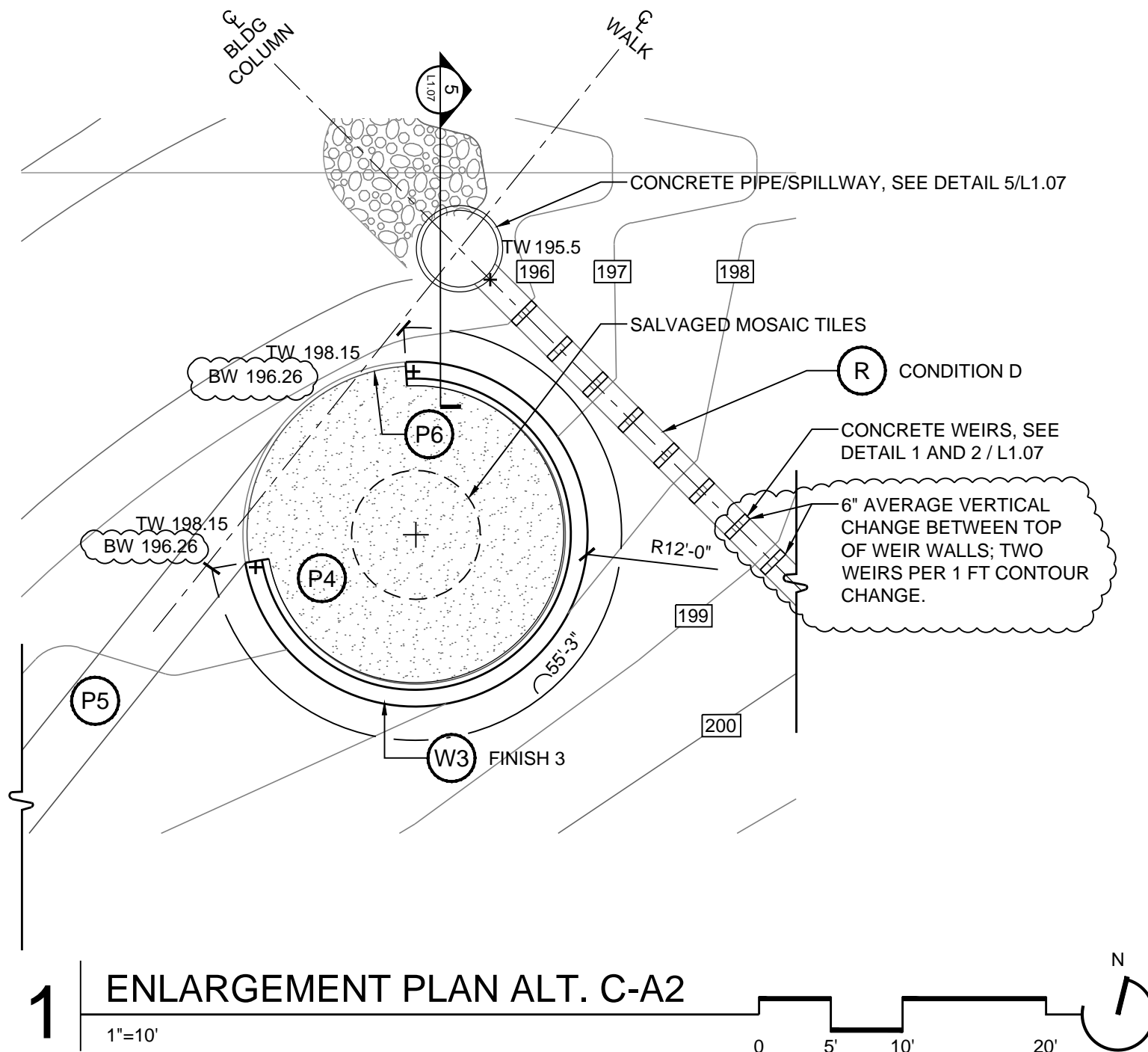
DRAWING NO.:

LAD 2.01

ADDENDUM 2

1300 W 36TH ST., BALTIMORE, MD 21211

SCALE: AS NOTED



MAHAN RYKIEL
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Baltimore City Public Schools

DATE: 04/22/16

CHANGE TO DRAWING: REV:

L1.03

DRAWING NO.:

LAD 2.02

ADDENDUM 2

Additions & Renovations at Robert Poole Building #056

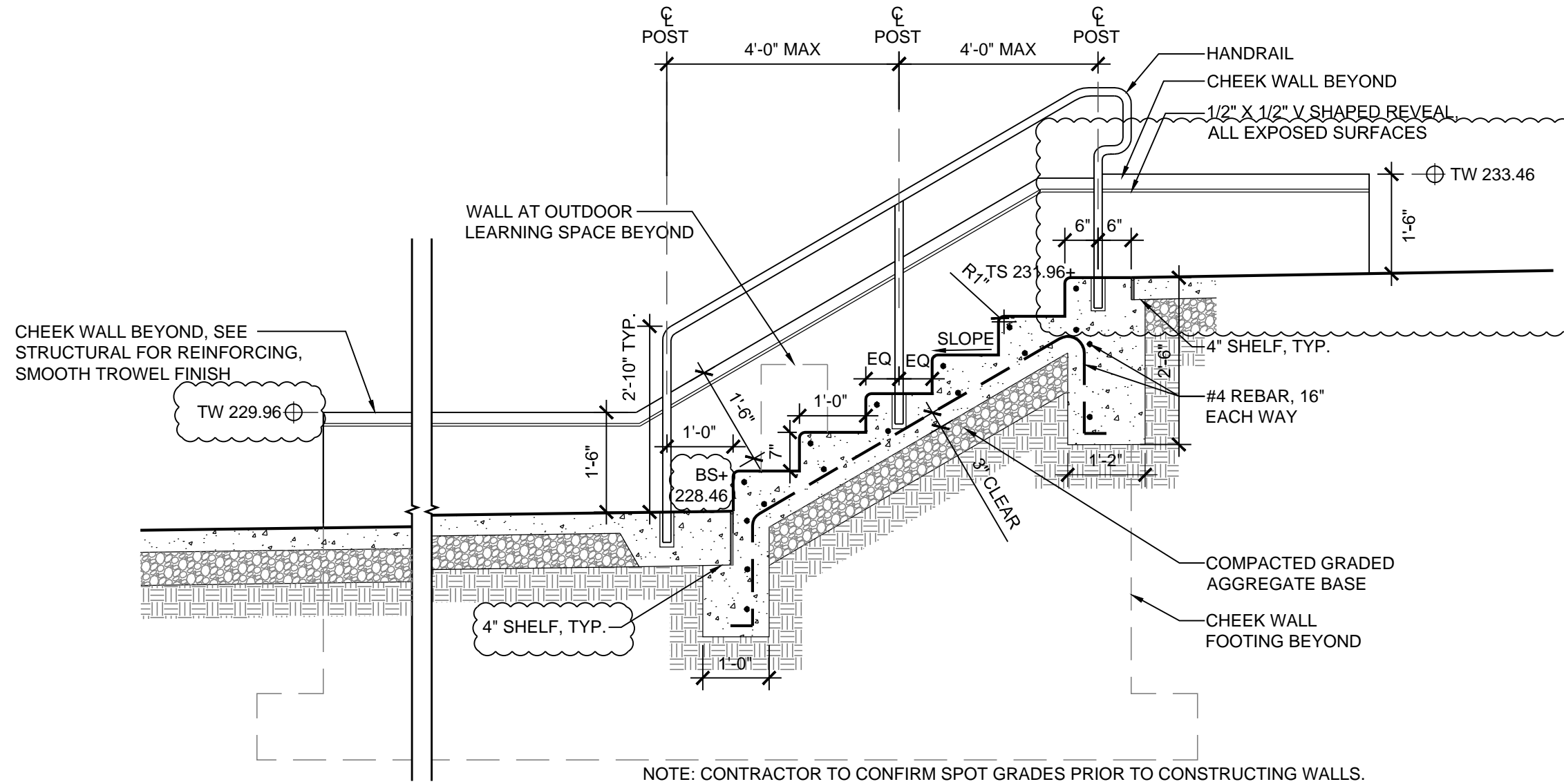
1300 W 36TH ST., BALTIMORE, MD 21211

SCALE: AS NOTED

5

EAST SIDE STAIRS NORTH FACE

1/2"=1'-0"



MAHAN RYKIEL
 ARCHITECTS INC
 The Stieff Silver Building, 800 Wyman Park Drive,
 Suite 100, Baltimore, MD 21211 410.235.6001

ADDENDUM 2

Baltimore City Public Schools

**Additions & Renovations at Robert Poole Building
 #056**
 1300 W 36TH ST., BALTIMORE, MD 21211

DATE: 04/22/16

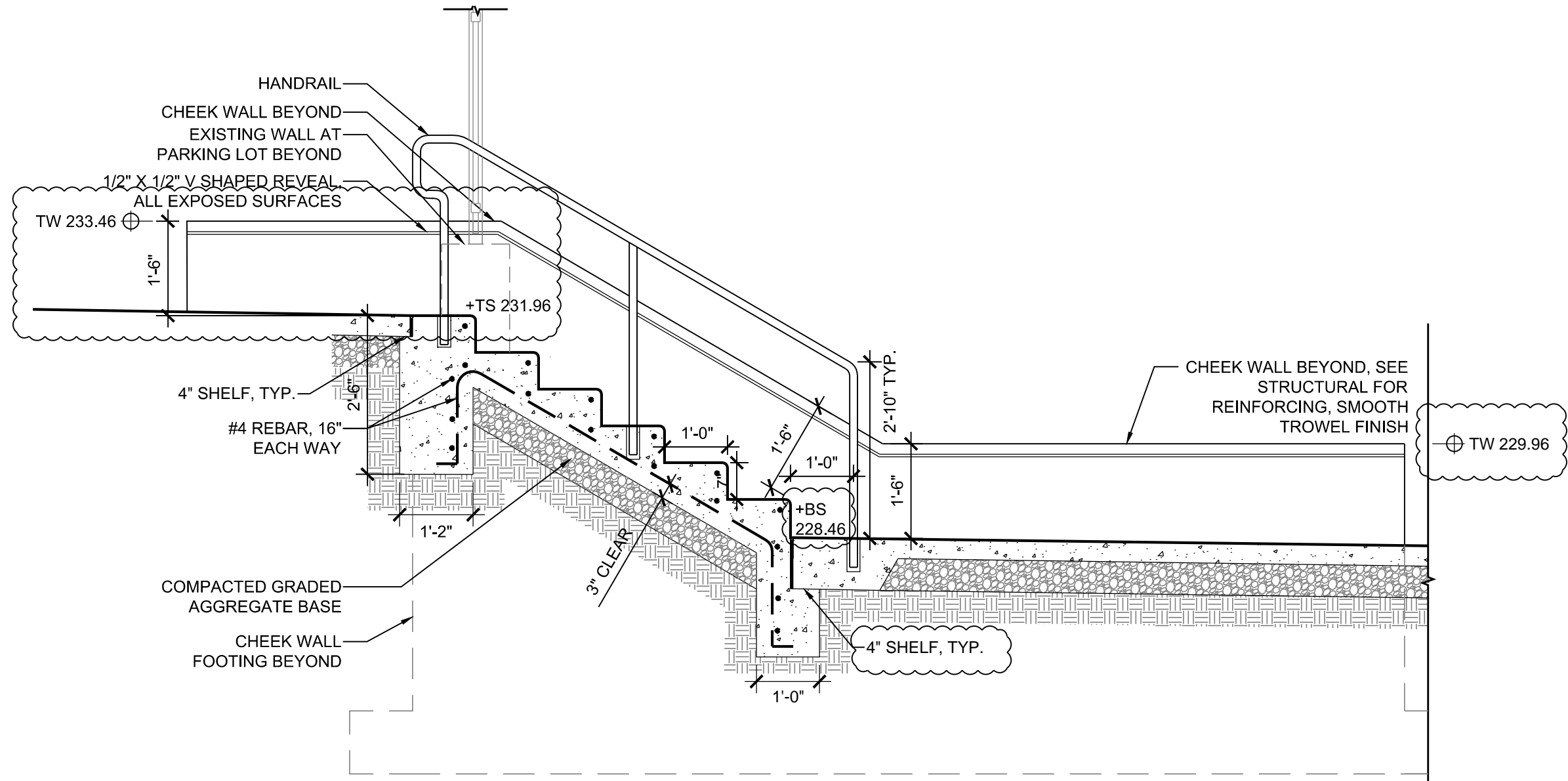
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L1.04

REV:

DRAWING NO.:

LAD 2.03

SCALE: AS NOTED



NOTE: CONTRACTOR TO CONFIRM SPOT GRADES PRIOR TO CONSTRUCTING WALLS.

6

EAST SIDE STAIRS SOUTH FACE

1/2"=1'-0"

DATE: 04/22/16

CHANGE TO DRAWING:
L1.04

REV:

DRAWING NO.:

LAD 2.04

SCALE: AS NOTED

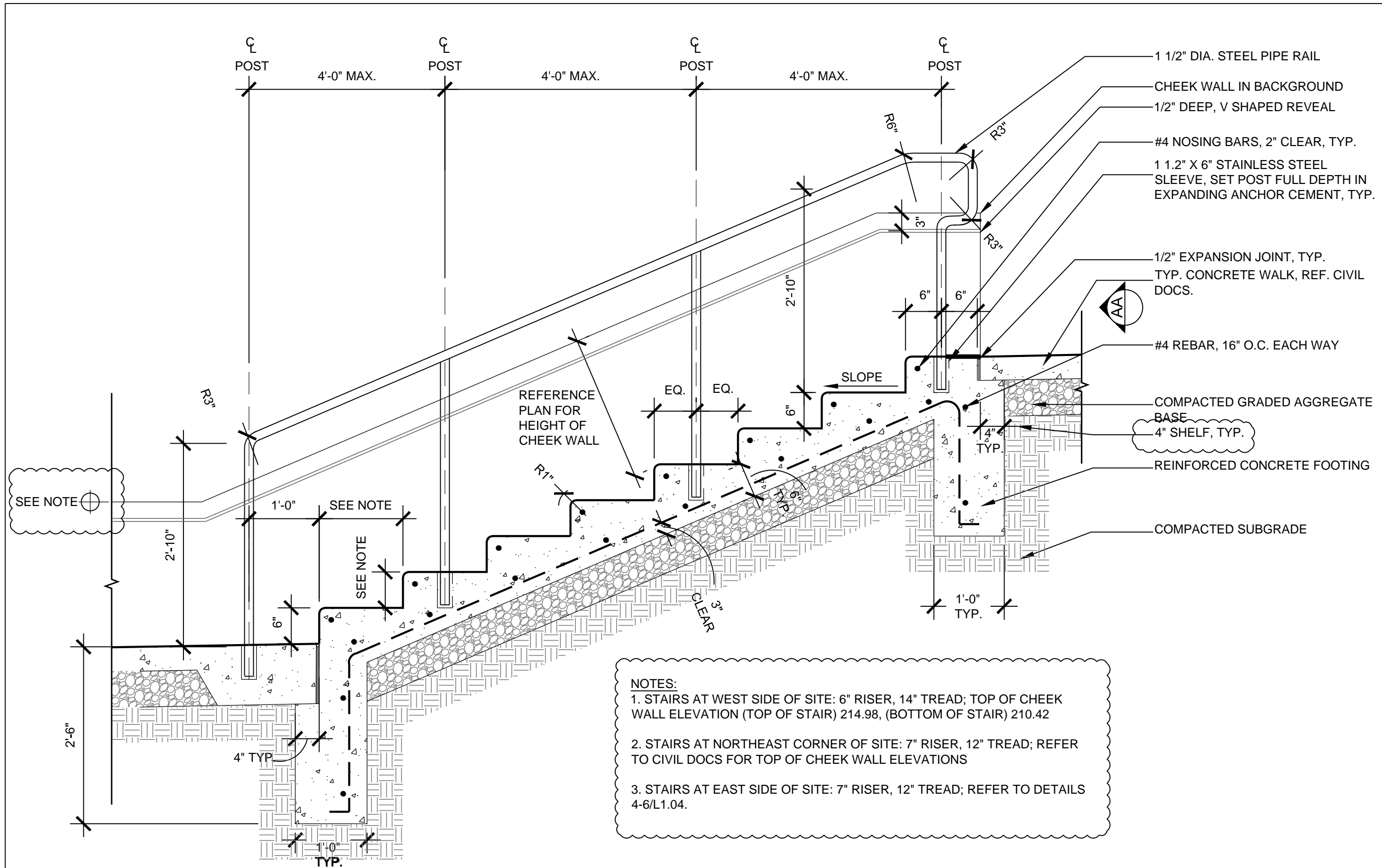
Baltimore City Public Schools

**Additions & Renovations at Robert Poole Building
#056**

1300 W 36TH ST., BALTIMORE, MD 21211

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ADDENDUM 2



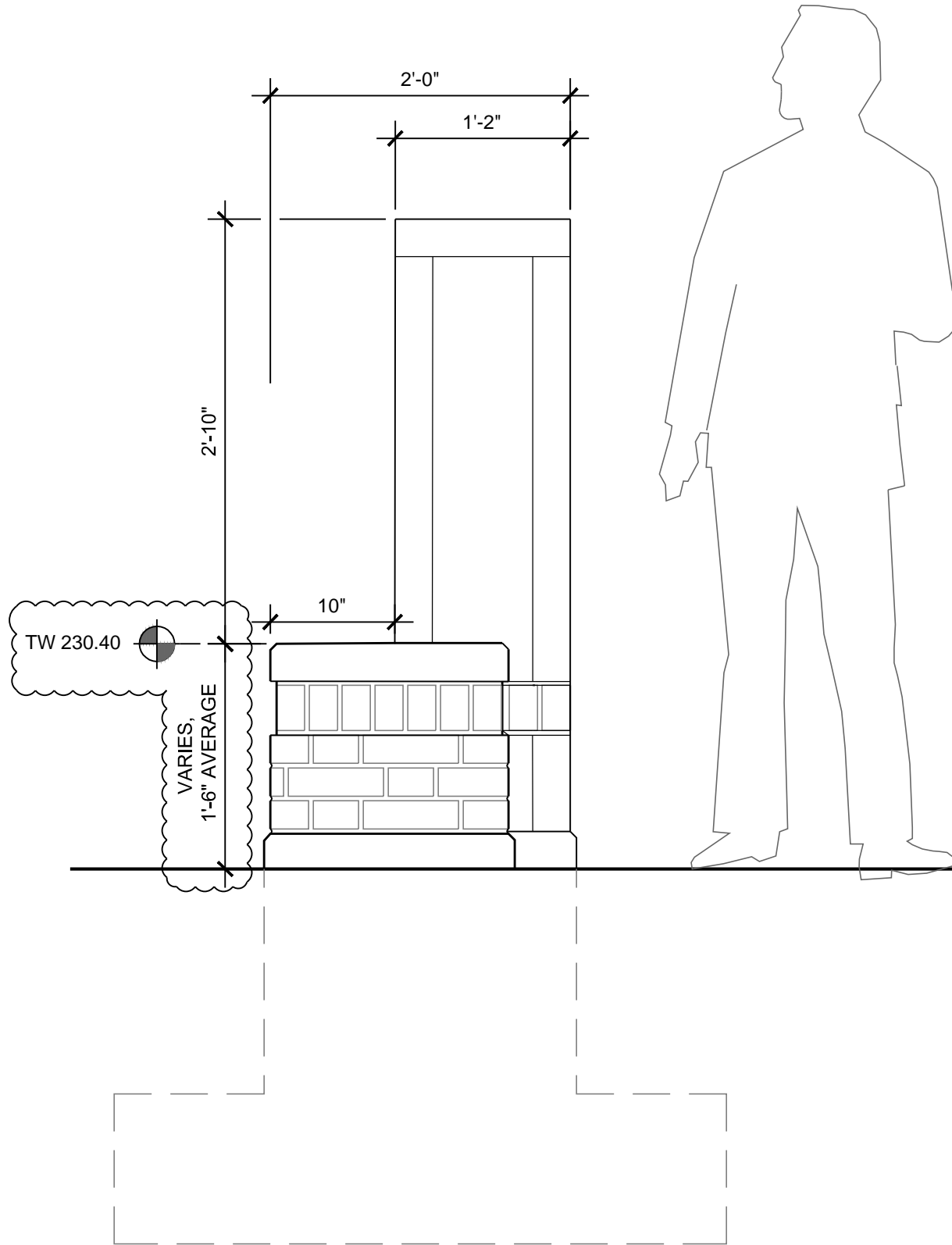
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 L1.05
 DRAWING NO.:
LAD 2.05
 SCALE: AS NOTED

Baltimore City Public Schools
 Additions & Renovations at Robert Poole Building
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 1300 W 36TH ST., BALTIMORE, MD 21211

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ADDENDUM 2

NOTES:
 1. STAIRS AT WEST SIDE OF SITE: 6" RISER, 14" TREAD; TOP OF CHEEK WALL ELEVATION (TOP OF STAIR) 214.98, (BOTTOM OF STAIR) 210.42
 2. STAIRS AT NORTHEAST CORNER OF SITE: 7" RISER, 12" TREAD; REFER TO CIVIL DOCS FOR TOP OF CHEEK WALL ELEVATIONS
 3. STAIRS AT EAST SIDE OF SITE: 7" RISER, 12" TREAD; REFER TO DETAILS 4-6/L1.04.

4 CONCRETE STAIRS WITH HANDRAIL
 3/4"=1'-0"



ELEVATION AA

9 ENTRY SIGN AND SEAT WALL

1"=1'-0"

MAHAN RYKIEL
 ASSOCIATES INC
 The Stieff Silver Building, 800 Wyman Park Drive,
 Suite 100, Baltimore, MD 21211 410.235.6001

ADDENDUM 2

Baltimore City Public Schools

**Additions & Renovations at Robert Poole Building
 #056**

1300 W 36TH ST., BALTIMORE, MD 21211

DATE: 04/22/16

CHANGE TO DRAWING:
L1.06

REV:

DRAWING NO.:

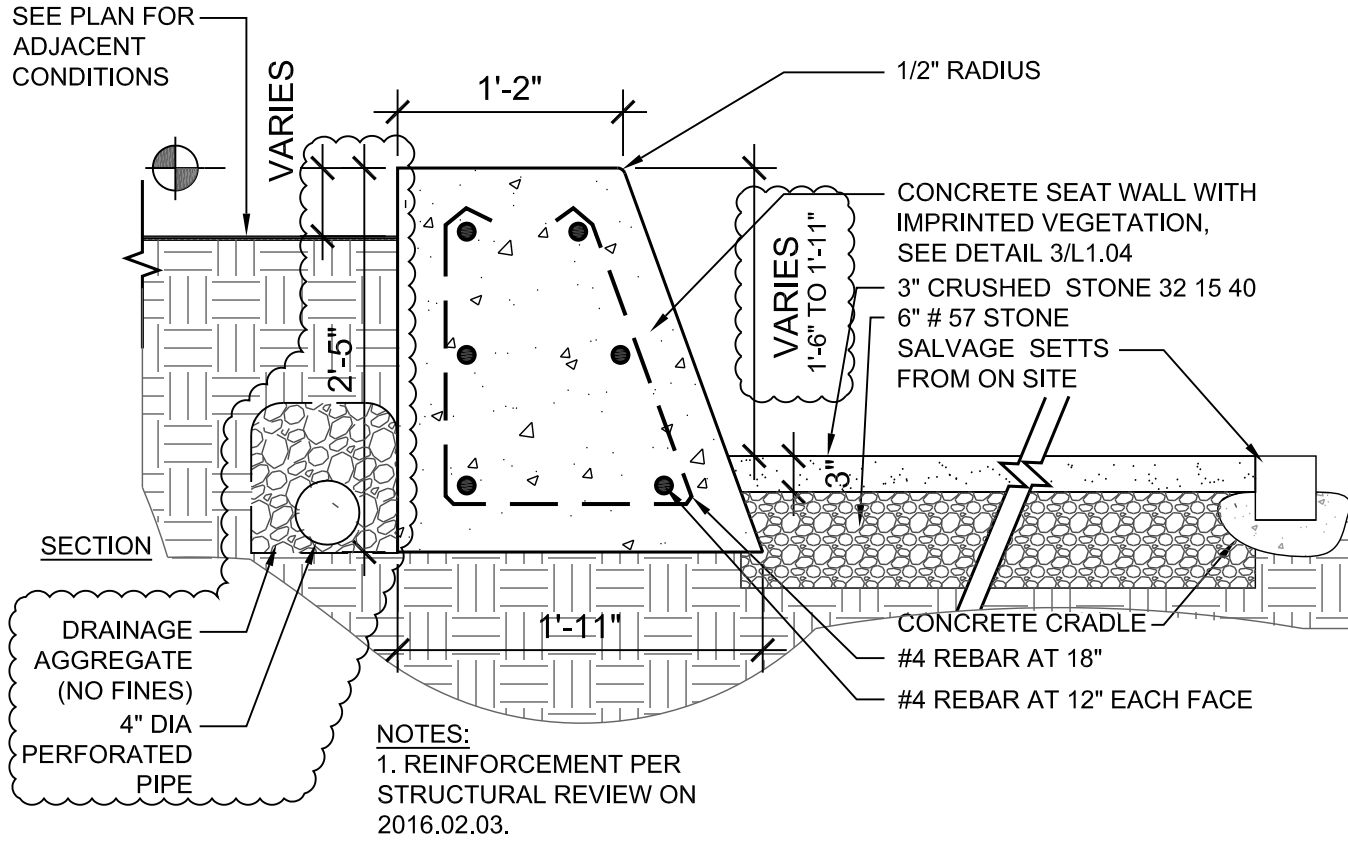
LAD 2.06

SCALE: AS NOTED

3

GRAVITY WALL AT OUTDOOR LEARNING NOOKS ALT C-A2

1" = 1' - 0"



MAHAN RYKIEL
A S O C I A T E S I N C
The Stieff Silver Building, 800 Wyman Park Drive,
Suite 100, Baltimore, MD 21211 410.235.6001

Baltimore City Public Schools

Additions & Renovations at Robert Poole Building #056

ADDENDUM 2

DATE: 04/22/16

CHANGE TO DRAWING: L1.07

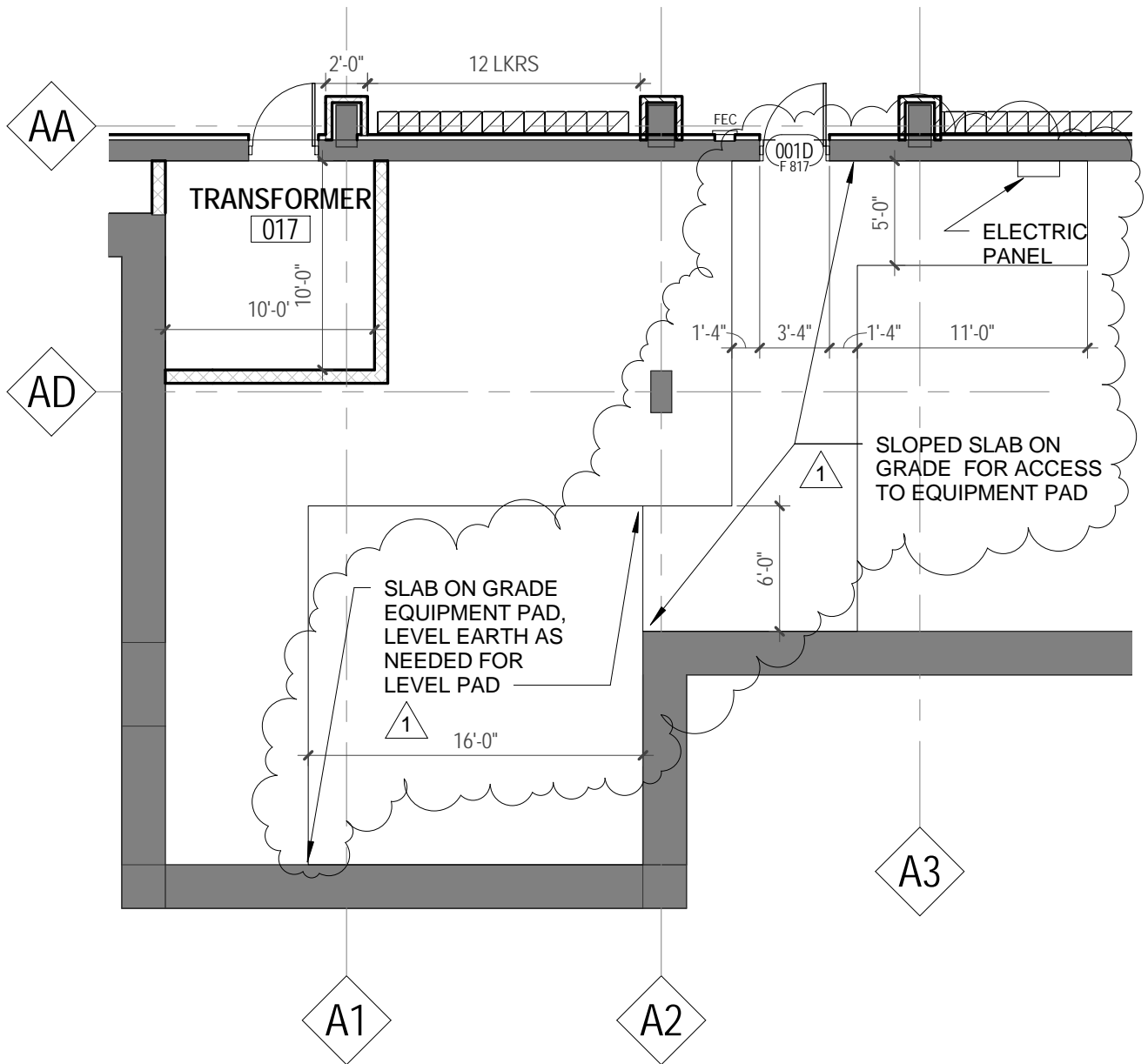
REV:

DRAWING NO.:

LAD 2.07

SCALE: AS NOTED

1300 W 36TH ST., BALTIMORE, MD 21211

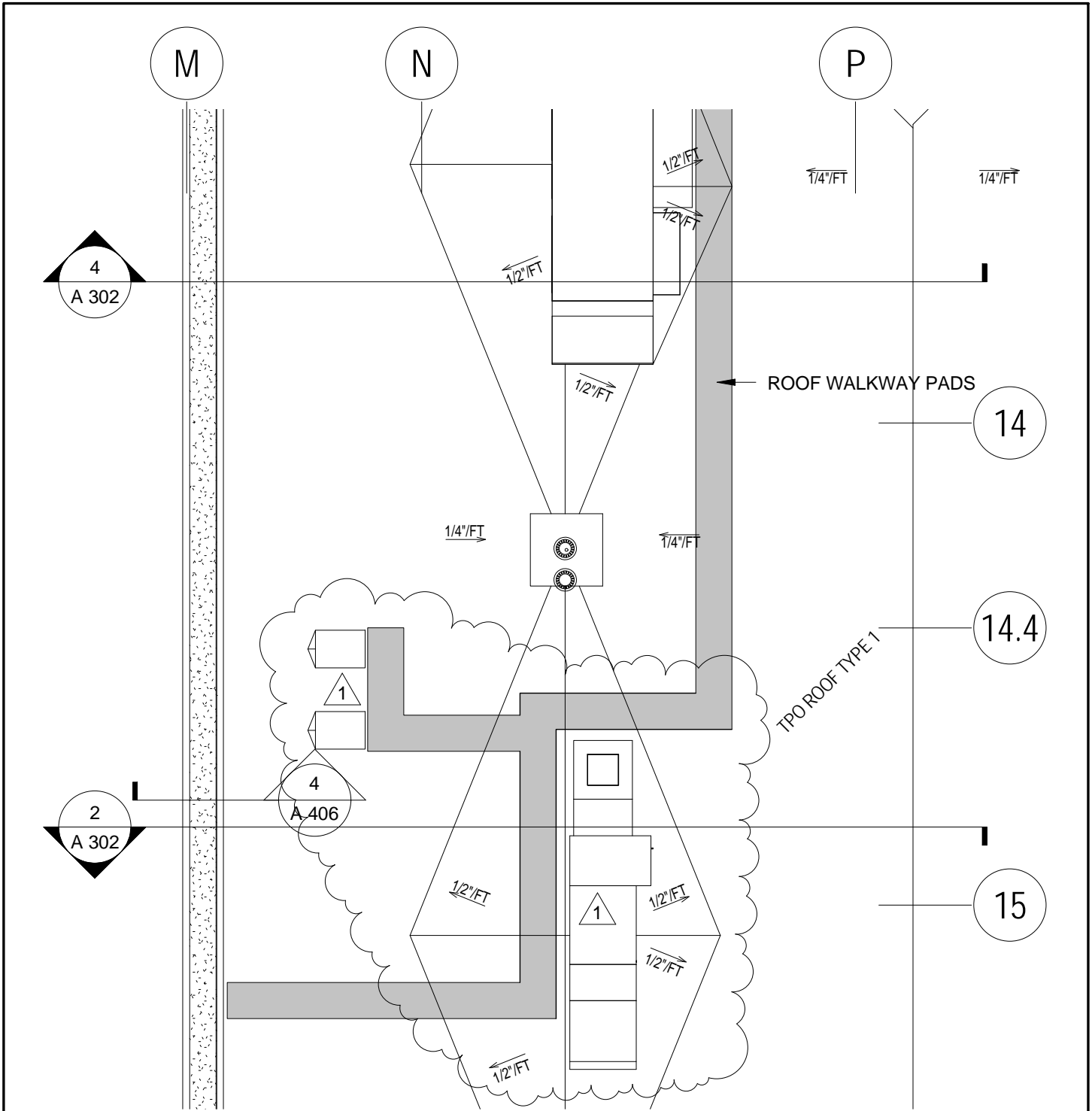


1
AAD
2.01

BLDG B - L0 FLOOR PLAN

SCALE: 1/8" = 1'-0"

JRS ARCHITECTS 2010 Clipper Park Rd. Suite 101 Baltimore, MD 21211 410.235.7256	Baltimore City Public Schools		DATE: 04/22/16	
	Water Entrance Slab		CHANGE TO DRAWING: 1/A 113	REV: 1
WATER ENTRANCE SLAB		Additions & Renovations at Robert Poole Building #056 1300 W 36TH ST., BALTIMORE, MD 21211		DRAWING NO.: AAD 2.01
				SCALE: 1/8" = 1'-0"

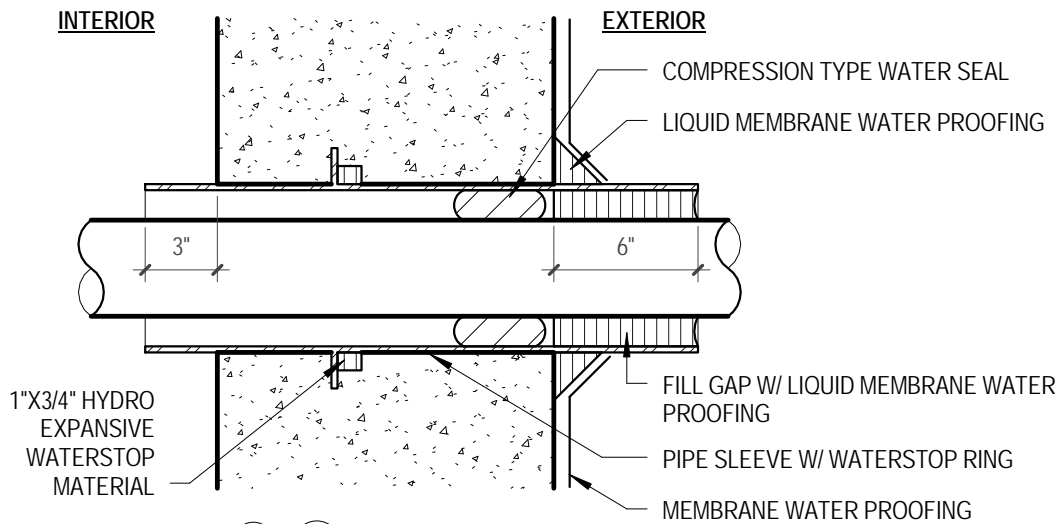


1
AAD
2.03

BLDG C - ROOF PLAN

SCALE: 1/8" = 1'-0"

JRS ARCHITECTS 2010 Clipper Park Rd. Suite 101 Baltimore, MD 21211 410.235.7256	Baltimore City Public Schools		DATE: 04/18/16	
	Additions & Renovations at Robert Poole Building #056 1300 W 36TH ST., BALTIMORE, MD 21211		CHANGE TO DRAWING: A 121	REV:
KITCHEN MAU		DRAWING NO.: AAD 2.03		SCALE: 1/8" = 1'-0"



1 **NEW PIPE THROUGH NEW WALL**

TYP PIPE PENETRATIONS THRU BELOW GRADE WATERPROOFING

1
AAD
2.04

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

JRS ARCHITECTS

2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/19/16

CHANGE TO DRAWING:

A 401

REV:

1

DRAWING NO.:

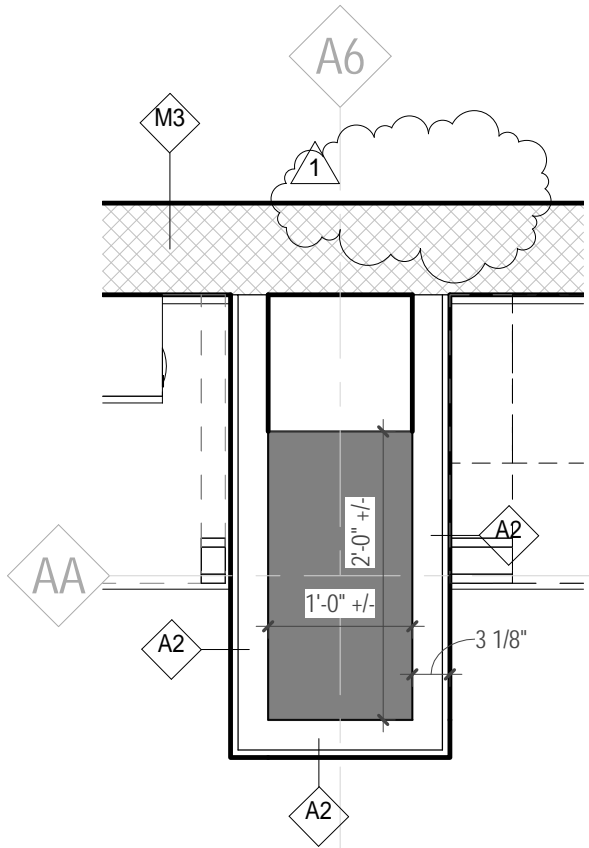
AAD 2.04

PIPE PENETRATION

**Additions & Renovations at Robert Poole
Building #056**

1300 W 36TH ST., BALTIMORE, MD 21211

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



1
AAD
2.05

L1 - COL AA-A6 - ADD 2

SCALE: 3/4" = 1'-0"

JRS ARCHITECTS

2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/19/16

CHANGE TO DRAWING:

REV:

1

**Additions & Renovations at Robert Poole
Building #056**

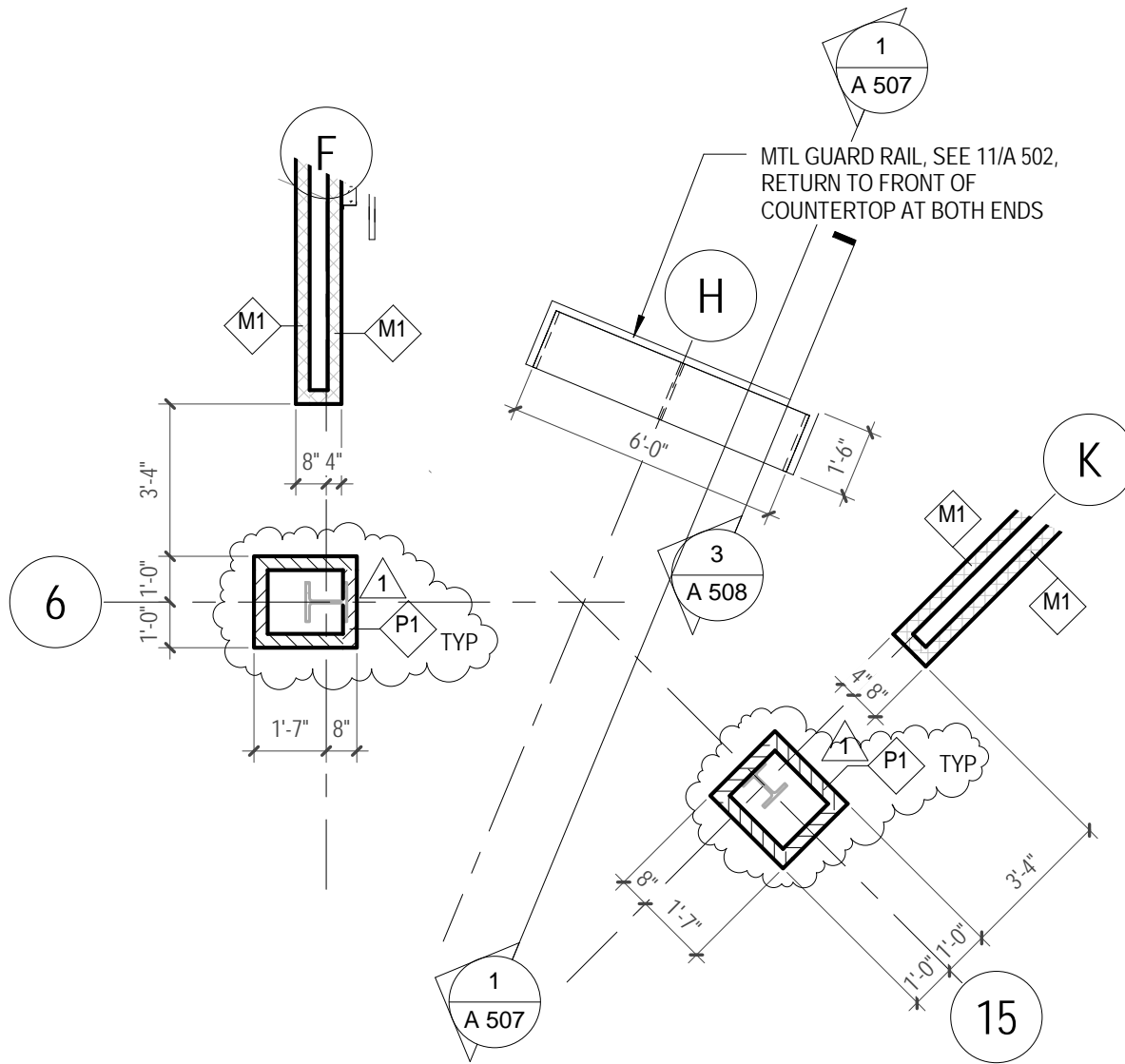
DRAWING NO.:

AAD 2.05

DELETE REVEAL

1300 W 36TH ST., BALTIMORE, MD 21211

SCALE: 3/4" = 1'-0"



1
AAD
2.06

COLLAB LEARNING STAIR - LEVEL 3 - ADD 2

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

JRS ARCHITECTS

2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/19/16

CHANGE TO DRAWING:
4/A 506

REV:
1

**Additions & Renovations at Robert Poole
Building #056**

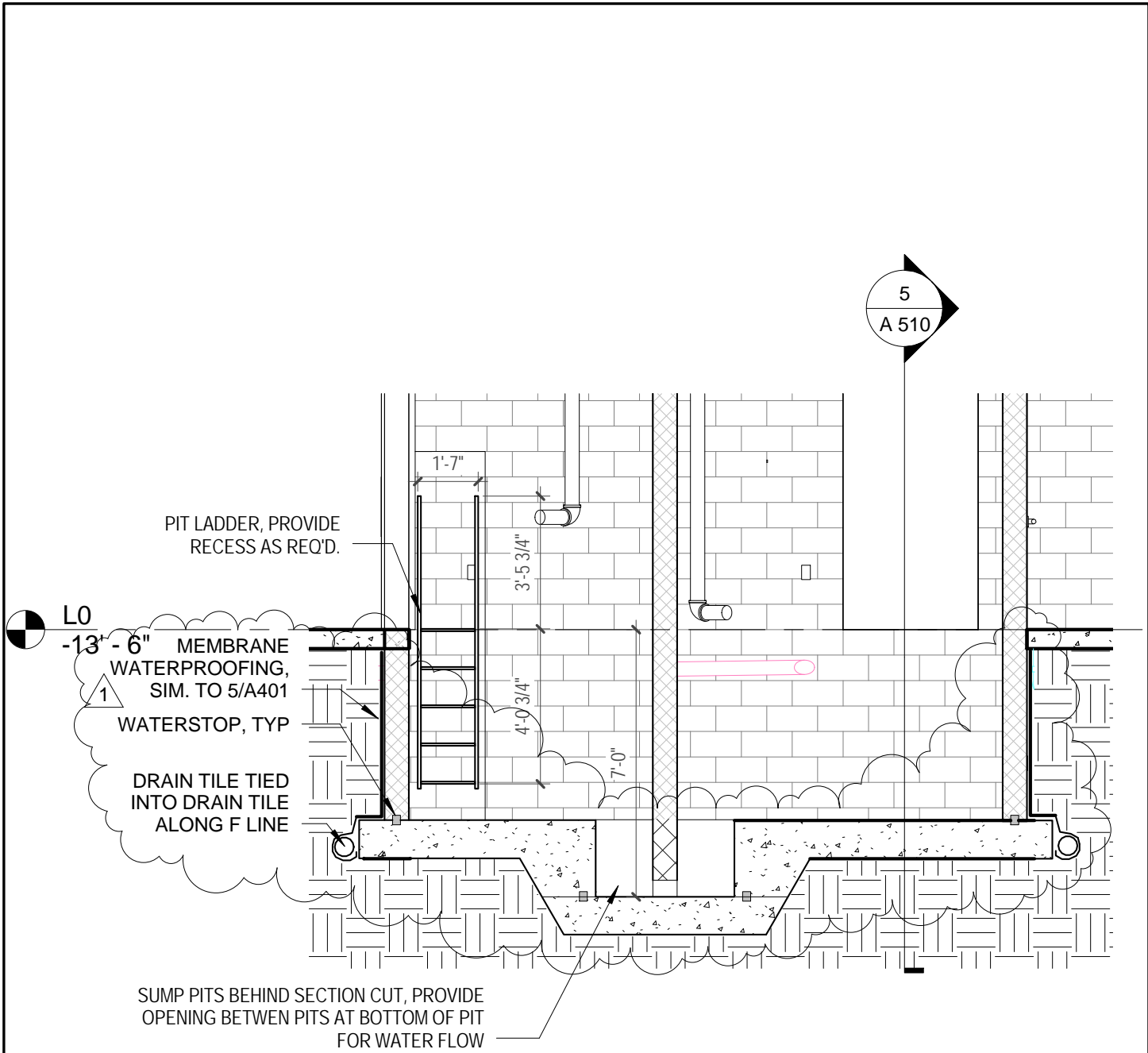
1300 W 36TH ST., BALTIMORE, MD 21211

DRAWING NO.:

AAD 2.06

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

**LEARNING STAIR COL.
ENCLOSURE**



1
AAD
2.07

ELEVATOR 1 & 2 SECTION - ADD 2

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

JRS ARCHITECTS

2010 Clipper Park Rd.
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Baltimore City Public Schools

**Additions & Renovations at Robert Poole
Building #056**

1300 W 36TH ST., BALTIMORE, MD 21211

DATE: 04/19/16

CHANGE TO DRAWING:
7/A 510

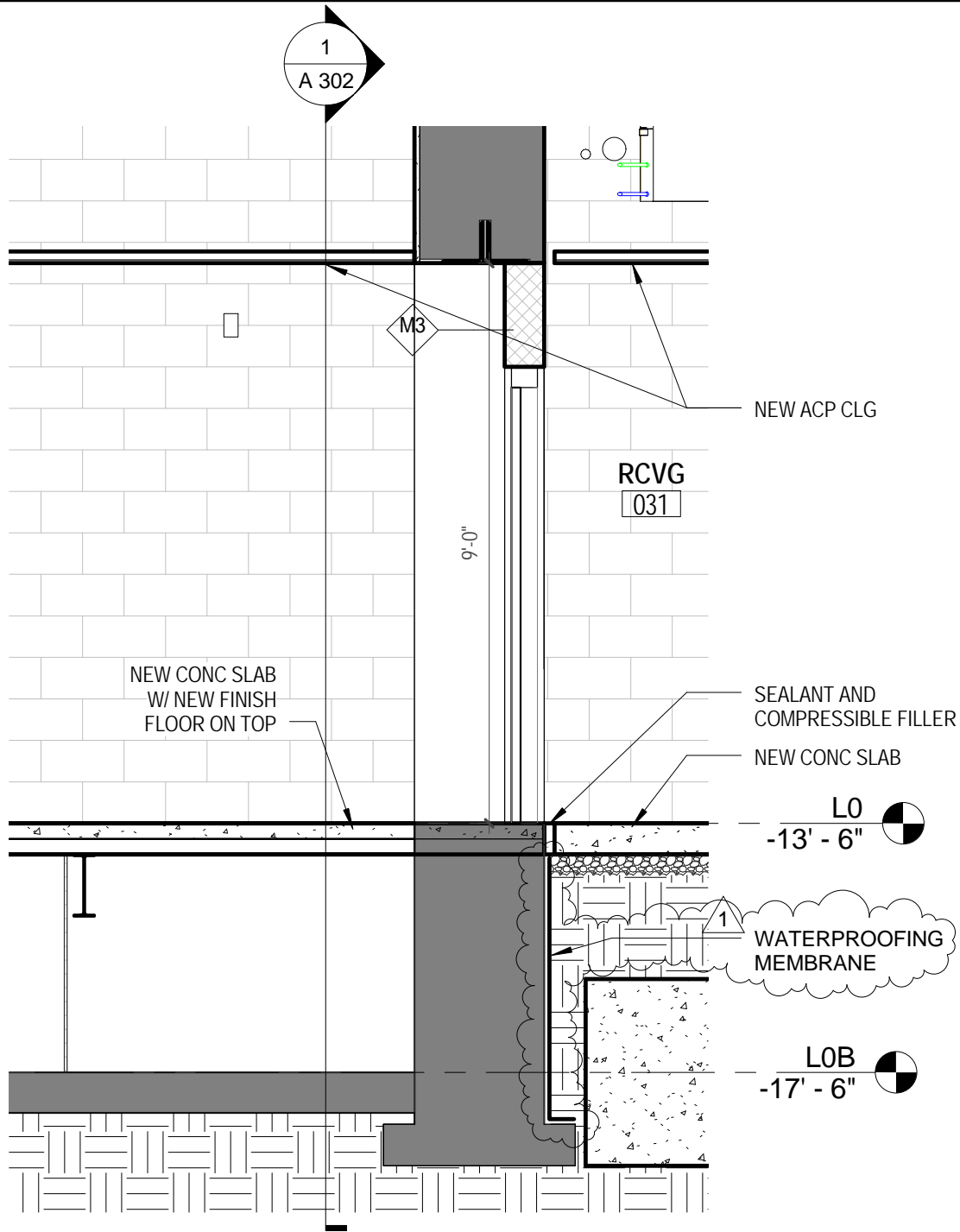
REV:
1

DRAWING NO.:

AAD 2.07

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

**ELEV. PIT
WATERPROOFING**



1
AAD
2.09

BLDG C AT BLDG B - ADD 2

SCALE: 3/8" = 1'-0"

JRS ARCHITECTS

2010 Clipper Park Rd.
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Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/20/16

CHANGE TO DRAWING:

5/A407

REV:

1

**Additions & Renovations at Robert Poole
Building #056**

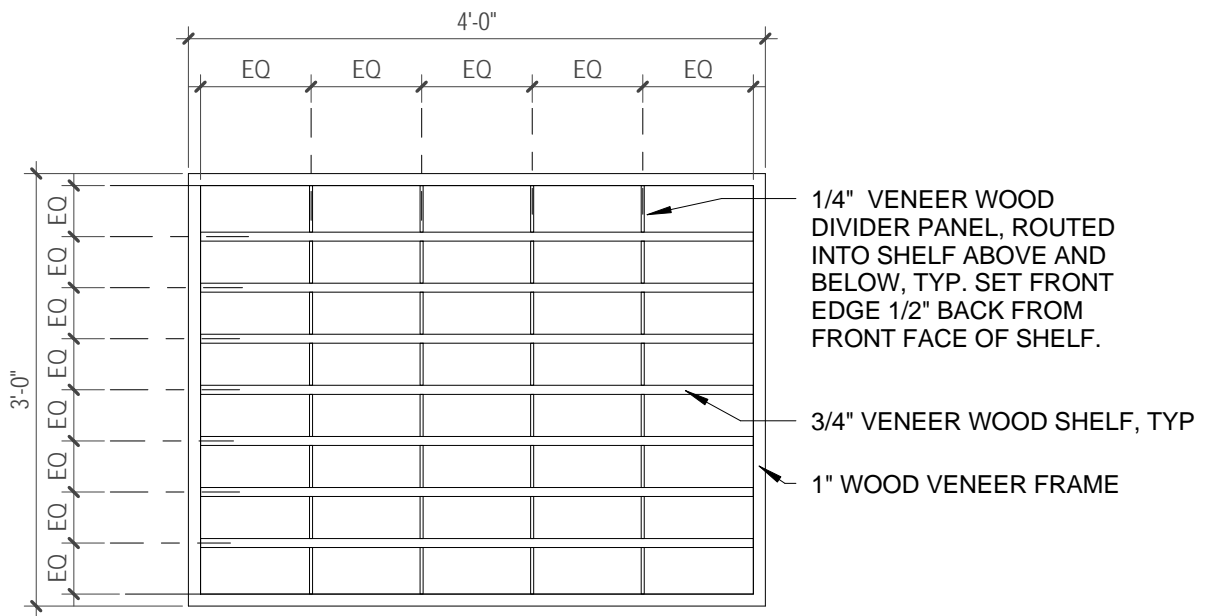
1300 W 36TH ST., BALTIMORE, MD 21211

DRAWING NO.:

AAD 2.09

SCALE: 3/8" = 1'-0"

**WATERPROOFING
EXISTING WALL**



1
AAD
2.10

MAILBOX UNIT ELEVATION - ADD 2

SCALE: 3/4" = 1'-0"

JRS ARCHITECTS

2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/22/16

CHANGE TO DRAWING:

A440

REV:

**Additions & Renovations at Robert Poole
Building #056**

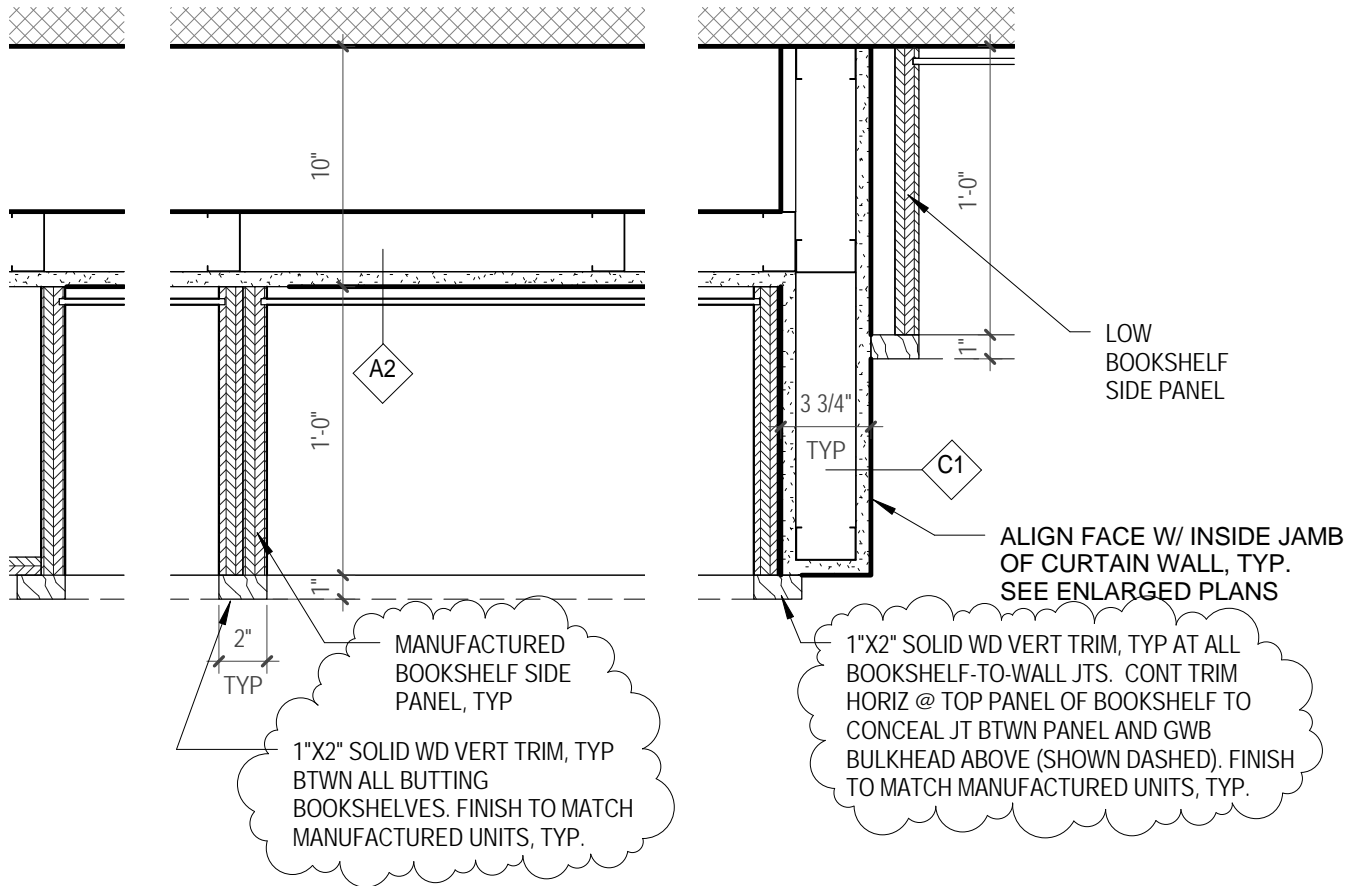
1300 W 36TH ST., BALTIMORE, MD 21211

DRAWING NO.:

AAD 2.10

SCALE: 3/4" = 1'-0"

MAILBOX UNIT



MEDIA CENTER BOOKSHELF CONNECTIONS

ADD 2

1
AAD
2.11

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

JRS ARCHITECTS

2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/21/16

CHANGE TO DRAWING:

REV:

1

**Additions & Renovations at Robert Poole
Building #056**

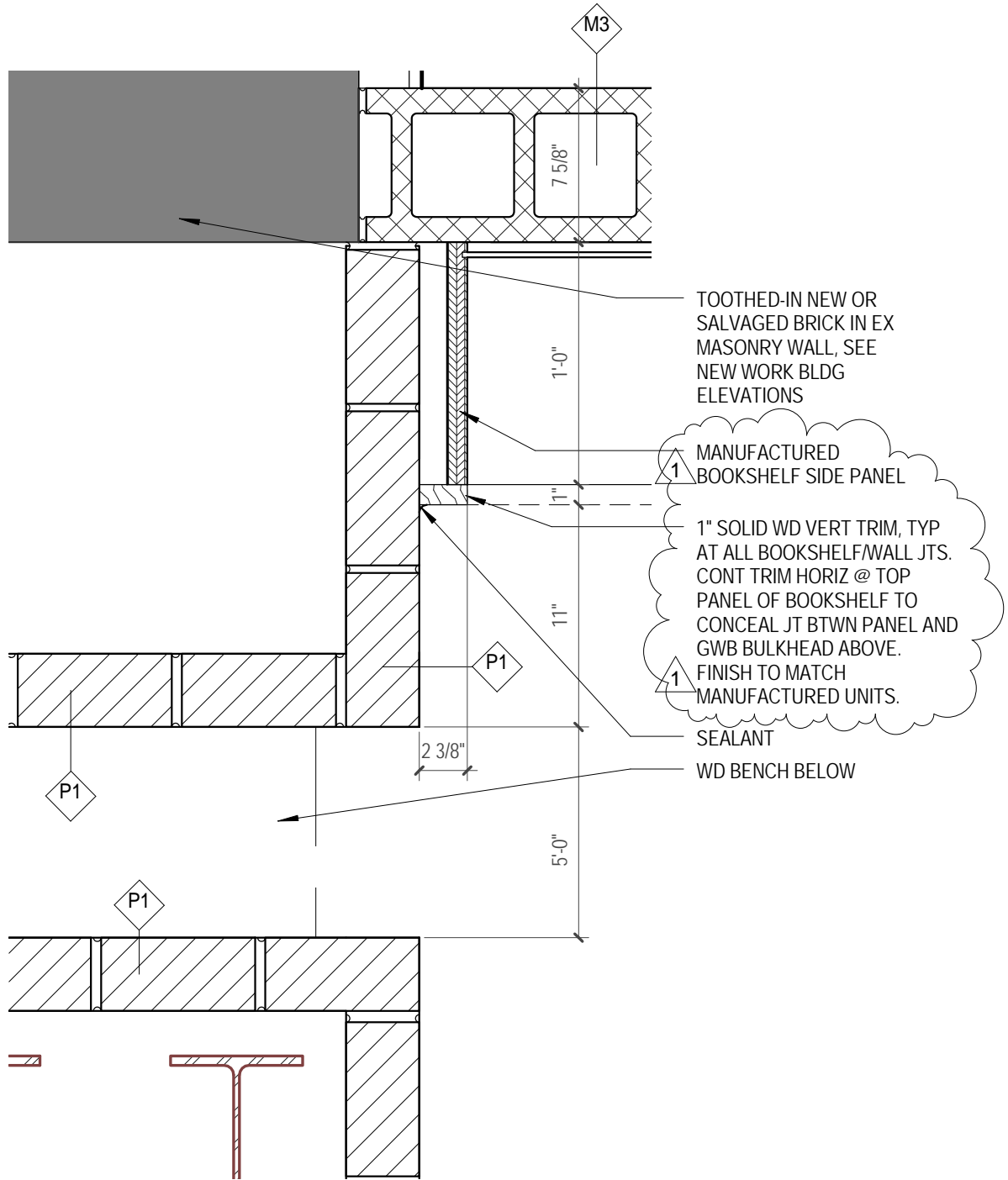
DRAWING NO.:

AAD 2.11

**MEDIA CENTER
BOOKSHELF**

1300 W 36TH ST., BALTIMORE, MD 21211

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



MEDIA CENTER ENTRY SHELVES AT PIER - ADD 2

1
AAD
2.12

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

JRS ARCHITECTS

2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/21/16

CHANGE TO DRAWING:

REV:

1

**Additions & Renovations at Robert Poole
Building #056**

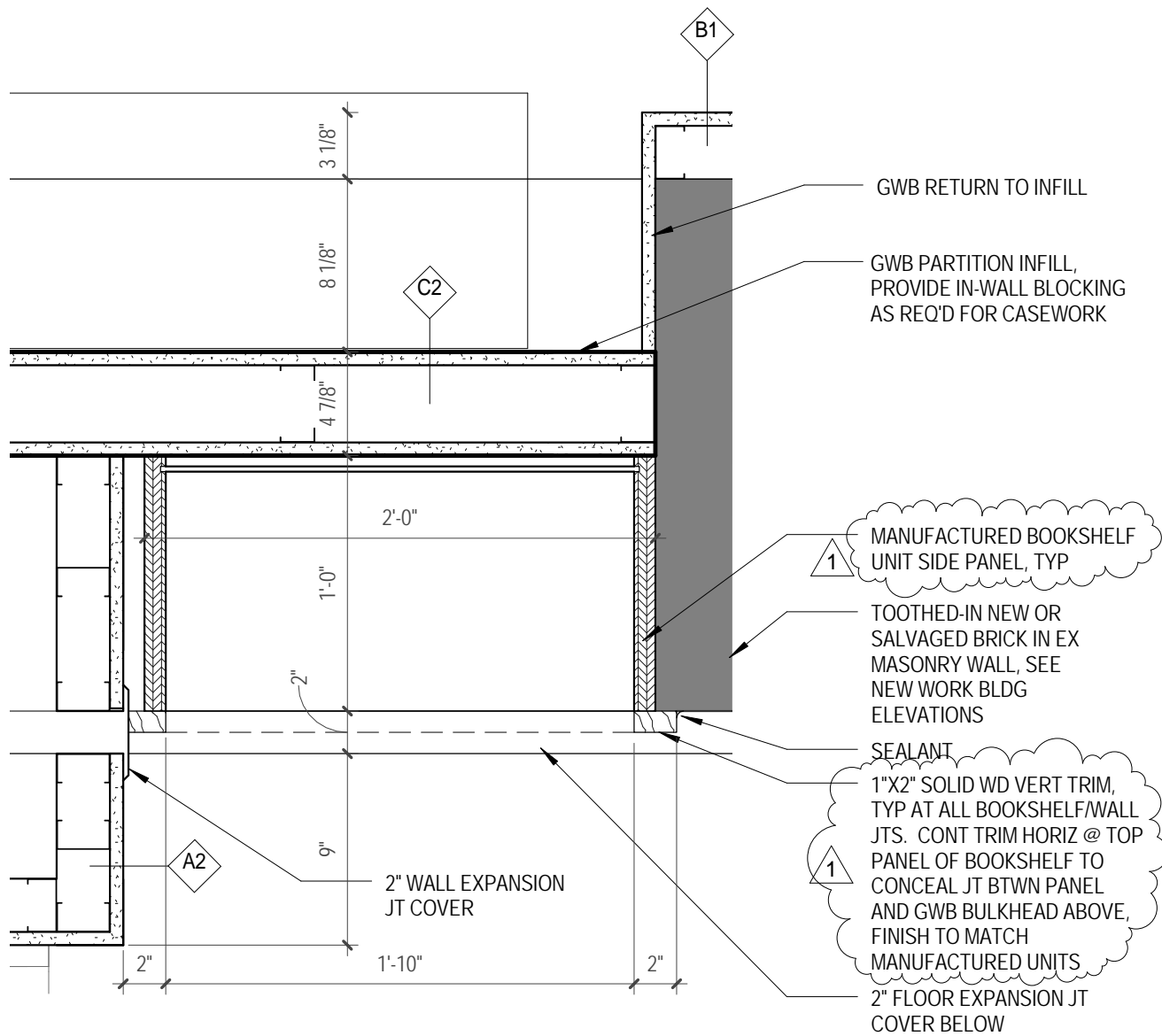
DRAWING NO.:

AAD 2.12

**MEDIA CENTER
ENTRY SHELVES**

1300 W 36TH ST., BALTIMORE, MD 21211

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



MEDIA CENTER BOOKSHELF AT MASONRY ADD 2

1
AAD
2.13

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

JRS ARCHITECTS

2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211

410.235.7256

Baltimore City Public Schools

DATE: 04/21/16

CHANGE TO DRAWING:

REV:

1

**Additions & Renovations at Robert Poole
Building #056**

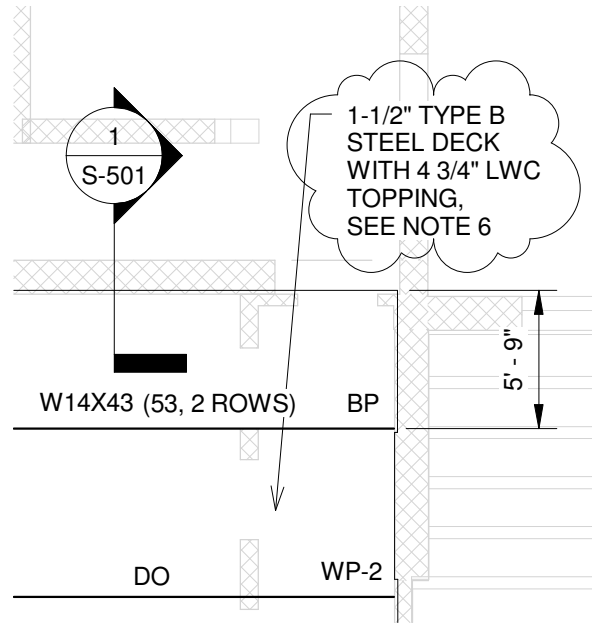
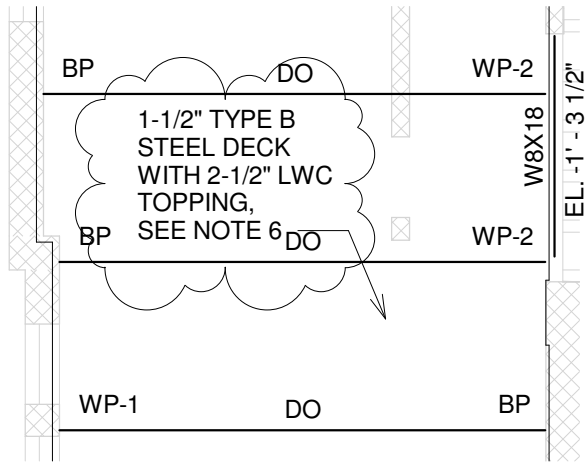
DRAWING NO.:

AAD 2.13

**MEDIA CENTER
BOOKSHELF**

1300 W 36TH ST., BALTIMORE, MD 21211

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



① L1-A - Partial Plan 1
1/8" = 1'-0"

② L1-A - Partial Plan 2
1/8" = 1'-0"

NOTES:

1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
2. T/SLAB ELEVATION = 0'-0" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
3. T/STL ELEVATION = -6 1/4" FROM TOP OF SLAB UNLESS NOTED OTHERWISE.
4. SEE S-003 FOR TYPICAL STEEL DETAILS NOT CALLED OUT.
5. COORDINATE DUCT PENETRATIONS WITH MECHANICAL DRAWINGS. OPENINGS TO BE LOCATED BETWEEN EXISTING JOISTS. RELOCATE OPENINGS AS NEEDED.
6. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.



3500 BOSTON STREET
SUITE 329
BALTIMORE, MD 21224
410-522-5870

Baltimore City Public Schools

DATE: 04/18/16

CHANGE TO DRAWING:

REV:

S-111

2

DRAWING NO.:

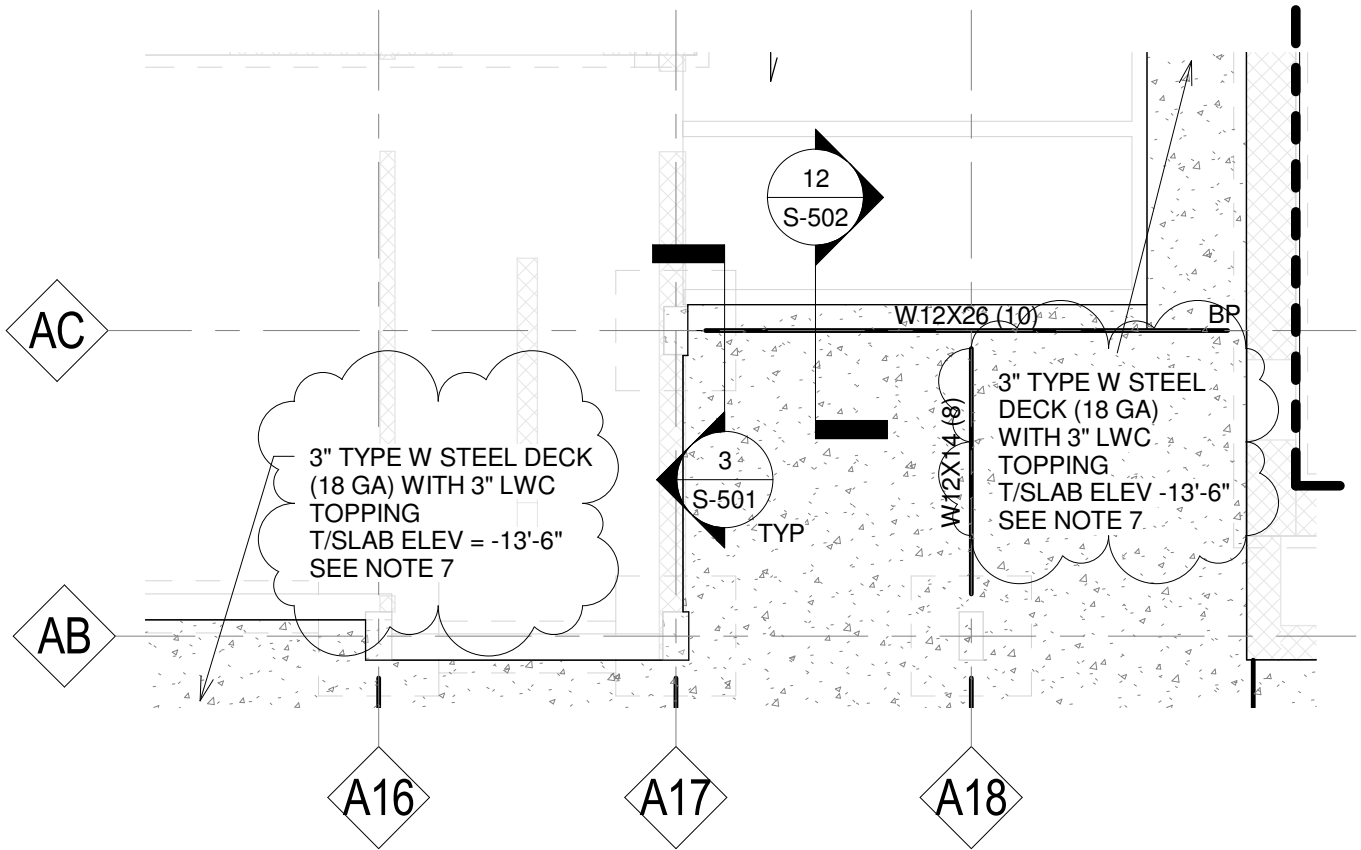
ADD S2.01

**FNDN A, LEVEL 1A
PARTIAL PLAN**

**Additions & Renovations at Robert Poole
Building #056**

1300 W 36TH ST, BALTIMORE, MD 21211


SCALE: 1/8" = 1'-0"

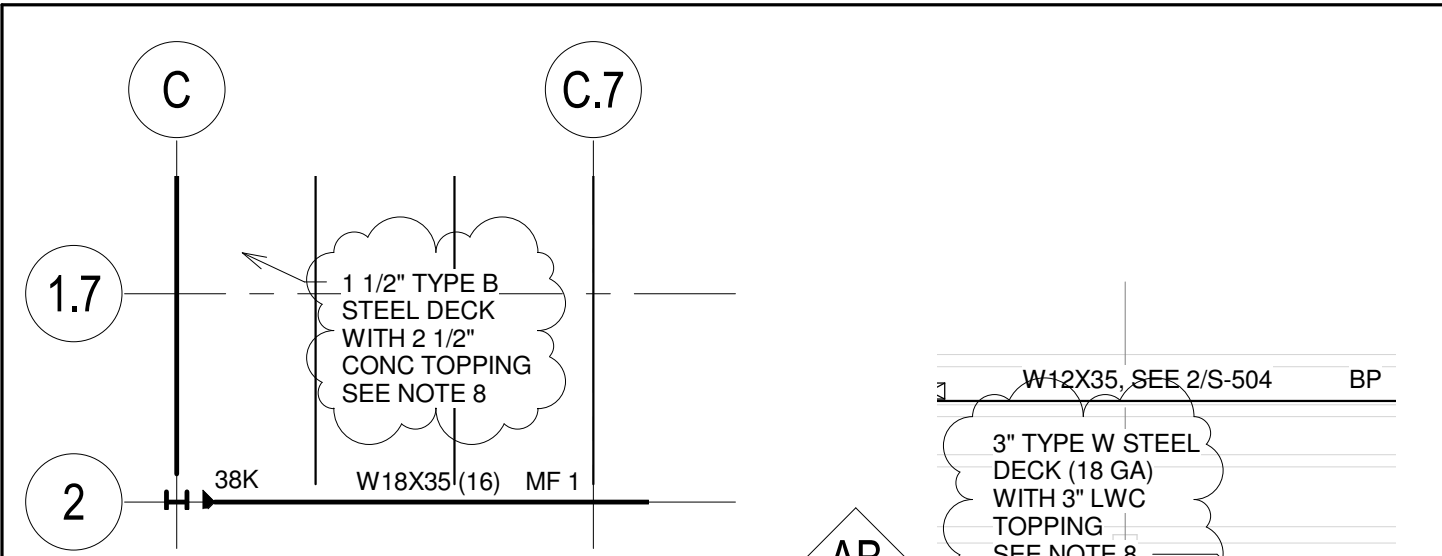


① Foundation B - Partial Plan 1
 1/8" = 1'-0"

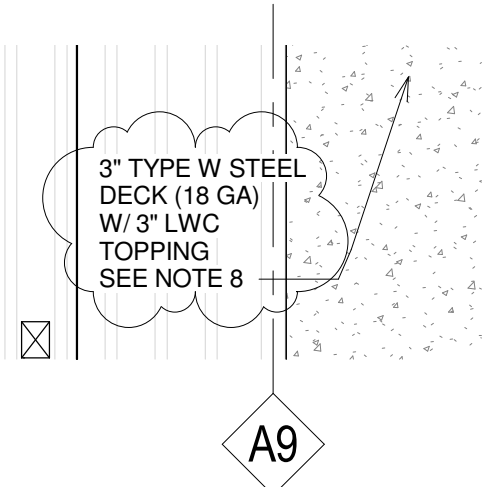
NOTES:

1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
2. T/SLAB ELEVATION = -13'-6" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
3. T/STL ELEVATION = -6" FROM TOP OF SLAB UNLESS NOTED OTHERWISE.
4. SLAB ON GRADE TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4. PROVIDE CONTROL JOINTS AT 15'-0" OC MAXIMUM SPACING. SEE TYPICAL DETAILS ON S-002.
5. SEE S-301 FOR COLUMN SCHEDULE.
6. COORDINATE SLAB DEPRESSIONS WITH OTHER DISCIPLINES.
7. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.

 <p>3500 BOSTON STREET SUITE 329 BALTIMORE, MD 21224 410-522-5870</p>	<p>Baltimore City Public Schools</p>	DATE: 04/18/16	
		CHANGE TO DRAWING: S-113	REV: 2
<p>FNDN B, C PARTIAL PLAN</p>	<p>Additions & Renovations at Robert Poole Building #056</p> <p>1300 W 36TH ST, BALTIMORE, MD 21211</p>	DRAWING NO.:	
		<p>ADD S2.02</p> <p>SCALE: 1/8" = 1'-0"</p>	



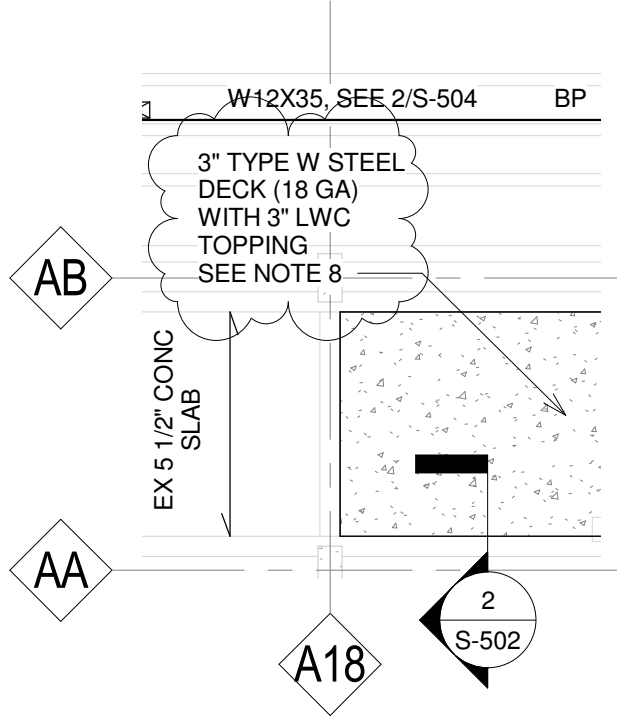
1 L1-B - Partial Plan 1
1/8" = 1'-0"




2 L1-B - Partial Plan 2
1/8" = 1'-0"

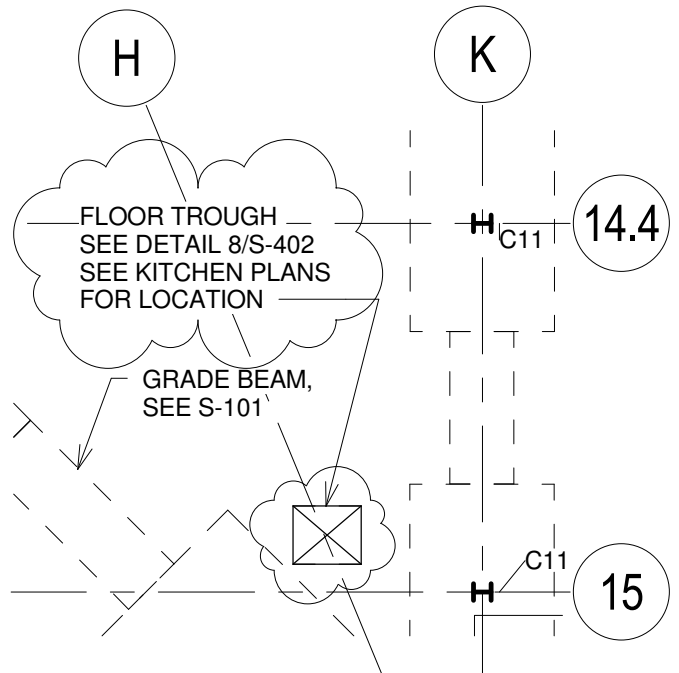
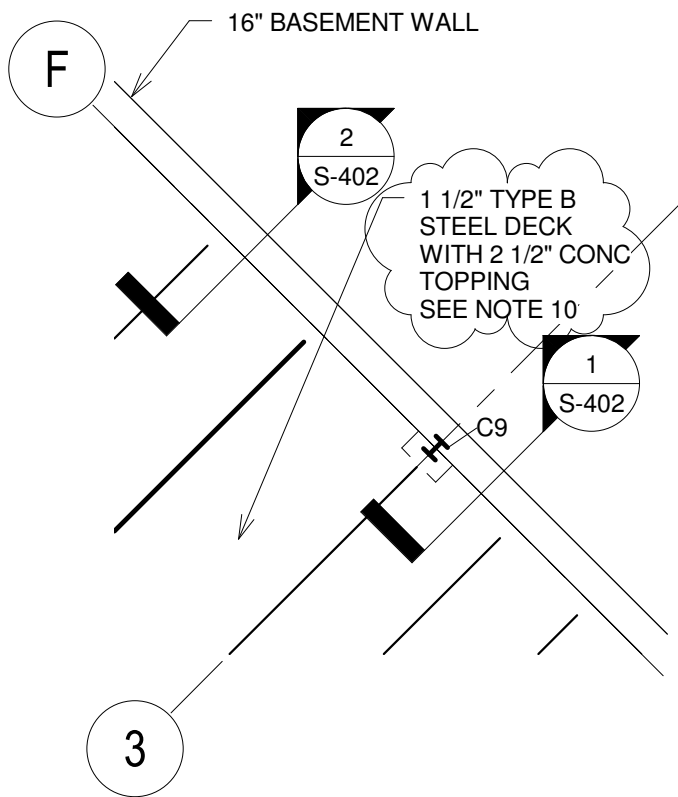
NOTES:

1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
2. T/SLAB ELEVATION = 0'-0" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
3. T/STL ELEVATION = -4" FROM TOP OF SLAB UNLESS NOTED OTHERWISE.
4. REFER TO S-201 FOR BRACED FRAME AND MOMENT FRAME DETAILS.
5. SEE S-003 FOR TYPICAL STEEL DETAILS NOT CALLED OUT.
6. SEE GENERAL NOTES FOR TYPICAL CONNECTION DESIGN. REACTIONS SHOWN IN PLAN FOR CONNECTIONS WITH GREATER REACTIONS.
7. COORDINATE DUCT PENETRATIONS WITH MECHANICAL DRAWINGS. OPENINGS TO BE LOCATED BETWEEN EXISTING JOISTS. RELOCATE OPENINGS AS NEEDED.
8. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.



3 L1-B - Partial Plan 3
1/8" = 1'-0"

 <p>3500 BOSTON STREET SUITE 329 BALTIMORE, MD 21224 410-522-5870</p>	Baltimore City Public Schools		DATE: 04/18/16	
	Additions & Renovations at Robert Poole Building #056		CHANGE TO DRAWING: S-114	REV: 2
LEVEL 1B PARTIAL PLAN		1300 W 36TH ST, BALTIMORE, MD 21211		DRAWING NO.: ADD S2.03
				SCALE: 1/8" = 1'-0"



1 L1-C - Partial Plan 1
1/8" = 1'-0"

2 L1-C - Partial Plan 2
1/8" = 1'-0"

NOTES:

1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
2. T/SLAB ELEVATION = 0'-0" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
3. T/STL ELEVATION = -4" FROM TOP OF SLAB UNLESS NOTED OTHERWISE.
4. SEE S-101 FOR PILE CAP AND HELICAL FRAME DETAILS.
5. SEE S-202 FOR MOMENT FRAME DETAILS
6. SLAB ON GRADE TO BE REINFORCED WITH #4@12" EACH WAY. PROVIDE CONTROL JOINTS AT 15'-0" MAXIMUM SPACING. SEE TYPICAL DETAILS ON S-002.
7. COORDINATE SLAB DEPRESSIONS WITH OTHER DISCIPLINES.
8. SEE S-003 FOR TYPICAL STEEL DETAILS NOT CALLED OUT.
9. SEE GENERAL NOTES FOR TYPICAL CONNECTION DESIGN. REACTIONS SHOWN IN PLAN FOR CONNECTIONS WITH GREATER REACTIONS.
10. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.

ALBRECHT
ENGINEERING INC

3500 BOSTON STREET
SUITE 329
BALTIMORE, MD 21224
410-522-5870

**LEVEL 1C
PARTIAL PLAN**

Baltimore City Public Schools

**Additions & Renovations at Robert Poole
Building #056**

1300 W 36TH ST, BALTIMORE, MD 21211

DATE: 04/18/16

CHANGE TO DRAWING:

S-115

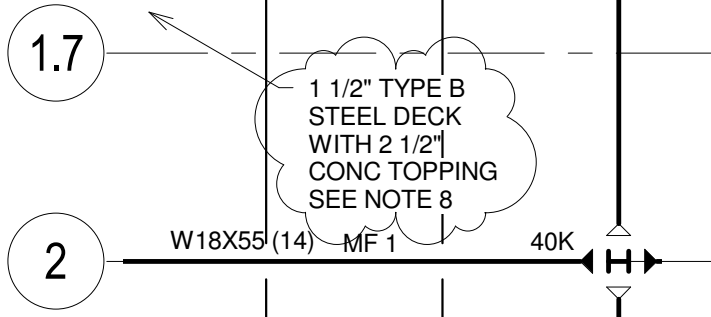
REV:

2

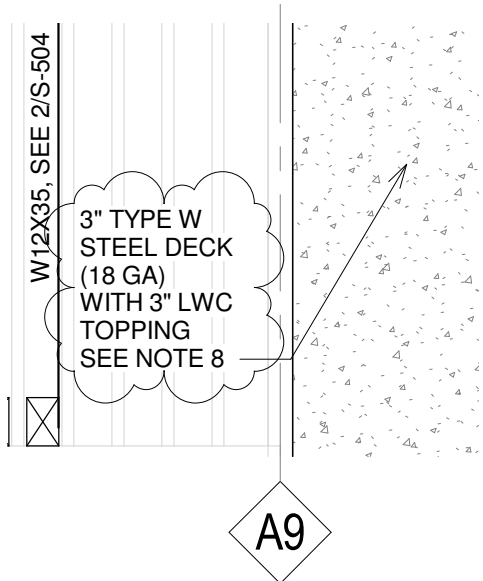
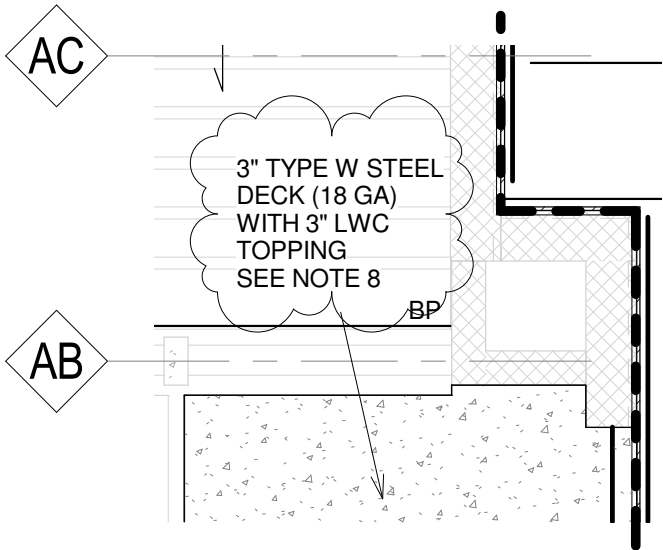
DRAWING NO.:

ADD S2.04

SCALE: 1/8" = 1'-0"



1 L2-B - Partial Plan 1
1/8" = 1'-0"



2 L2-B - Partial Plan 2
1/8" = 1'-0"

3 L2-B - Partial Plan 3
1/8" = 1'-0"

NOTES:

1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
2. T/SLAB ELEVATION = 13'-6" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
3. T/STL ELEVATION = -4" FROM TOP OF SLAB UNLESS NOTED OTHERWISE.
4. SEE S-201 FOR BRACED FRAME AND MOMENT FRAME DETAILS.
5. SEE S-003 FOR TYPICAL STEEL DETAILS NOT CALLED OUT.
6. SEE GENERAL NOTES FOR TYPICAL CONNECTION DESIGN. REACTIONS SHOWN IN PLAN FOR CONNECTIONS WITH GREATER REACTIONS.
7. COORDINATE DUCT PENETRATIONS WITH MECHANICAL DRAWINGS. OPENINGS TO BE LOCATED BETWEEN EXISTING JOISTS. RELOCATE OPENINGS AS NEEDED.
8. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.

ALBRECHT
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3500 BOSTON STREET
SUITE 329
BALTIMORE, MD 21224
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**LEVEL 2B
PARTIAL PLAN**

Baltimore City Public Schools

**Additions & Renovations at Robert Poole
Building #056**

1300 W 36TH ST, BALTIMORE, MD 21211

DATE: 04/18/16

CHANGE TO DRAWING:
S-116

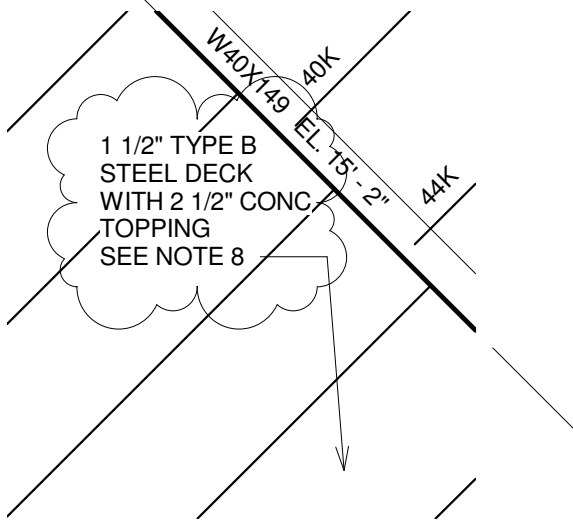
REV:
2

DRAWING NO.:

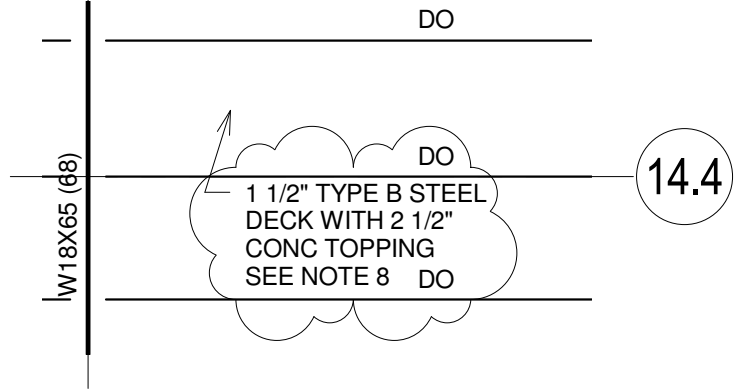
ADD S2.05

SCALE: 1/8" = 1'-0"

F



L



1 L2-C - Partial Plan 1
1/8" = 1'-0"

2 L2-C - Partial Plan 2
1/8" = 1'-0"

NOTES:

1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
2. T/SLAB ELEVATION = 13'-6" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
3. T/STL ELEVATION = -4" FROM TOP OF SLAB UNLESS NOTED OTHERWISE.
4. SEE S-202 AND S-203 FOR MOMENT FRAME AND BRACE FRAME DETAILS.
5. SEE S-003 FOR TYPICAL STEEL DETAILS NOT CALLED OUT.
6. SEE GENERAL NOTES FOR TYPICAL CONNECTION DESIGN. REACTIONS SHOWN IN PLAN FOR CONNECTIONS WITH GREATER REACTIONS.
7. DUCT PENETRATIONS TO BE COORDINATED WITH MECHANICAL DRAWINGS. OPENINGS TO BE LOCATED BETWEEN STRUCTURAL FRAMING. RELOCATE OPENINGS AS NEEDED. ANY OPENINGS 18" OR WIDER IN THE DIRECTION PERPENDICULAR TO THE SPAN OF THE STEEL DECK WITH CONCRETE TOPPING ARE TO BE REINFORCED PER DETAIL 1/S-504.
8. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.



3500 BOSTON STREET
SUITE 329
BALTIMORE, MD 21224
410-522-5870

Baltimore City Public Schools

DATE: 04/18/16

CHANGE TO DRAWING:

REV:

S-117

2

**Additions & Renovations at Robert Poole
Building #056**

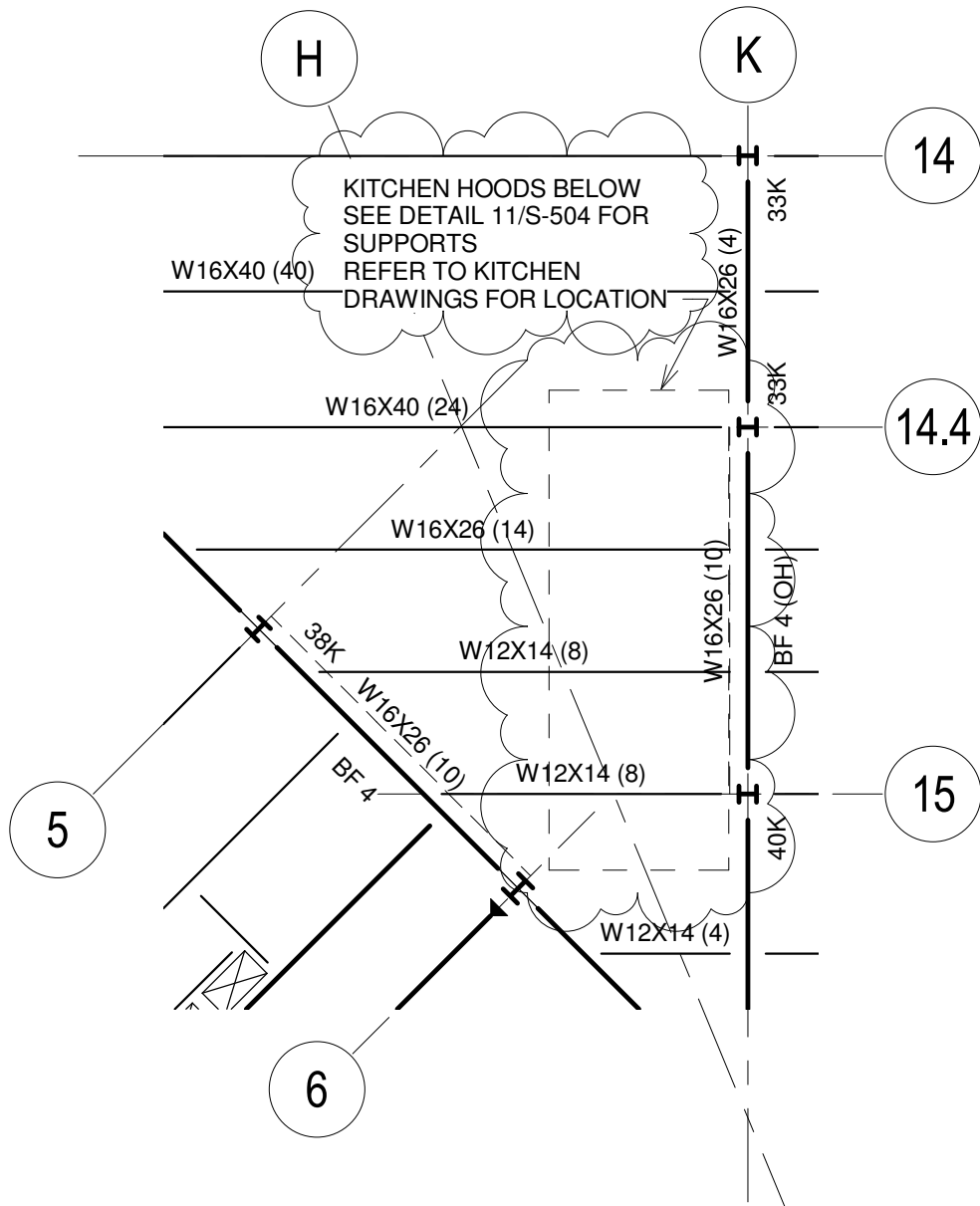
DRAWING NO.:

ADD S2.06

**LEVEL 2C
PARTIAL PLAN**

1300 W 36TH ST, BALTIMORE, MD 21211

SCALE: 1/8" = 1'-0"



① L2-C - Partial Plan 3
 1/8" = 1'-0"



3500 BOSTON STREET
 SUITE 329
 BALTIMORE, MD 21224
 410-522-5870

Baltimore City Public Schools

DATE: 04/18/16

CHANGE TO DRAWING:

REV:

S-117

2

DRAWING NO.:

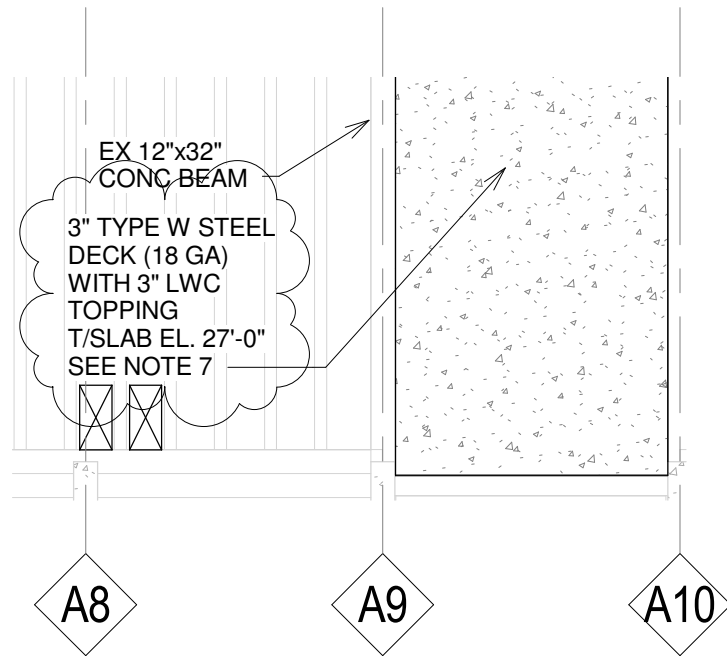
ADD S2.07

**LEVEL 2C
 PARTIAL PLAN**

**Additions & Renovations at Robert Poole
 Building #056**

1300 W 36TH ST, BALTIMORE, MD 21211


SCALE: 1/8" = 1'-0"

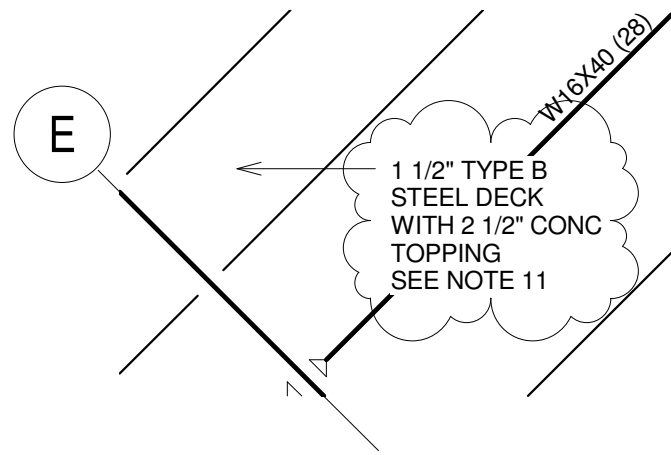


1 L3-B - Partial Plan 1
1/8" = 1'-0"

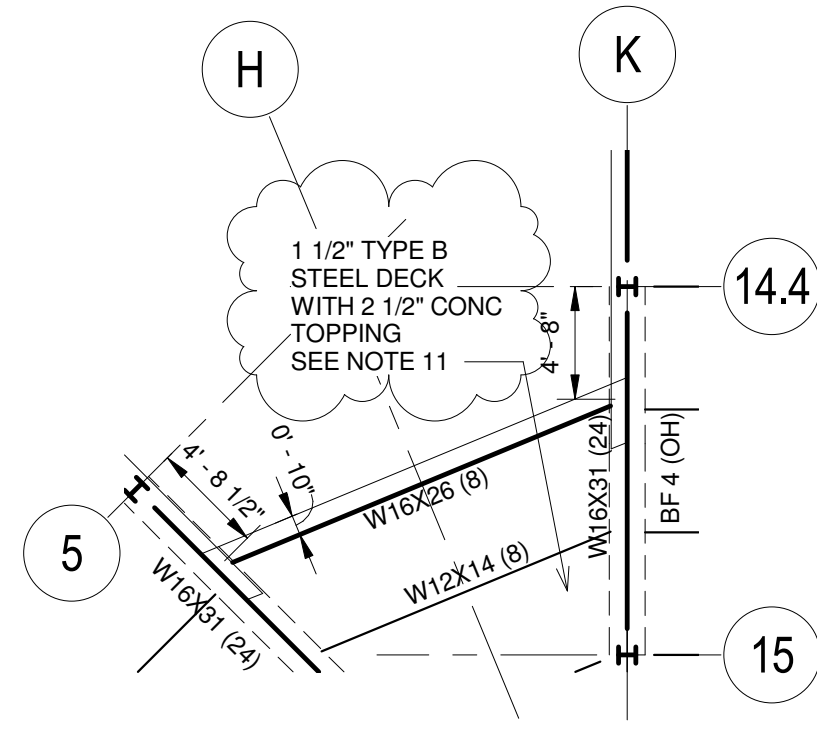
NOTES:

1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
2. T/STL ELEVATION = 27'-0" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
3. SEE S-201 FOR BRACED FRAME AND MOMENT FRAME DETAILS.
4. SEE S-003 FOR TYPICAL STEEL DETAILS NOT CALLED OUT.
5. SEE GENERAL NOTES FOR TYPICAL CONNECTION DESIGN. REACTIONS SHOWN IN PLAN FOR GREATER REACTIONS.
6. COORDINATE DUCT PENETRATIONS WITH MECHANICAL DRAWINGS. OPENINGS TO BE LOCATED BETWEEN EXISTING JOISTS. RELOCATE OPENINGS AS NEEDED.
7. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.

 <p>3500 BOSTON STREET SUITE 329 BALTIMORE, MD 21224 410-522-5870</p>	<p>Baltimore City Public Schools</p>	DATE: 04/18/16	
		CHANGE TO DRAWING: S-118	REV: 2
<p>LEVEL 3B PARTIAL PLAN</p>	<p>Additions & Renovations at Robert Poole Building #056</p> <p>1300 W 36TH ST, BALTIMORE, MD 21211</p>	DRAWING NO.:	
		<p>ADD S2.08</p> <p>SCALE: 1/8" = 1'-0"</p>	

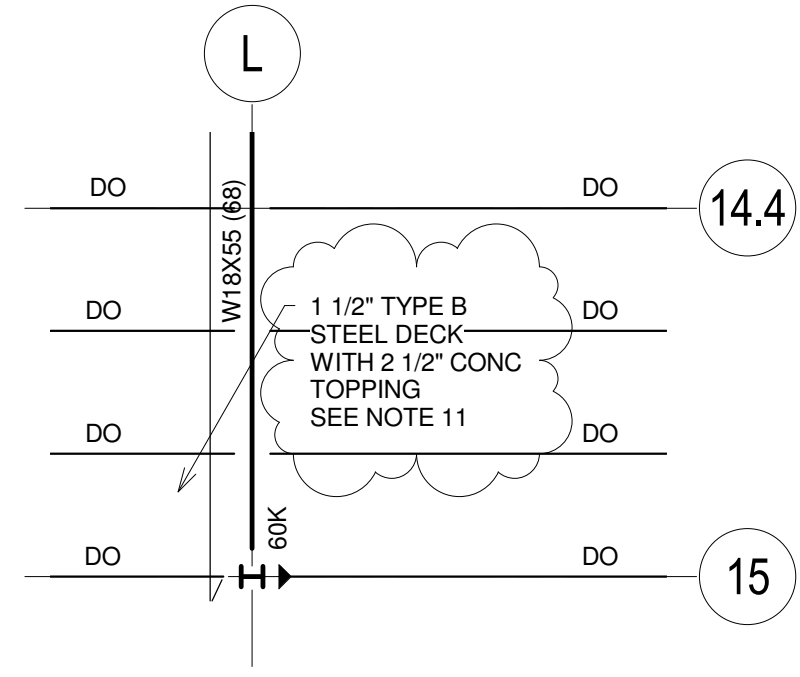


1 L3-C & R2 - Partial Plan 1
1/8" = 1'-0"

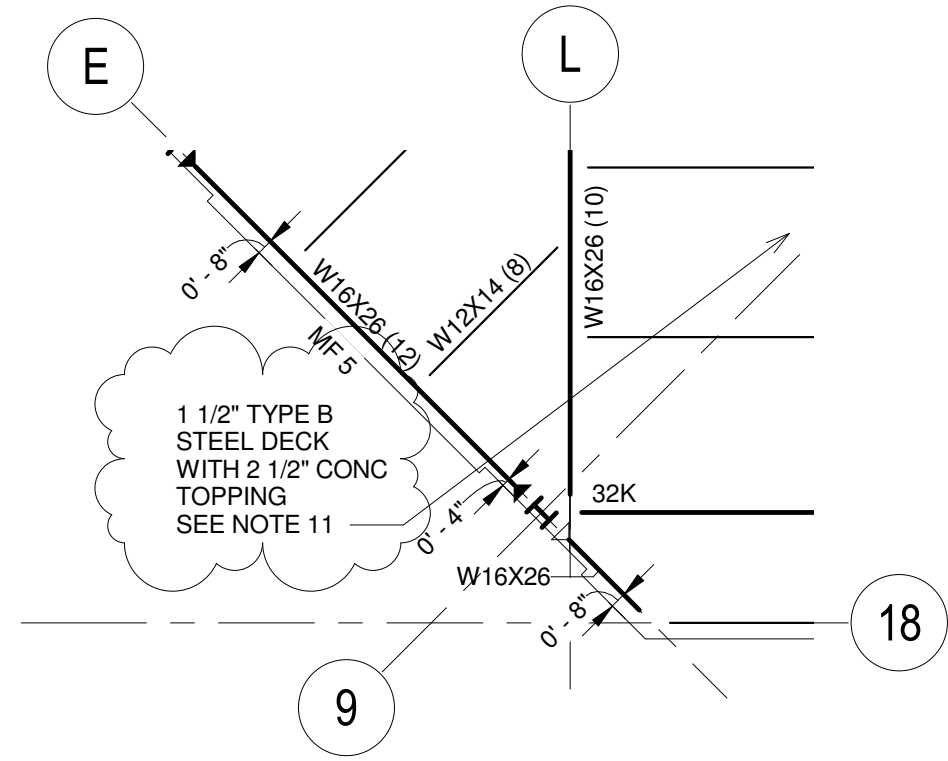


2 L3-C & R2 - Partial Plan 2
1/8" = 1'-0"

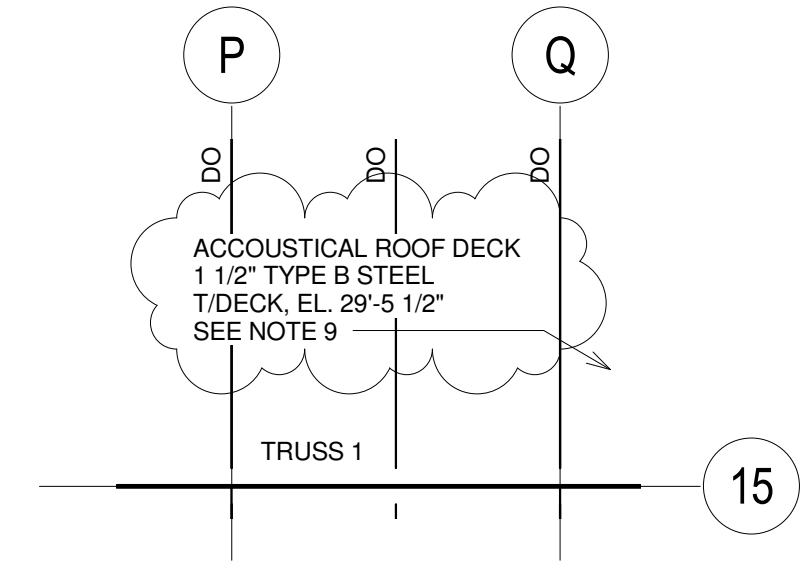
- NOTES:**
1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
 2. T/SLAB ELEVATION = 27'-0" RELATIVE TO PROJECT DATUM UNLESS NOTED OTHERWISE.
 3. T/STL ELEVATION = -4" FROM TOP OF SLAB UNLESS NOTED OTHERWISE.
 4. SEE S-202 AND S-203 FOR MOMENT FRAME AND BRACE FRAME DETAILS.
 5. SEE S-211 FOR TRUSS 1 DETAILS.
 6. SEE S-003 FOR TYPICAL STEEL DETAILS NOT CALLED OUT.
 7. COORDINATE LOCATION OF CURB SUPPORTS WITH ROOF TOP UNIT MANUFACTURERS.
 8. SEE GENERAL NOTES FOR TYPICAL CONNECTION DESIGN. REACTIONS SHOWN IN PLAN FOR CONNECTIONS WITH GREATER REACTIONS.
 9. ROOF HAS BEEN DESIGNED FOR AN ADDITIONAL 13 PSF TO ACCOMMODATE FUTURE SOLAR PANEL INSTALLATION.
 10. DUCT PENETRATIONS TO BE COORDINATED WITH MECHANICAL DRAWINGS. OPENINGS TO BE LOCATED BETWEEN STRUCTURAL FRAMING. RELOCATE OPENINGS AS NEEDED. ANY OPENINGS 18" OR WIDER IN THE DIRECTION PERPENDICULAR TO THE SPAN OF THE STEEL DECK ARE TO BE REINFORCED PER DETAIL 1/S-504.
 11. CONCRETE ON STEEL DECK TO BE REINFORCED WITH WWF 6X6-W1.4XW1.4.



3 L3-C & R2 - Partial Plan 3
1/8" = 1'-0"

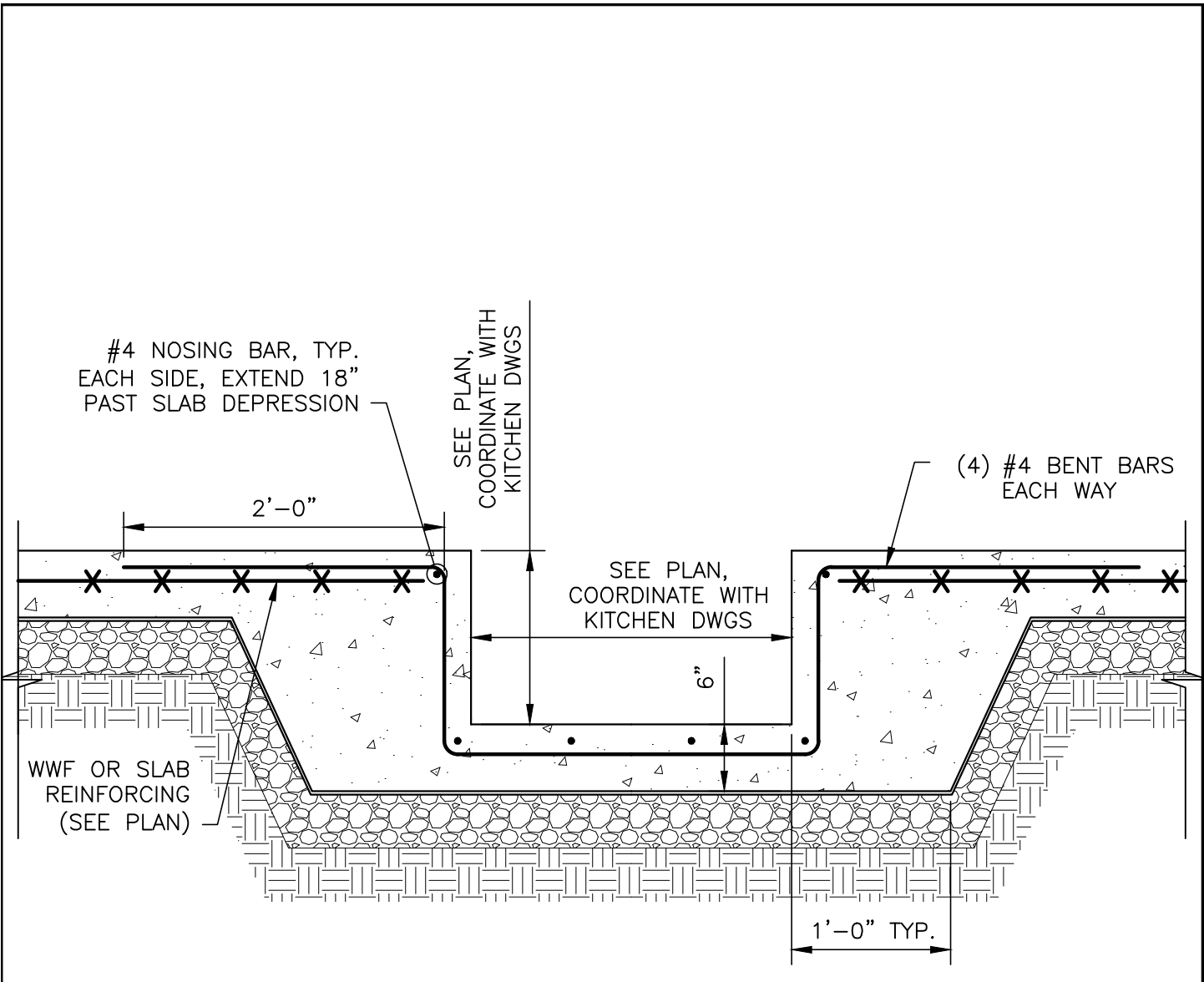


4 L3-C & R2 - Partial Plan 4
1/8" = 1'-0"



5 L3-C & R2 - Partial Plan 5
1/8" = 1'-0"


DATE: 04/18/16 CHANGE TO DRAWING: S-119	REV: 1	DRAWING NO: ADD S2.09	SCALE: 1/8" = 1'-0"
	Baltimore City Public Schools		
Additions & Renovations at Robert Poole Building #056 1300 W 36TH ST, BALTIMORE, MD 21211		3500 BOSTON STREET SUITE 329 BALTIMORE, MD 21224 410-522-5870 ALBRECHT ENGINEERING INC	
		LEVEL 3C & R2 PARTIAL PLAN	

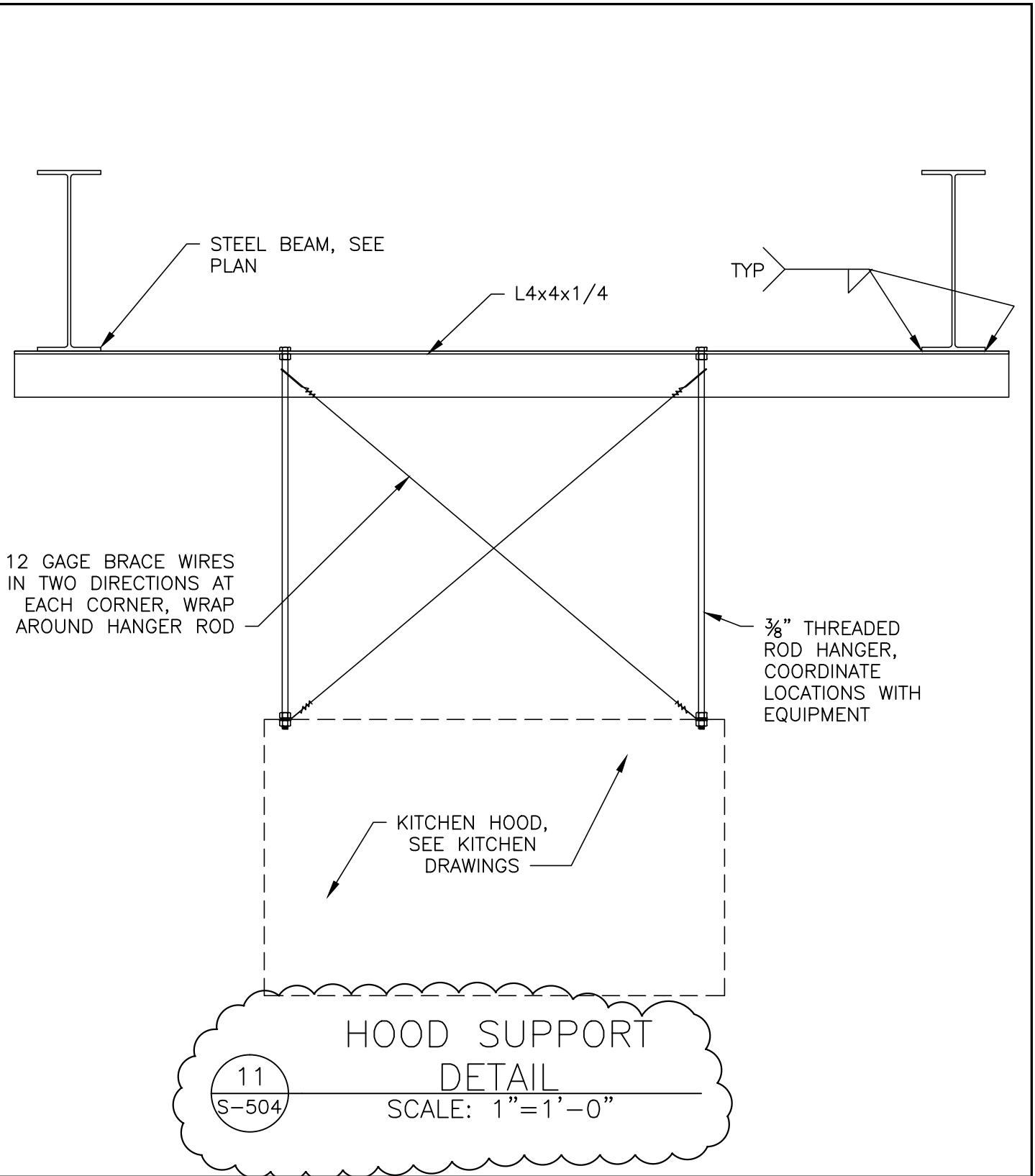


FLOOR TROUGH
DETAIL

8
S-402

1" = 1'-0"

 <p>3500 BOSTON STREET SUITE 329 BALTIMORE, MD 21224 410-522-5870</p>	<p>Baltimore City Public Schools</p>	<p>DATE: 04/22/16</p>	
	<p>FLOOR TROUGH DETAIL</p>	<p>Additions & Renovations at Robert Poole Building #056</p> <p>1300 W 36TH ST., BALTIMORE, MD 21211</p>	<p>CHANGE TO DRAWING: S-402</p>
<p>DRAWING NO.:</p> <p>ADD S2.10</p>			
<p>SCALE: 1" = 1'-0"</p>			

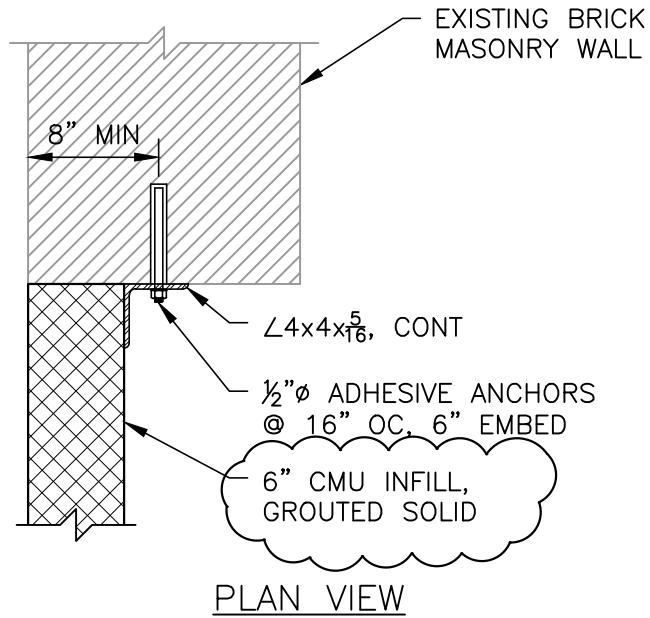


11
 S-504

**HOOD SUPPORT
DETAIL**

SCALE: 1" = 1'-0"

	3500 BOSTON STREET SUITE 329 BALTIMORE, MD 21224 410-522-5870	Baltimore City Public Schools	DATE: 04/22/16
	HOOD SUPPORT DETAIL	Additions & Renovations at Robert Poole Building #056	CHANGE TO DRAWING: S-504
		1300 W 36TH ST., BALTIMORE, MD 21211	DRAWING NO.: ADD S2.11
			SCALE: 1" = 1'-0"



5
S-501

WINDOW WELL INFILL DETAIL

SCALE: 1" = 1'-0"



3500 BOSTON STREET
SUITE 329
BALTIMORE, MD 21224
410-522-5870

Baltimore City Public Schools

DATE: 04/22/16

CHANGE TO DRAWING:

REV:

S-501

2

DRAWING NO.:

ADD S2.12

**WINDOW WELL
INFILL DETAIL**

**Additions & Renovations at Robert Poole
Building #056**

1300 W 36TH ST., BALTIMORE, MD 21211

SCALE: 1" = 1'-0"

GENERAL NOTES FOR ALL PARTITION TYPES

1. ALL PARTITIONS ARE CONTINUOUS TO FLOOR SLAB OR ROOF DECK ABOVE, EXCEPT WHERE NOTED OTHERWISE.
2. ALL PARTITIONS ARE CONTINUOUS ABOVE DOORS, FRAMES, CASED OPENINGS, BORROWED LIGHTS, HOLLOW METAL FRAMES, CURTAINWALL AND ALUMINUM WINDOWS.
3. ALL PARTITIONS ARE CONTINUOUS BELOW PARTIAL HEIGHT SIDELIGHTS, COUNTER DOORS, HOLLOW METAL WINDOWS AND BORROWED LIGHTS.

GENERAL NOTES FOR METAL STUD PARTITIONS

- A. METAL STUD FRAMING**
UNLESS NOTED OTHERWISE ON A SPECIFIC DETAIL ALL METAL STUD FRAMING SHALL BE AS FOLLOWS:
EXCEPT FOR ATTACHED PARTITIONS: ALL STUDS SHALL BE FULL HEIGHT FROM FLOOR TO UNDERSIDE OF FLOOR OR ROOF ABOVE. STUDS SHALL BE CUT SHORT AT HEAD TRACK TO ALLOW FOR DIFFERENTIAL LIVE LOAD DEFLECTION AS REQUIRED BELOW.
ALL STUDS SHALL BE AT 16" ON CENTER MAXIMUM UNLESS NOTED OTHERWISE.
PROVIDE FULL HEIGHT DOUBLE STUDS AT ALL JAMB CONDITIONS AT DOOR AND BORROWED LIGHT OPENINGS.
AT ATTACHED PARTITIONS STUDS SHALL EXTEND FROM FLOOR TO FOUR INCHES ABOVE FINISHED CEILING OR IF THERE IS NO CEILING TO STRUCTURAL DECK ABOVE.
- B. LIVE LOAD DEFLECTION**
PROVIDE MINIMUM 20 GAUGE RUNNER TRACKS WITH VERTICAL LEGS OF SUFFICIENT HEIGHT TO ACCOMMODATE DIFFERENTIAL LIVE LOAD DEFLECTION BETWEEN FLOORS.
PARTITIONS WITHIN 15 FEET OF A COLUMN LINE: ALLOW FOR 1/2" LIVE LOAD DEFLECTION.
PARTITIONS MORE THAN 15 FEET BUT LESS THAN 30 FEET FROM A COLUMN LINE: ALLOW FOR 1" LIVE LOAD DEFLECTION.
PARTITIONS MORE THAN 30 FEET FROM A COLUMN LINE: ALLOW FOR 1-1/2" LIVE LOAD DEFLECTION.

- C. WALLBOARD**
UNLESS NOTED OTHERWISE BELOW OR ON THE DRAWINGS ALL GYPSUM WALL BOARD SHALL BE AS FOLLOWS:
THICKNESS: 5/8" UNLESS NOTED OTHERWISE.
HEIGHT: UNLESS NOTED OTHERWISE:
1. FIRE RESISTIVE RATED AND SMOKE RATED PARTITIONS: FULL HEIGHT FROM FLOOR TO UNDERSIDE OF FLOOR OR ROOF DECK ABOVE.
2. ACOUSTICAL PARTITIONS: FULL HEIGHT FROM FLOOR TO UNDERSIDE OF FLOOR OR ROOF DECK ABOVE UNLESS NOTED OTHERWISE.

- D. FIRE RESISTIVE RATED PARTITIONS**
SEE ARCHITECTURAL FLOOR PLANS FOR DEFINITION OF SCOPE OF FIRE RESISTIVE PARTITIONS. WHERE A TESTING AGENCY NUMBER IS INDICATED ON THE PARTITION TYPE DETAIL, THE PARTITION SHALL BE CONSTRUCTED IN STRICT ACCORDANCE WITH THE TESTED ASSEMBLY DESIGN.
OVERSIZE CUT-OUTS FOR ELECTRICAL DEVICE BOXES WILL NOT BE PERMITTED.

- PROVIDE FIRESTOPPING IN ACCORDANCE WITH THE SPECIFICATION AND AS FOLLOWS:
1. AT ALL THROUGH WALL PENETRATIONS
2. AT TOP OF PARTITIONS TO FILL THE VOIDS AT DECK INTERFACE. SEE DETAILS PROVIDED.
3. AT ALL OTHER LOCATIONS NECESSARY TO MAINTAIN THE FIRE RESISTIVE INTEGRITY OF THE ASSEMBLY.

- E. ACOUSTICAL PERFORMANCE PARTITIONS:**
SEE ARCHITECTURAL FLOOR PLANS FOR DEFINITION OF SCOPE OF ACOUSTICAL PERFORMANCE PARTITIONS. ALL ACOUSTICAL PERFORMANCE PARTITIONS SHALL PROVIDE THE STC RATINGS INDICATED AND SHALL CONFORM TO THE FOLLOWING:
1. JOINTS IN WALL BOARD SHALL BE TAPED AND SPACKLED EVEN IN CONCEALED LOCATIONS SUCH AS ABOVE SUSPENDED CEILINGS.
2. ELECTRICAL DEVICE BOXES FACING OPPOSITE SIDES OF THE PARTITION SHALL NOT BE LOCATED BACK TO BACK OR WITHIN THE SAME STUD CAVITY.
3. ACOUSTICAL SEALS SHALL BE PROVIDED AT ALL THROUGH WALL PENETRATIONS, CONTINUOUSLY BETWEEN CONCRETE FLOORS AND METAL TRACK RUNNERS, AND CONTINUOUSLY AT TOP TRACKS IN ACCORDANCE WITH THE DETAILS PROVIDED.
4. ACOUSTICAL INSULATION SHALL BE PROVIDED BETWEEN STUDS FOR FULL DEPTH AND HEIGHT OF PARTITION UNLESS NOTED OTHERWISE. AND AT THE TOP OF THE PARTITION TO FILL THE VOIDS AT METAL DECK INTERFACE. IF PARTITION IS ALSO A FIRE RESISTIVE RATED PARTITION FOLLOW INSTRUCTIONS ABOVE.

- F. TYPICAL PARTITION DETAILS DO NOT INDICATE EVERY COMBINATION OF MATERIALS REQUIRED. SEE FLOOR PLAN INDICATIONS FOR PARTITION TYPES REQUIRED.**

- G. PROVIDE WALL BOARD AT INTERIOR FACE OF ALL EXTERIOR WALL FRAMING EXPOSED TO VIEW OR WHERE REQUIRED FOR ACOUSTICAL OR FIRE RESISTIVE REQUIREMENTS.**

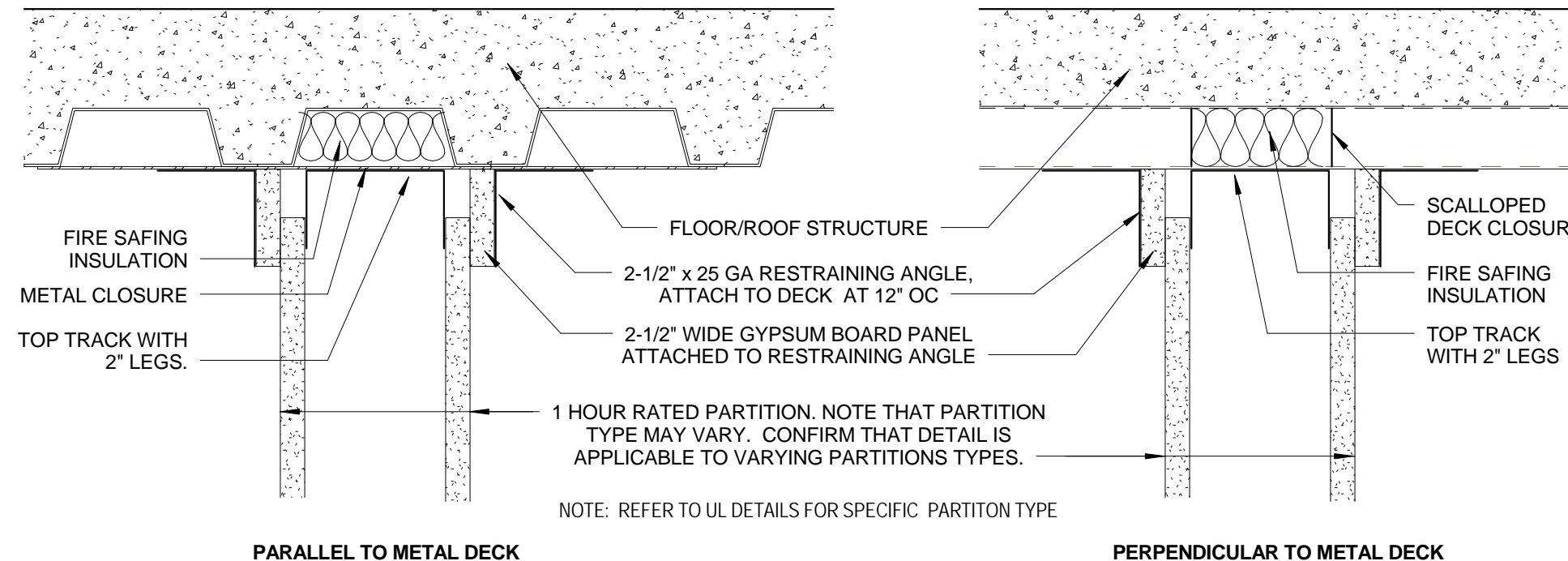
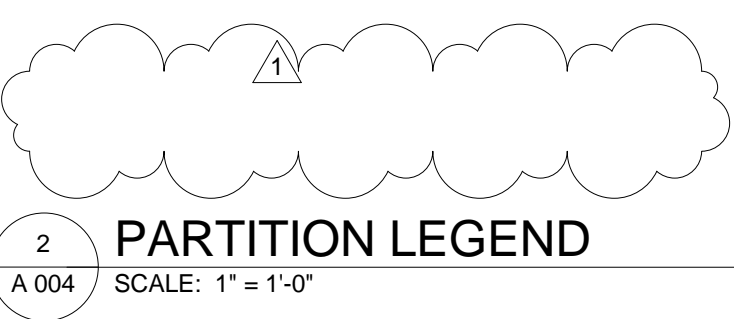
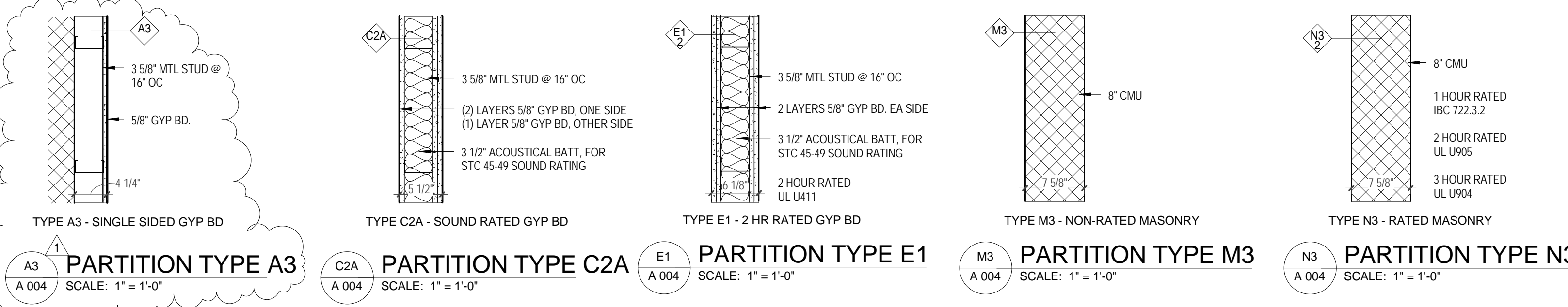
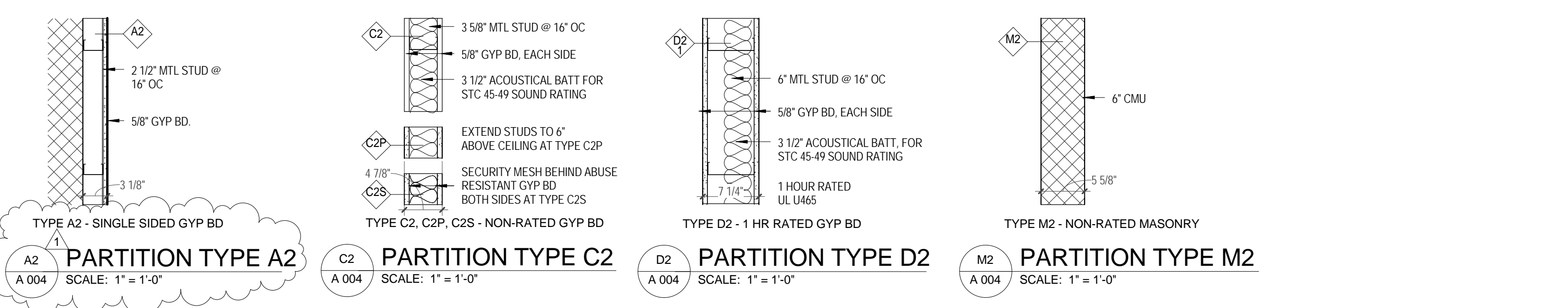
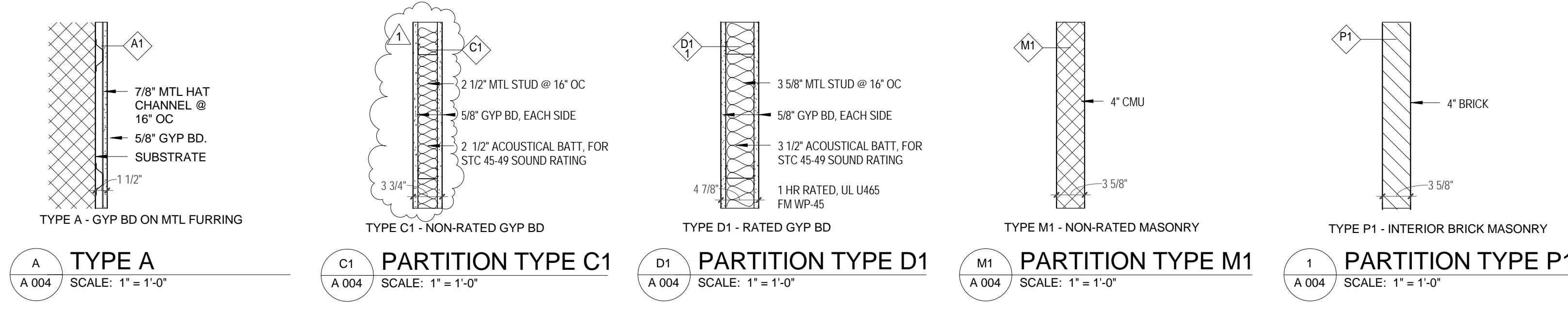
- GENERAL NOTES FOR MASONRY PARTITIONS**

- A. FIRE RESISTIVE RATED PARTITIONS:**
1. WHERE FIRE RESISTIVE RATED PARTITIONS ARE INDICATED ON THE ARCHITECTURAL FLOOR PLANS PROVIDE MASONRY UNITS THAT ARE CERTIFIED TO MEET UL OR OTHER TESTING AGENCY REQUIREMENTS FOR RATED CONSTRUCTION INDICATED.
2. PROVIDE FIRE STOPPING AT ALL PENETRATIONS THROUGH FIRE RATED PARTITIONS.
3. PROVIDE FIRE STOPPING AT TOP OF PARTITION/UNDERSIDE OF FLOOR OR ROOF INTERFACE CONDITION IN LIEU OF COMPRESSIBLE FILLER IN ACCORDANCE WITH DETAILS PROVIDED. FIRE STOPPING SHALL ACCOMMODATE LIVE LOAD DEFLECTION OF DECK ABOVE AND BELOW AS DESCRIBED BELOW.

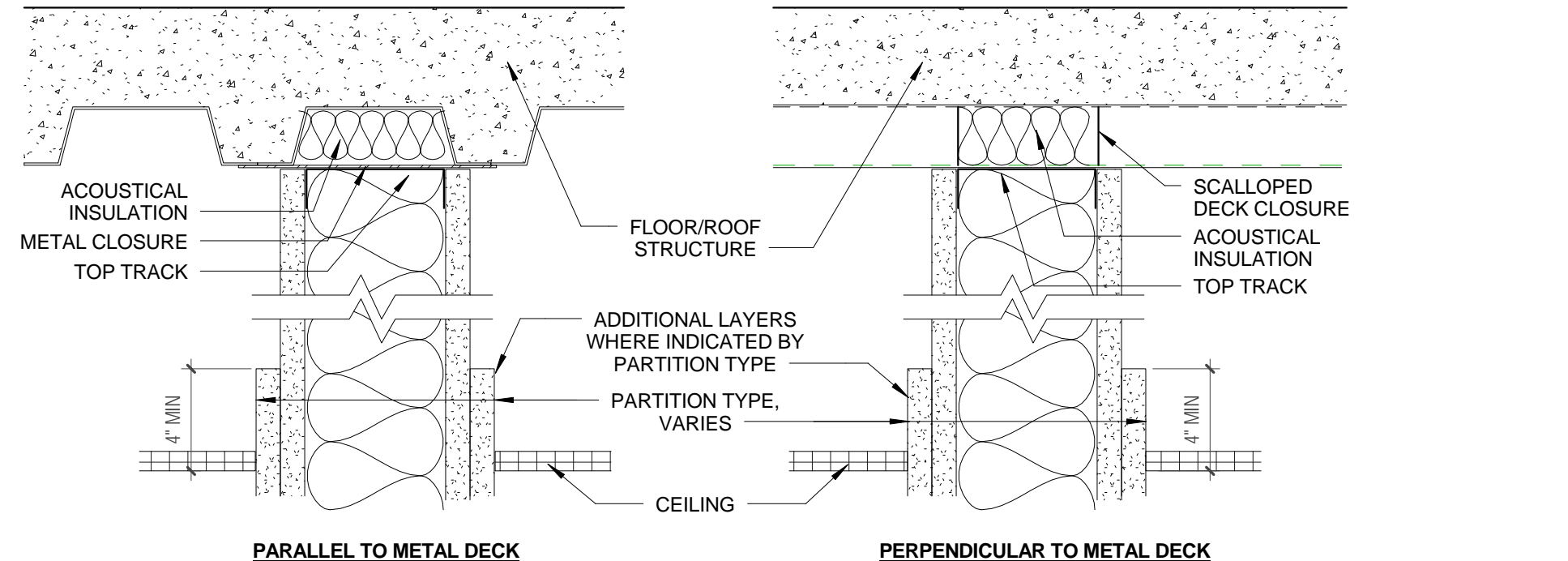
- B. LIVE LOAD DEFLECTION:**
1. PARTITIONS WITHIN 15 FEET OF A COLUMN LINE ALLOW FOR 1/2" LIVE LOAD DEFLECTION.
2. PARTITIONS MORE THAN 15 FEET BUT LESS THAN 30 FEET FROM A COLUMN LINE ALLOW FOR 1" LIVE LOAD DEFLECTION.
3. PARTITIONS MORE THAN 30 FEET FROM A COLUMN LINE ALLOW FOR 1-1/2" LIVE LOAD DEFLECTION.

- C. OUTSIDE CORNER CONDITIONS:**
PROVIDE RADIUS CORNER UNITS AT ALL OUTSIDE CORNER CONDITIONS EXCEPT WHERE INDICATED OR SCHEDULED TO RECEIVE CERAMIC TILE. RADIUS SHALL BE ONE INCH (1").

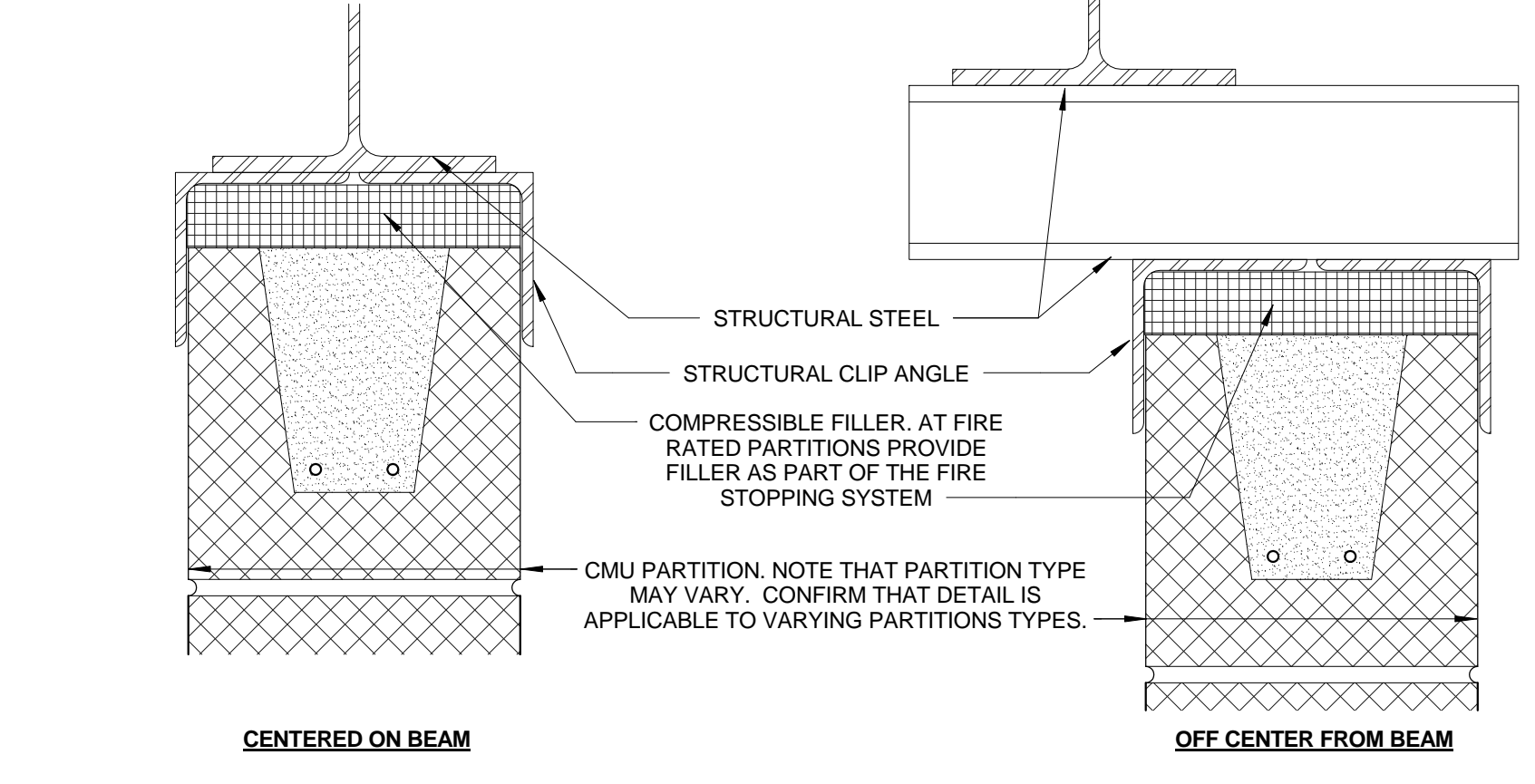
- D. JOINT TREATMENT:**
ALL JOINTS SHALL BE TOOLED TO A SLIGHT CONCAVITY EXCEPT WHERE A FINISH MATERIAL IS TO BE APPLIED OVER THE MASONRY UNITS, IN FOOD PREPARATION AREAS, OR WHERE OTHERWISE NOTED.



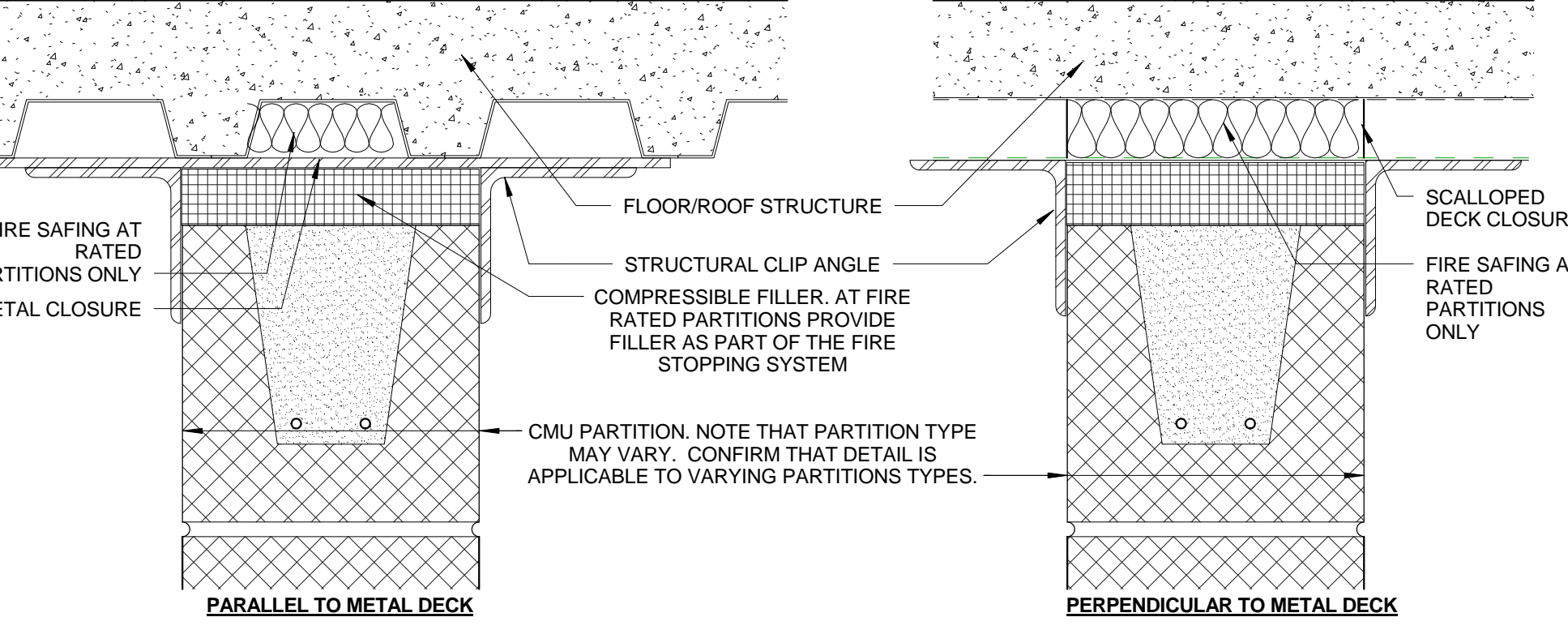
22 TYP HEAD AT RATED PARTITION
SCALE: 3" = 1'-0"



23 TYP HEAD AT NON-RATED ACOUSTICAL PARTITION
SCALE: 3" = 1'-0"



25 TYP CMU PARTITION HEAD AT BEAM
SCALE: 3" = 1'-0"



24 TYP HEAD AT CMU PARTITION
SCALE: 3" = 1'-0"

HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR SUPERVISED BY ME, AND THAT I AM A duly LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 4881
EXPIRES ON 04/01/2017

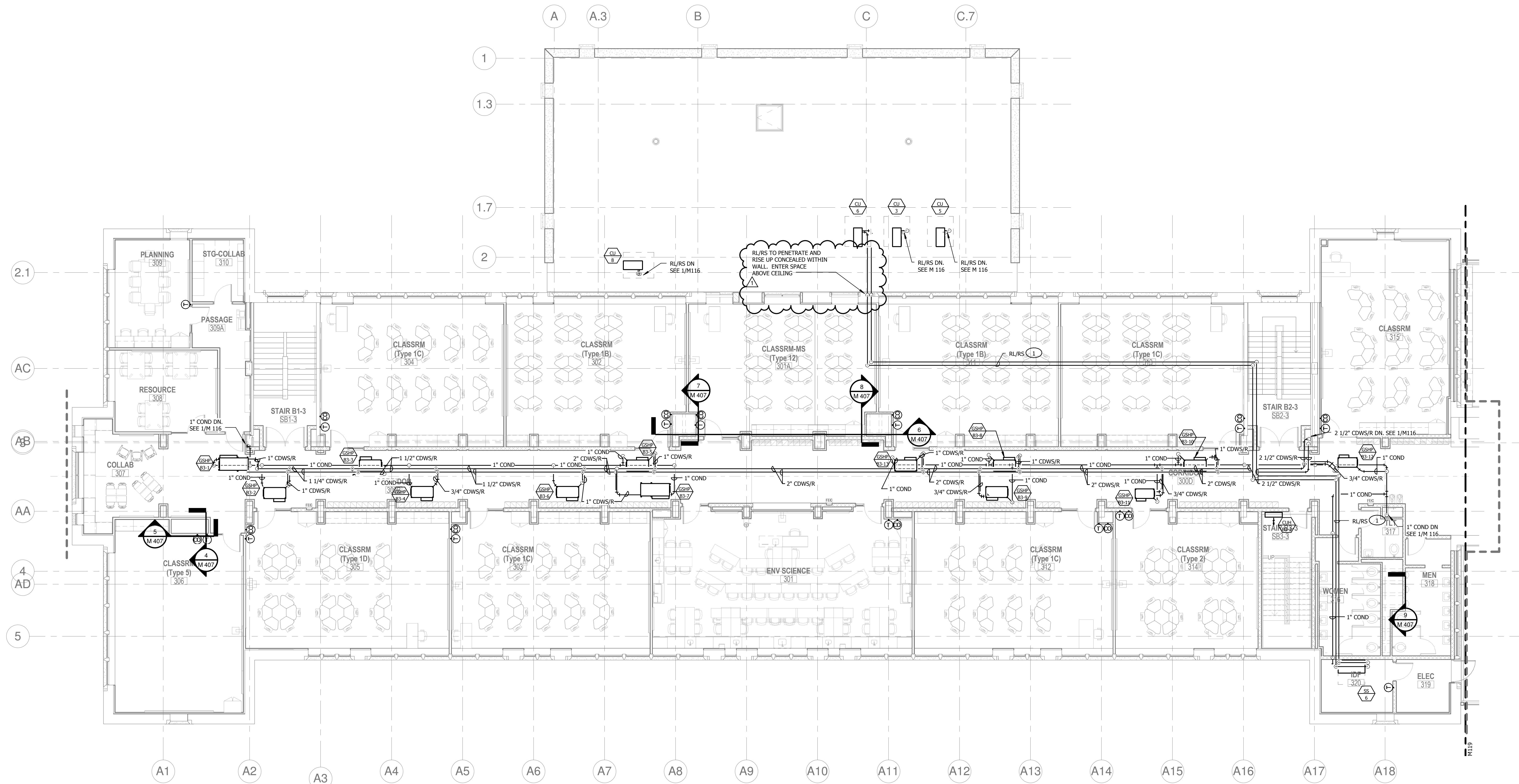
No.	DATE	DESCRIPTION
1	4/22/16	ADDENDUM 2

BID ISSUE

PROJECT No.: 152-01
DATE: 3/31/16
SCALE: As indicated
DRAWING NAME: PARTITION TYPES
A 004

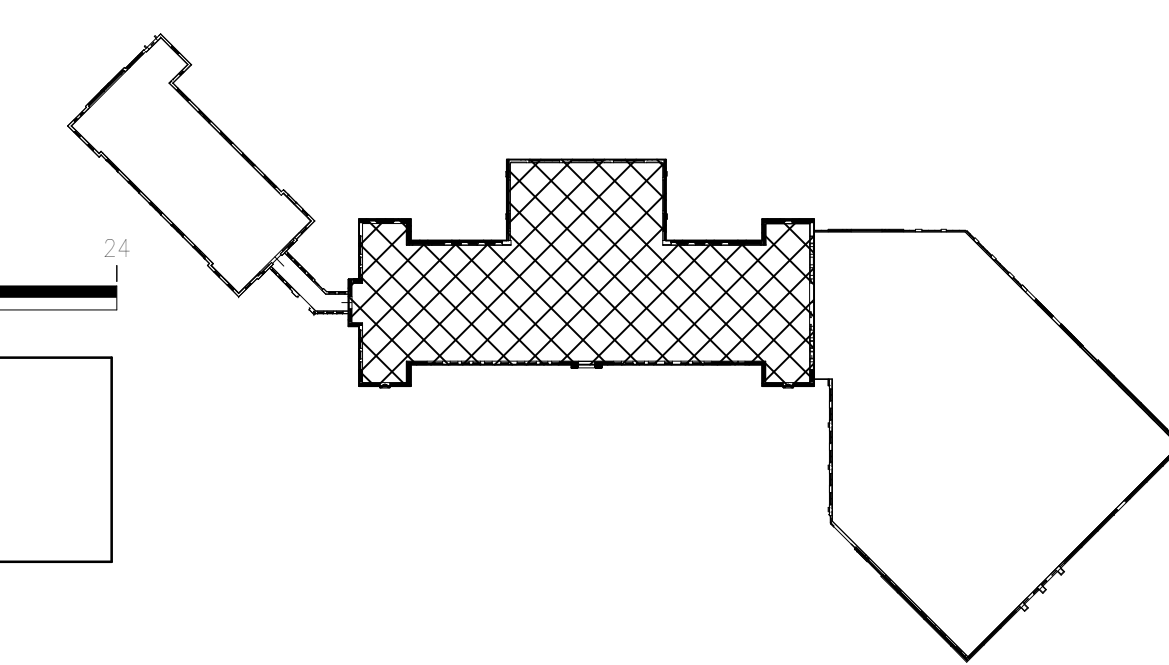
KEYED NOTES:

1 REFRIGERANT LINES SIZED PER MANUFACTURER'S STANDARDS.



1 NEW WORK THIRD FLOOR PLAN B - MECHANICAL PIPING
1/8" = 1'-0"

NOTE:
CONTRACTOR SHALL CHECK &
VERIFY ALL DIMENSIONS &
EXISTING CONDITIONS AT SITE.



**Baltimore City Public Schools
Additions & Renovations at Robert Poole
Building #056**
1300 W 36TH ST., BALTIMORE, MD 21211

HEREBY CERTIFY THAT THESE DOCUMENTS WERE
PREPARED BY ME OR UNDER MY CLOSE PERSONAL
SUPERVISION AND THAT I AM A DULY
LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS
OF THE STATE OF MARYLAND.
LICENSE NO.: 1524
EXPIRATION DATE: 12/31/2016

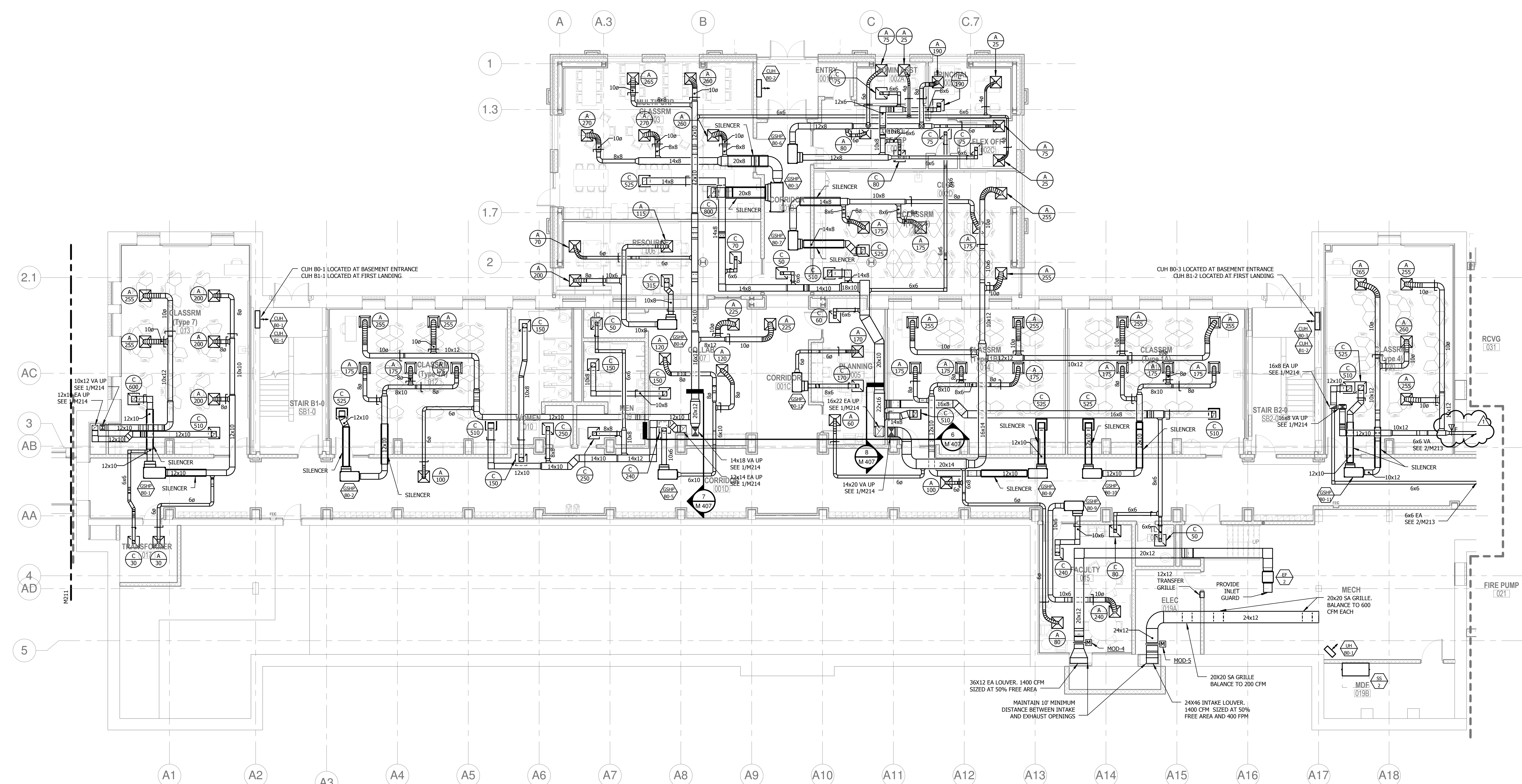
No.	DATE	DESCRIPTION
1	04/22/16	ADDENDUM #2

BID ISSUE

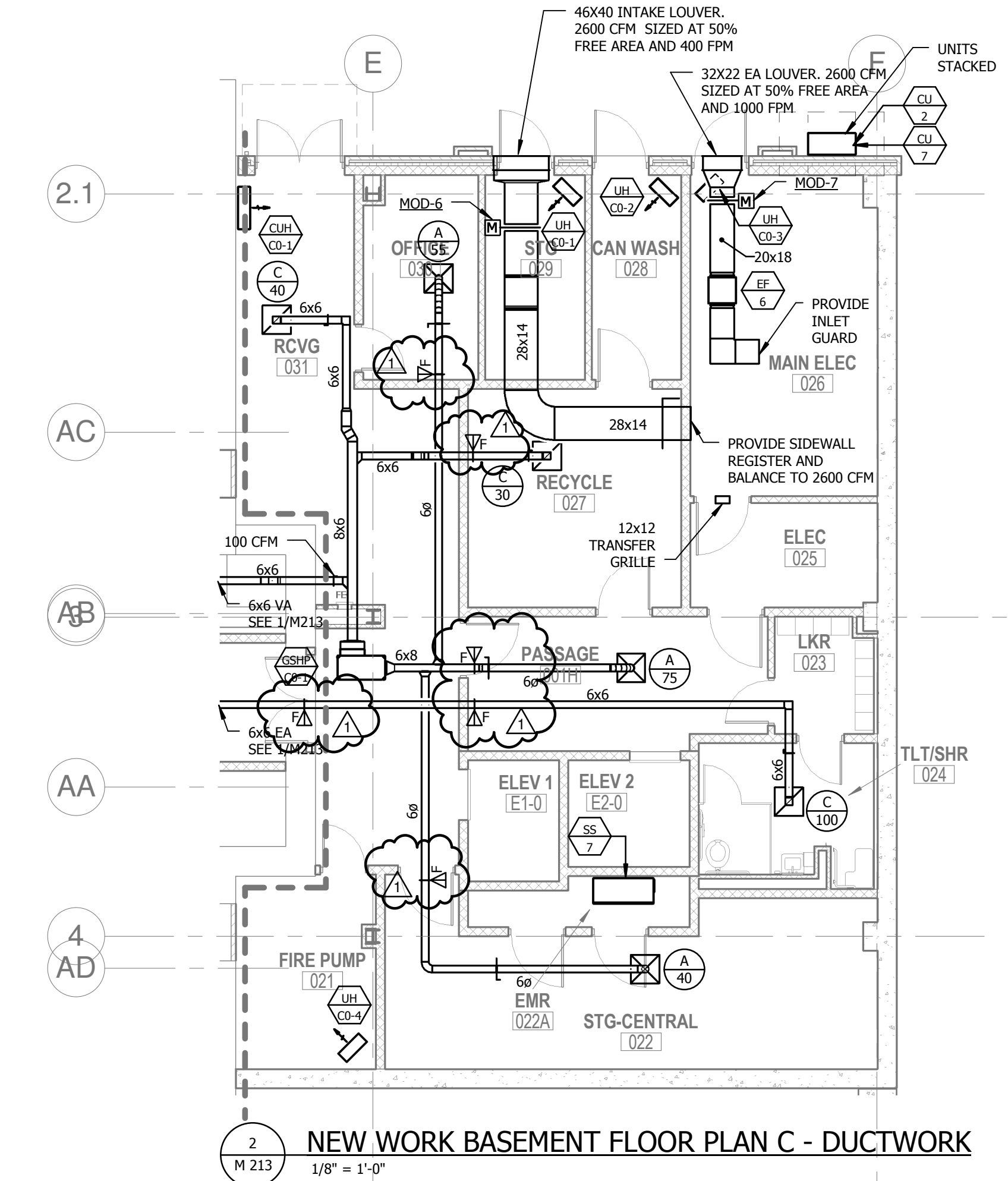
PROJECT No.: 152-01
DATE: 03/31/16
SCALE: AS NOTED
DRAWING NAME:
NEW WORK THIRD FLOOR PLAN B - MECHANICAL PIPING

M 118

Baltimore City Public Schools
Additions & Renovations at Robert Poole
Building #056
1300 W 36TH ST., BALTIMORE, MD 21211

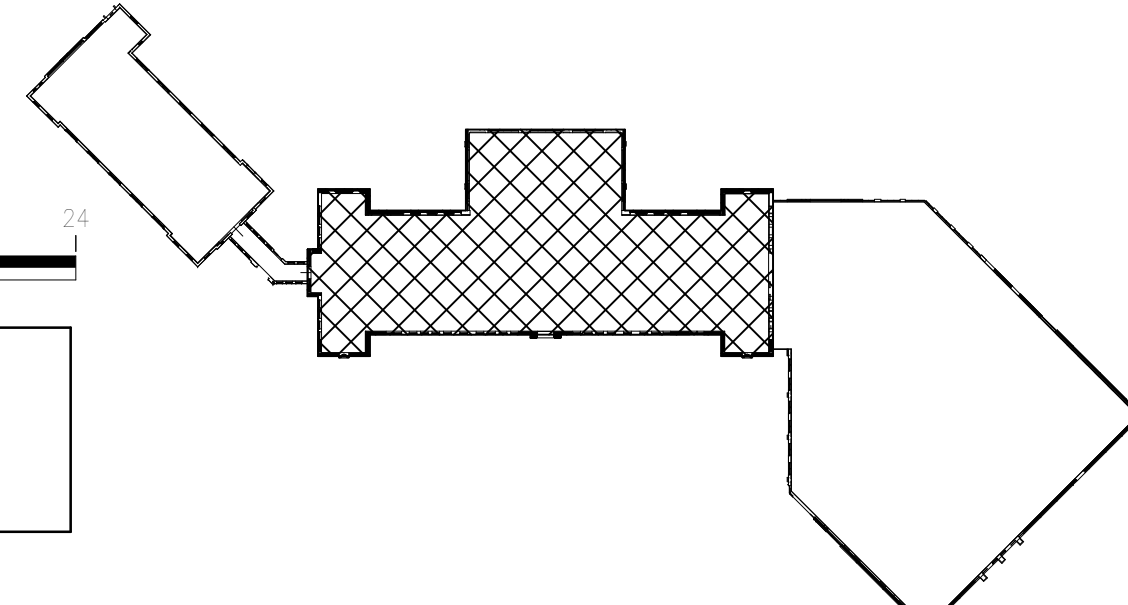


1 NEW WORK BASEMENT FLOOR PLAN B - DUCTWORK
1/8" = 1'-0"



2 NEW WORK BASEMENT FLOOR PLAN C - DUCTWORK
1/8" = 1'-0"

NOTE:
CONTRACTOR SHALL CHECK &
VERIFY ALL DIMENSIONS &
EXISTING CONDITIONS AT SITE.



HEREBY CERTIFY THAT THESE DOCUMENTS WERE
PREPARED BY ME OR UNDER MY CLOSE PERSONAL
SUPERVISION AND THAT I AM A duly
LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS
OF THE STATE OF MARYLAND.
LICENSE NO.: 1004
EXPIRATION DATE: 12/31/2016

No.	DATE	DESCRIPTION
1	04/22/16	ADDENDUM #2

BID ISSUE

PROJECT No.: 152-01

DATE: 03/31/16

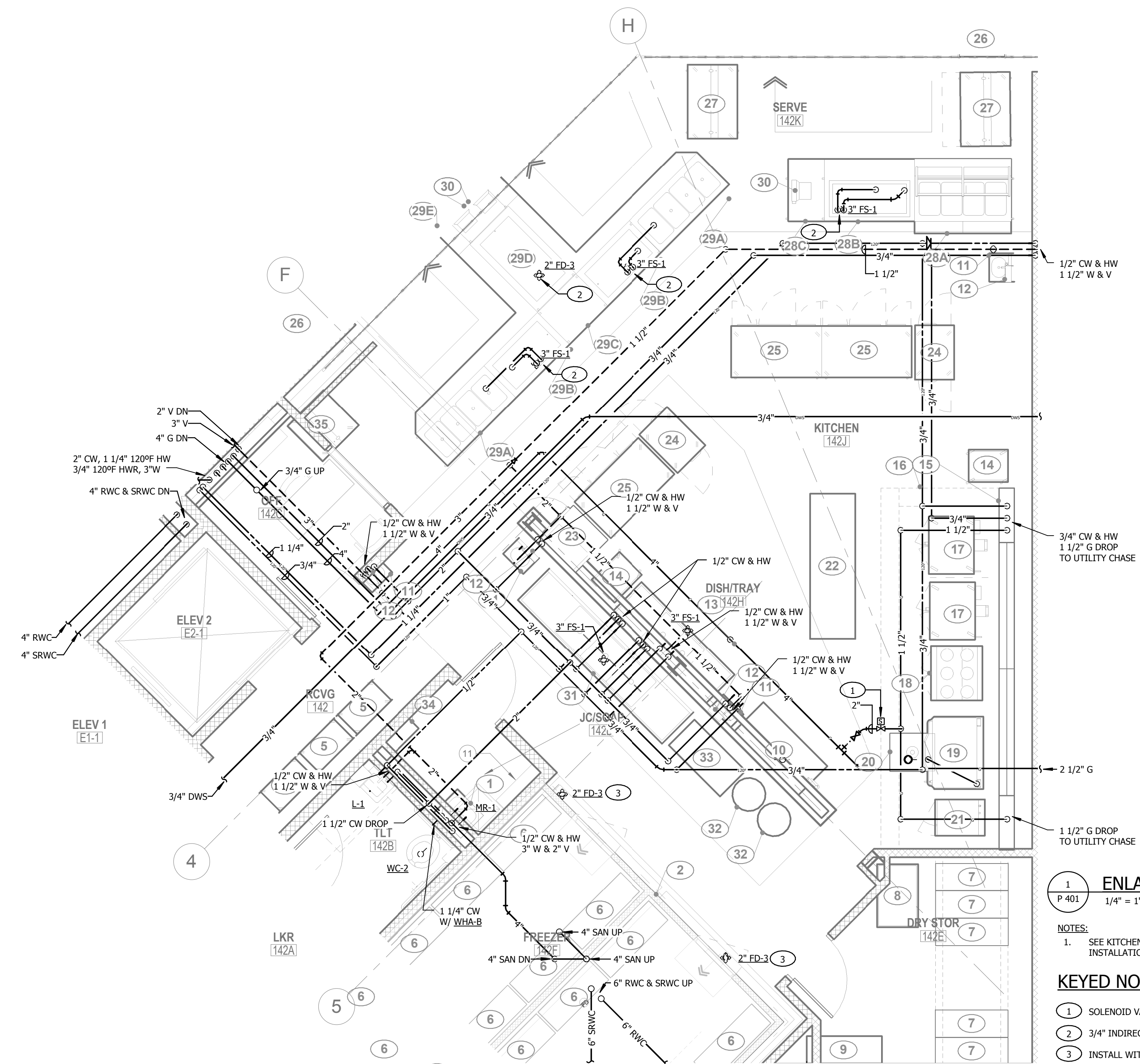
SCALE: AS NOTED

DRAWING NAME

**NEW WORK
BASEMENT PLAN
B - DUCTWORK**

M 213

Baltimore City Public Schools
Additions & Renovations at Robert Poole
Building #056
1300 W 36TH ST., BALTIMORE, MD 21211

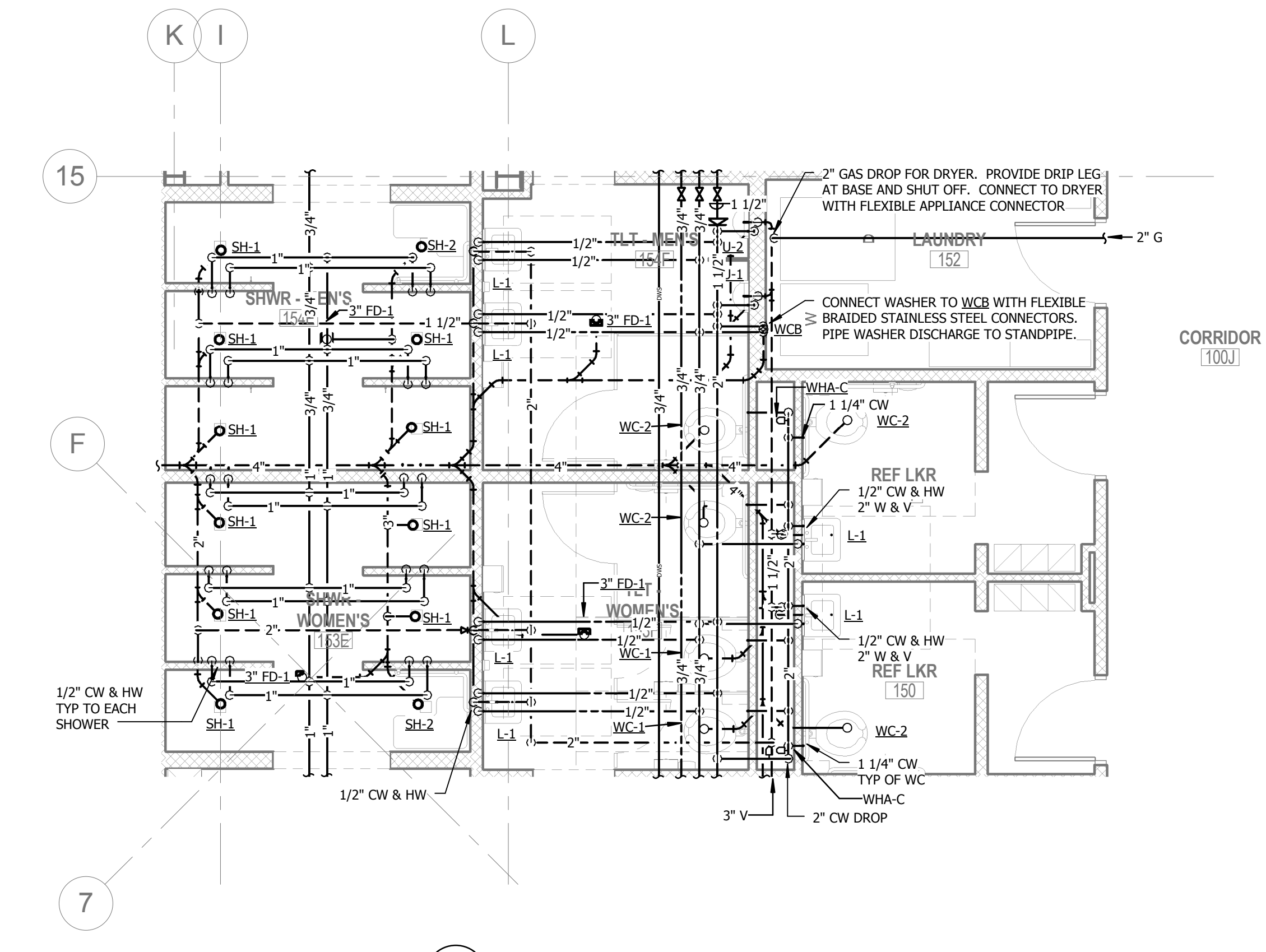


1 ENLARGED KITCHEN - PLUMBING
P 401 1/4" = 1'-0"

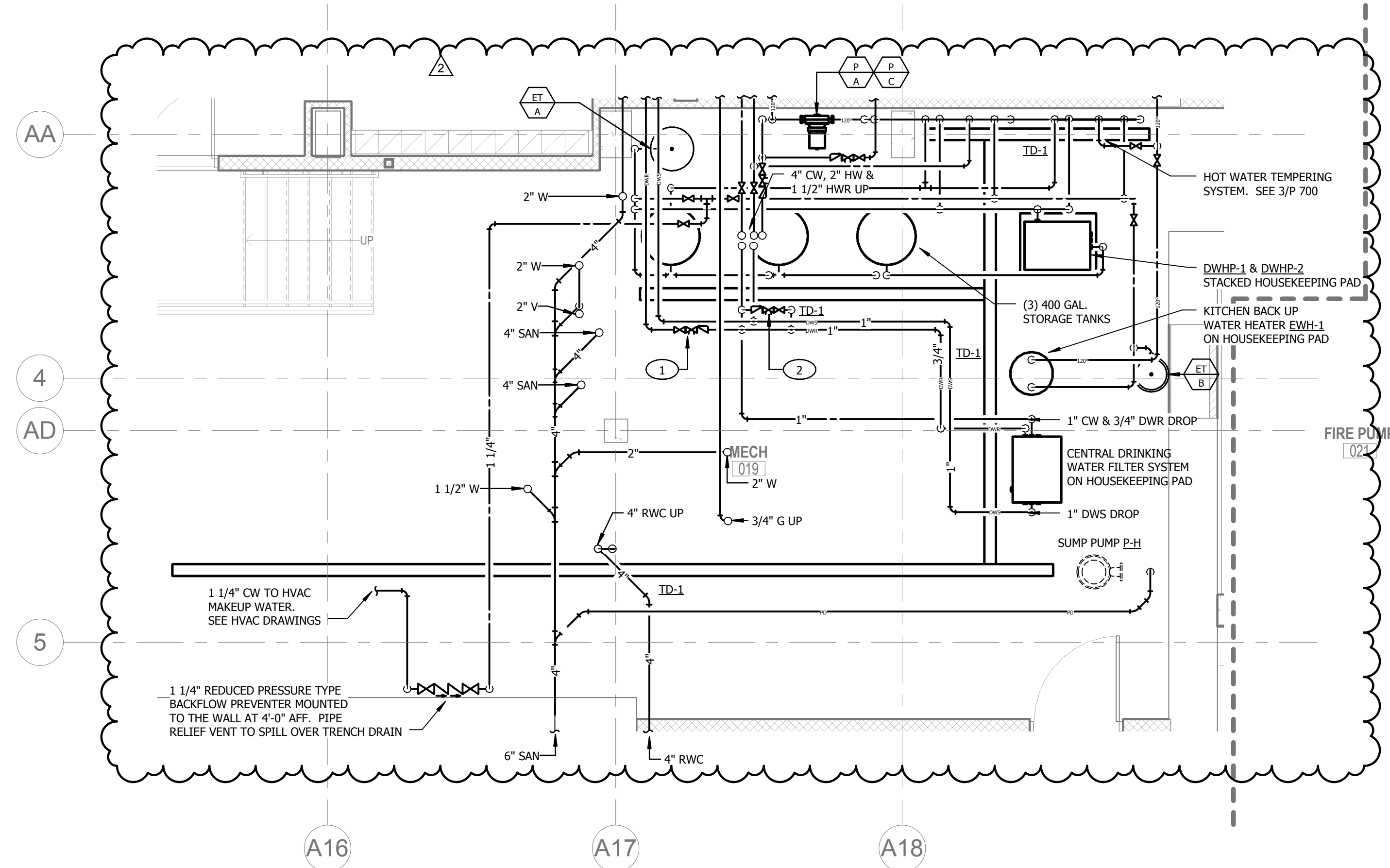
NOTES:
1. SEE KITCHEN DRAWINGS FOR PLUMBING CONTRACTOR RESPONSIBILITIES RELATED TO INSTALLATION OF KITCHEN EQUIPMENT.

KEYED NOTES:

- 1 SOLENOID VALVE BY P.C. FOR CONNECTION TO HOOD SUPPRESSION SYSTEM.
- 2 3/4" INDIRECT WASTE FROM HOT WELLS/COLD WELLS TO FLOOR SINK WITH AIR GAP.
- 3 INSTALL WITH TOP OF RIM FLUSH WITH FINISHED FLOOR.



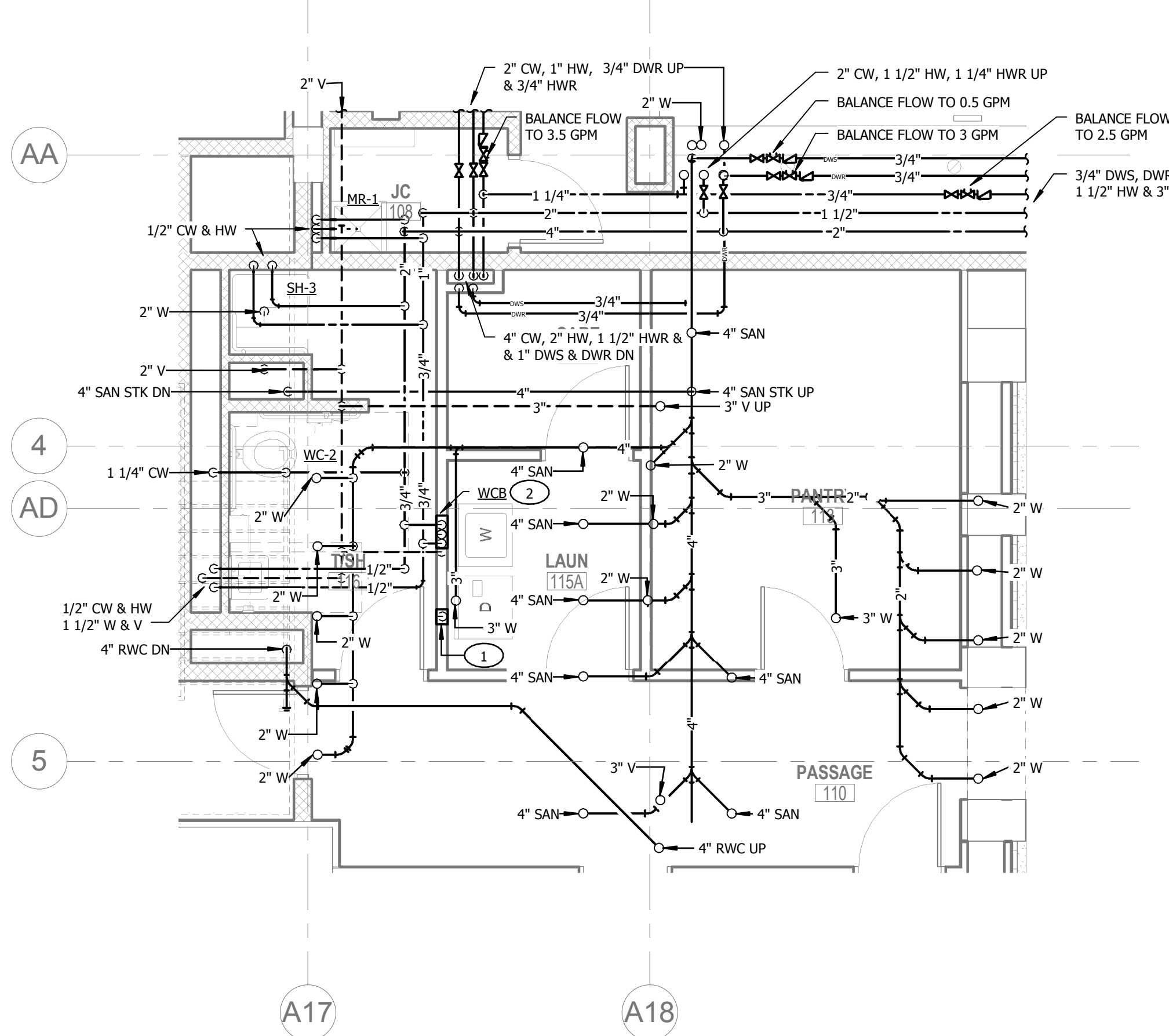
2 ENLARGED LOCKER ROOM
P 401 1/4" = 1'-0"



5 ENLARGED MECHANICAL ROOM - PLUMBING
P 401 1/4" = 1'-0"

KEYED NOTES:

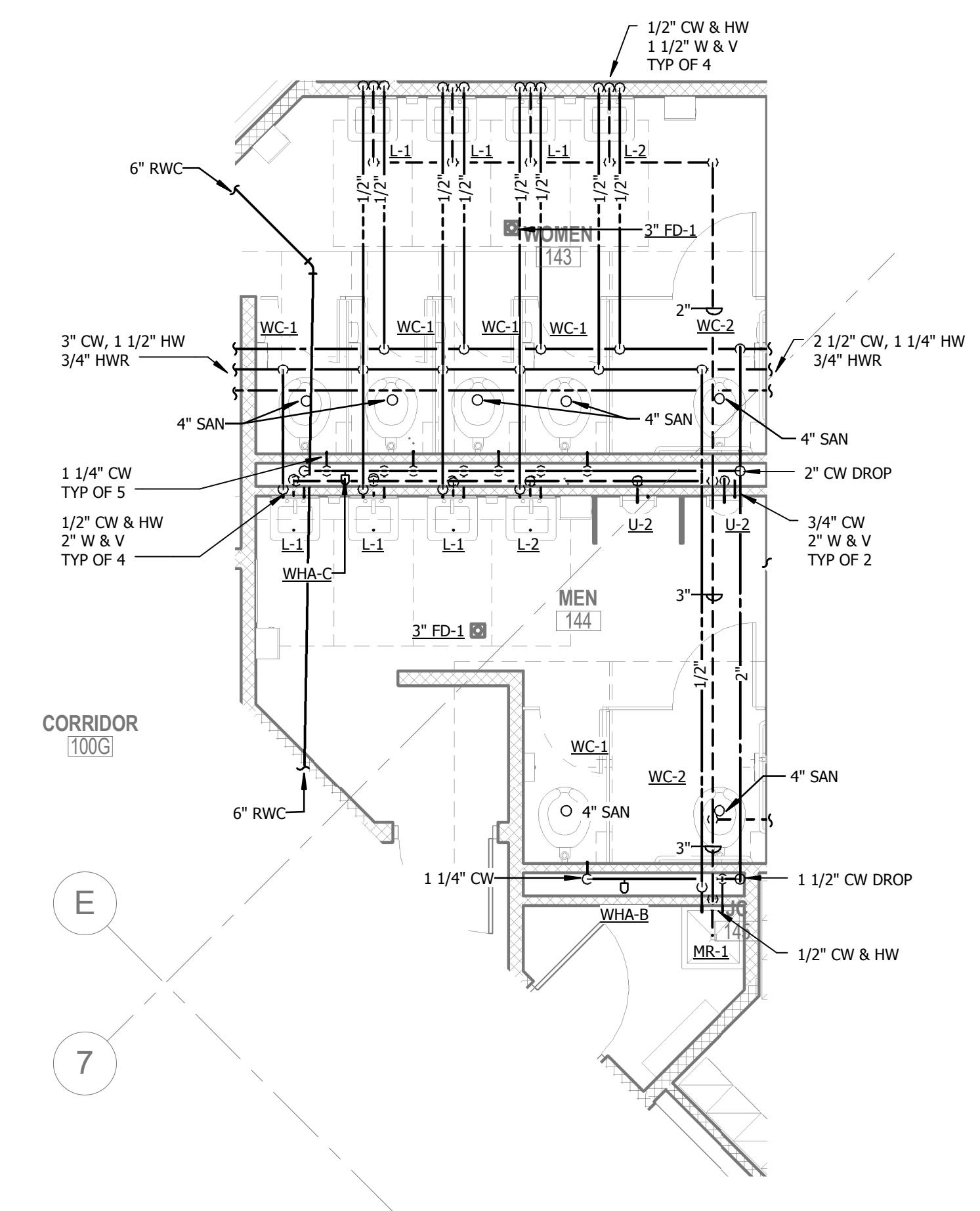
- 1 BALANCE FLOW TO 3 GPM.
- 2 BALANCE FLOW TO 3.5 GPM.



4 ENLARGED LAUNDRY - PLUMBING
P 401 1/4" = 1'-0"

KEYED NOTES:

- 1 GAS CONNECTION BOX IN WALL WITH 3/4" GAS FROM BELOW. CONNECT DRYER WITH FLEXIBLE APPLIANCE CONNECTION.
- 2 1/2" COLD AND HOT WATER, 2" WASTE AND VENT TO WCB. CONNECT WASHER WITH FLEXIBLE STAINLESS STEEL BRAIDED SUPPLY CONNECTORS.



3 ENLARGED WOMEN 143/MEN 144
P 401 1/4" = 1'-0"

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR SUPERVISED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: 1504
EXPIRATION DATE: 12/31/2015

No.	DATE	DESCRIPTION
1	04/14/16	ADDENDUM #1
2	04/22/16	ADDENDUM #2

BID ISSUE

PROJECT NO.: 152-01
DATE: 03/31/16
SCALE: AS NOTED

DRAWING NAME
ENLARGED PLANS - PLUMBING

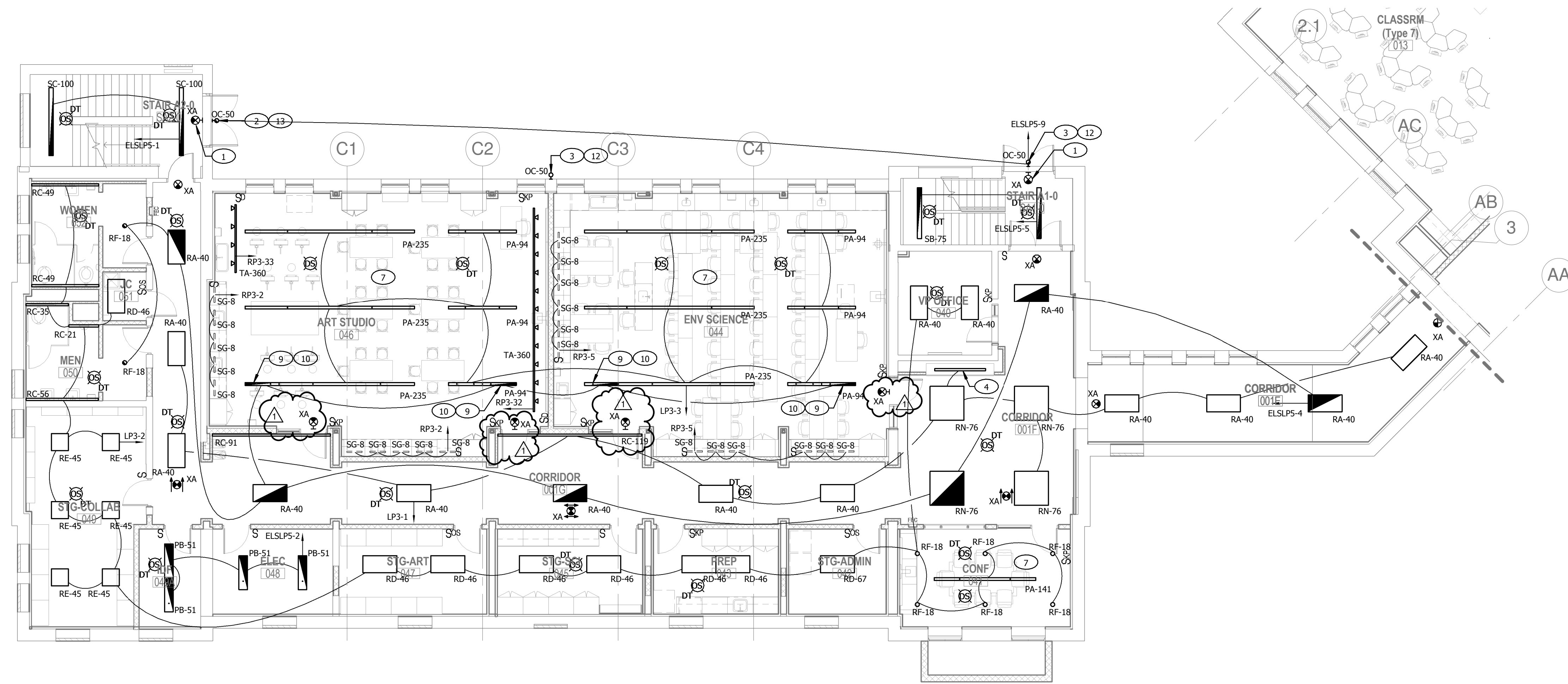
Baltimore City Public Schools
Additions & Renovations at Robert Poole
Building #056
1300 W 36TH ST., BALTIMORE, MD 21211

GENERAL NOTES:

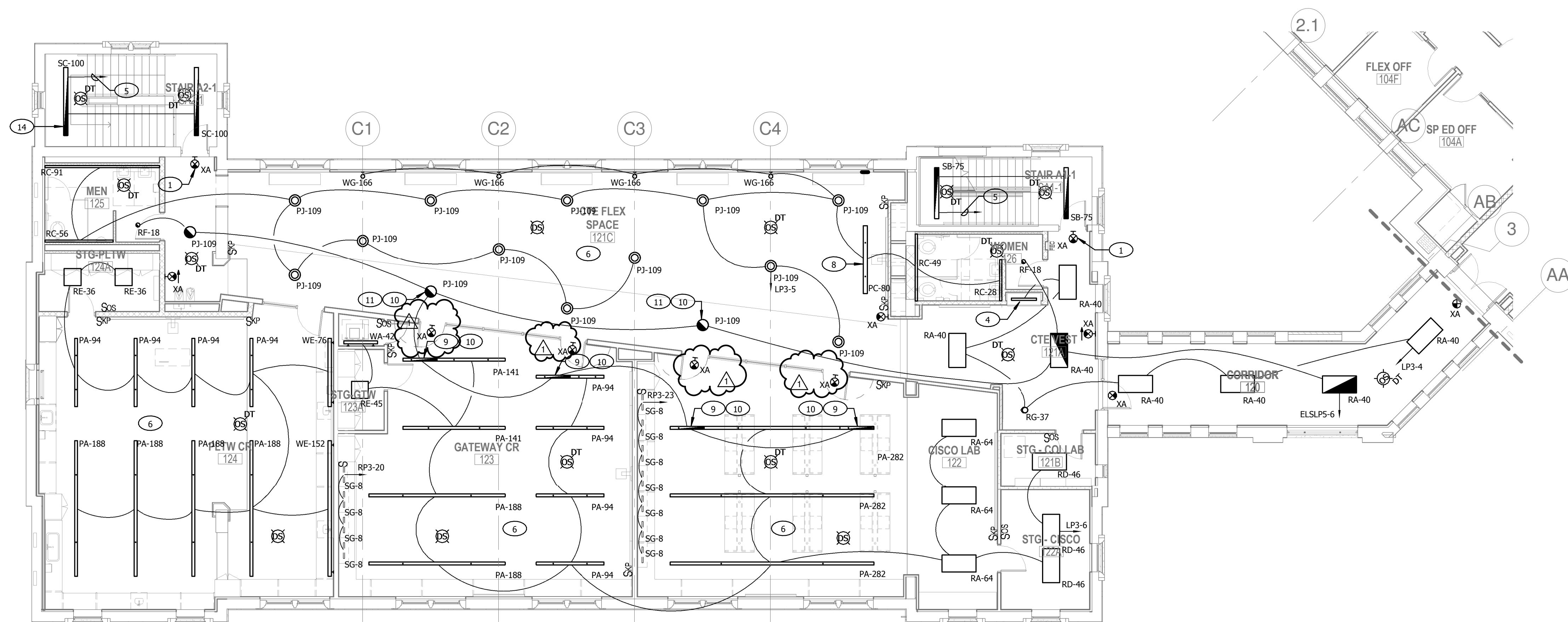
- A. UNLESS NOTED OTHERWISE, PROVIDE BODINE GTD (OR APPROVED EQUAL) FOR CONNECTION OF EMERGENCY CIRCUIT TO NORMAL/EMERGENCY FIXTURES. REFER TO DRAWING E 501 FOR TYPICAL INSTALLATION DETAIL.
- B. OCCUPANCY SENSOR/DAYLIGHT SENSOR LOCATIONS ARE DIAGRAMMATIC AND ARE SHOWN TO INDICATE AREAS TO BE COVERED ONLY. PROVIDE QUANTITIES/LOCATIONS AND RELATED APPEARANCES AS REQUIRED FOR COVERAGE AS DEFINED IN THE SPECIFICATIONS.
- C. CONNECT EXIT SIGNS UNSWITCHED TO NEAREST NORMAL/EMERGENCY CIRCUIT WITH 2 #12 & 1 #12 GROUND IN 3/4" CONDUIT.
- D. REFER TO DRAWING E401 FOR A TYPICAL CLASSROOM LAYOUT AND CONTROL DETAIL.

KEYED NOTES:

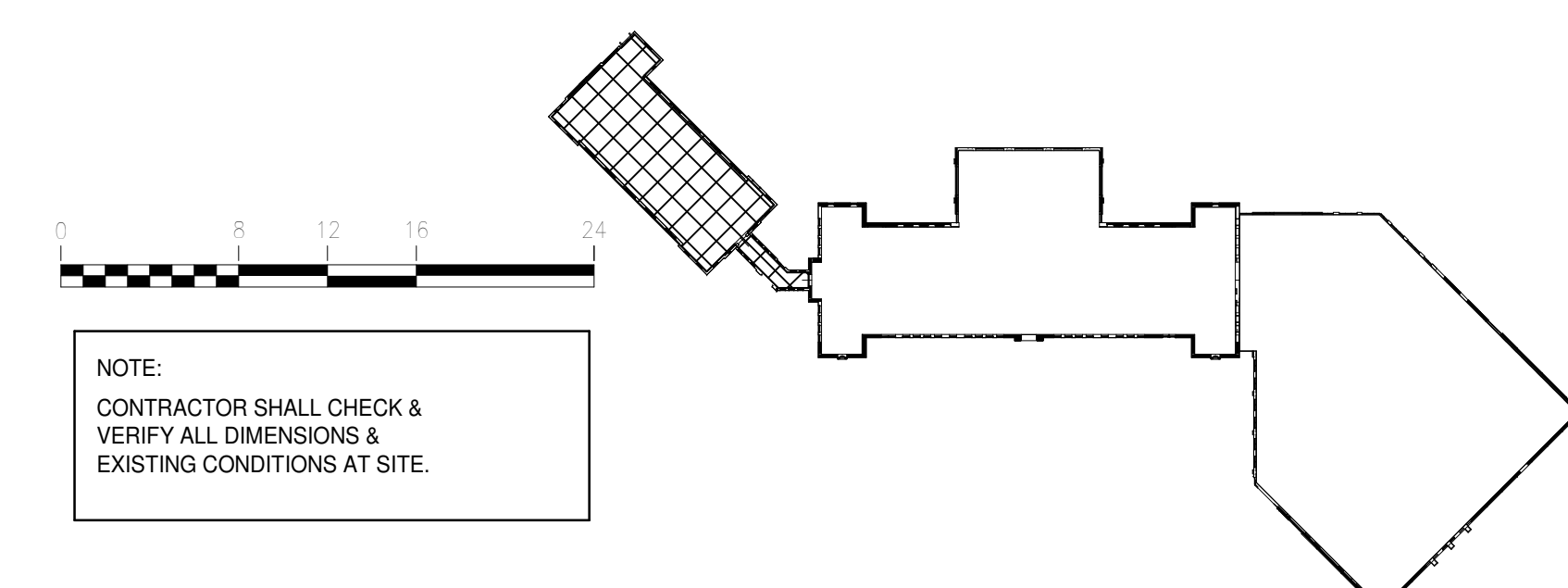
- 1 MOUNT EXIT SIGN 1'-0" ABOVE TOP OF DOOR FRAME.
- 2 MOUNT WALL SCONCE HALFWAY BETWEEN EXISTING STEEL LINTEL AND CAST STONE BAND DIRECTLY ABOVE IT; AT APPROXIMATELY 14" AFG.
- 3 MOUNT WALL SCONCE AT SAME DISTANCE BELOW CAST STONE BAND AS THE TYPE 'OC-50' FIXTURE THAT IS LOCATED AT EASTERN EXIT DOOR FROM STAIR 42-5.
- 4 DISPLAY CASE LIGHTING TO BE PROVIDED BY CASEWORK VENDOR. ELECTRICAL CONTRACTOR SHALL PROVIDE POWER AND CONNECTION TO LIGHT FIXTURES. CONNECT FIXTURES TO NORMAL POWER CIRCUIT FEEDING THE NEAREST CORRIDOR LIGHT FIXTURE.
- 5 CONNECT TO CIRCUIT DOWN ON FLOOR BELOW.
- 6 MOUNT THE PENDANT LIGHT FIXTURES IN THIS ROOM SUCH THAT THE FIXTURES ARE CENTERED ON THE UPPER WINDOWS OF THE EXTERIOR WALL; AT APPROXIMATELY 14" AFF TO CENTER OF FIXTURE.
- 7 MOUNT THE PENDANT LIGHT FIXTURES IN THIS ROOM AT 7'-9" AFF TO BOTTOM OF FIXTURE.
- 8 MOUNT FIXTURE AS NOTED IN LIGHTING FIXTURE SCHEDULE, SHEET E700.
- 9 CONNECT LAST 4' OF FIXTURE ROW TO NORMAL/EMERGENCY CIRCUIT INDICATED AND PROVIDE BODINE GTD-20A CONTROL UNIT FOR CIRCUIT INTERFACE. REMAINDER OF FIXTURE ROW SHALL BE CONNECTED TO NORMAL POWER CIRCUIT INDICATED.
- 10 INSTALL ALL NECESSARY CONTROL AND POWER WIRING BETWEEN ROOM CONTROL SYSTEM AND LOCAL FIXTURE GTD DEVICE TO ALLOW CONTROL OF NORMAL EMERGENCY FIXTURES WITH LOCAL ZONING REQUIREMENTS.
- 11 NORMAL/EMERGENCY LIGHT FIXTURES IN CTE FLEX SPACE TO BE CONTROLLED WITH ASSOCIATED NORMAL LIGHTS IN SAME SPACE. PROVIDE BODINE GTD-20A CONTROL UNIT FOR CIRCUIT INTERFACE.
- 12 THIS 'OC-50' FIXTURE SHALL HAVE TYPE 3 OPTICAL DISTRIBUTION.
- 13 THIS 'OC-50' FIXTURE SHALL HAVE TYPE 4 OPTICAL DISTRIBUTION.
- 14 MOUNT THIS FIXTURE VIA RIGID STEM SUSPENSION, AT HEIGHT OF 14'-0" AFF FROM BOTTOM OF FIXTURE TO TOP OF STAIR LANDING DIRECTLY UNDERNEATH.



1 NEW WORK BASEMENT FLOOR PLAN A - LIGHTING
E 111 1/8" = 1'-0"



2 NEW WORK FIRST FLOOR PLAN A - LIGHTING
E 111 1/8" = 1'-0"



HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: 1004
EXPIRATION DATE: 12/31/2015

No.	DATE	DESCRIPTION
1	04/22/16	ADDENDUM #2

BID ISSUE

PROJECT No.: 152-01

DATE: 03/31/16

SCALE: AS NOTED

DRAWING NAME
NEW WORK BASEMENT & FIRST FLOOR PLAN A - LIGHTING

E 111

**Baltimore City Public Schools
Additions & Renovations at Robert Poole
Building #056**
1300 W 36TH ST., BALTIMORE, MD 21211

HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: 1094
EXPIRATION DATE: 12/31/2016

No.	DATE	DESCRIPTION
1	04/22/16	ADDENDUM #2

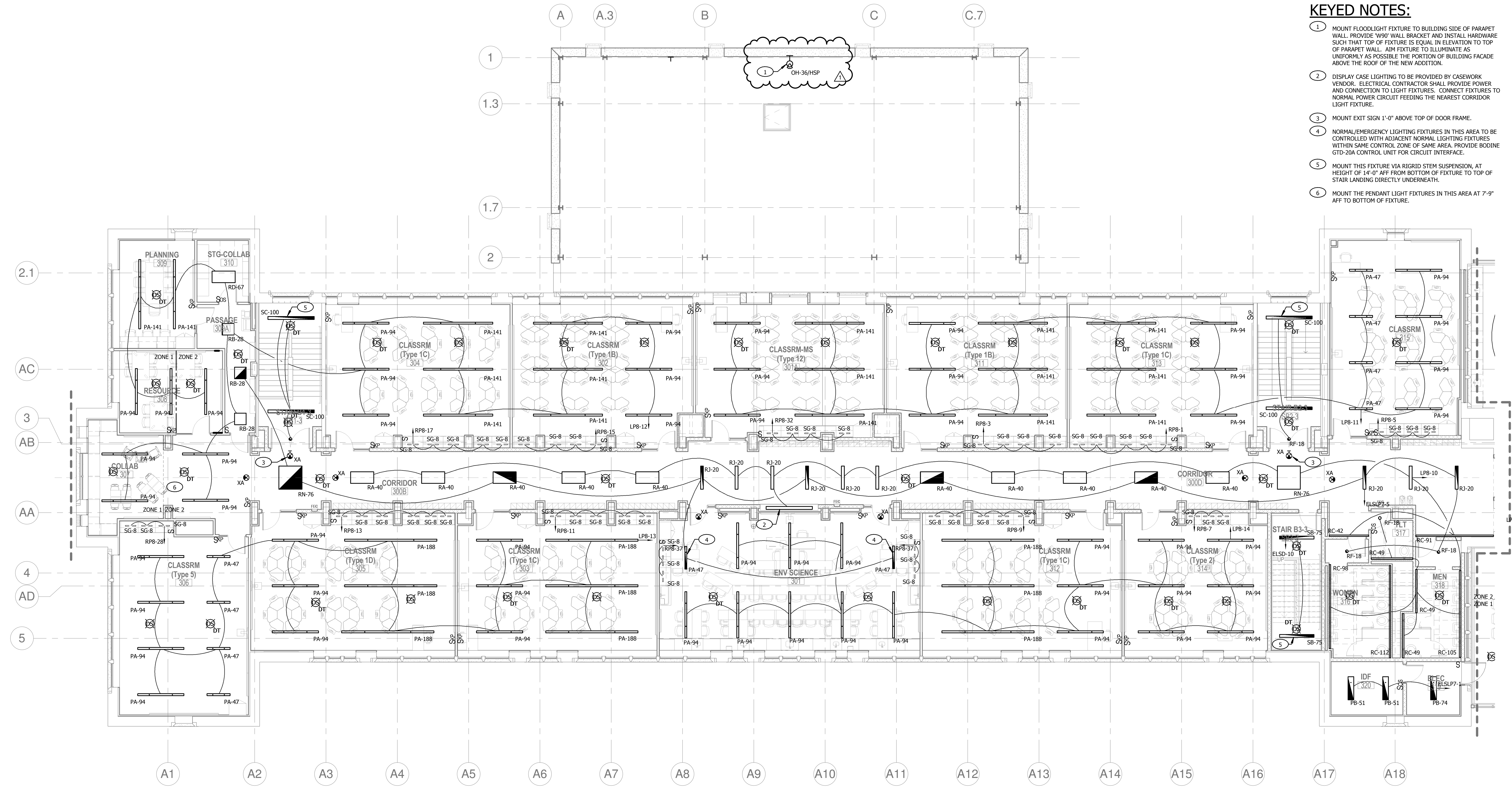
BID ISSUE	
PROJECT No.:	152-01
DATE:	03/31/16
SCALE:	AS NOTED
DRAWING NAME	
NEW WORK THIRD FLOOR PLAN B - LIGHTING	
E 118	

GENERAL NOTES:

- A. UNLESS NOTED OTHERWISE, PROVIDE BODINE GTD (OR APPROVED EQUAL) FOR CONNECTION OF EMERGENCY CIRCUIT TO NORMAL/EMERGENCY FIXTURES. REFER TO DRAWING E-501 FOR TYPICAL INSTALLATION DETAIL.
- B. OCCUPANCY SENSOR/DAYLIGHT SENSOR LOCATIONS ARE DIAGNOSTIC AND ARE SHOWN TO INDICATE AREAS TO BE COVERED ONLY. PROVIDE QUANTITIES/LOCATIONS AND RELATED APPURTENANCES AS REQUIRED FOR COVERAGE AS DEFINED IN THE SPECIFICATIONS.
- C. CONNECT EXIT SIGNS UNSWITCHED TO NEAREST NORMAL/EMERGENCY CIRCUIT WITH 2 #12 & 1 #12 GROUND IN 3/4" CONDUIT.
- D. REFER TO DRAWING E401 FOR A TYPICAL CLASSROOM LAYOUT AND CONTROL DETAIL.

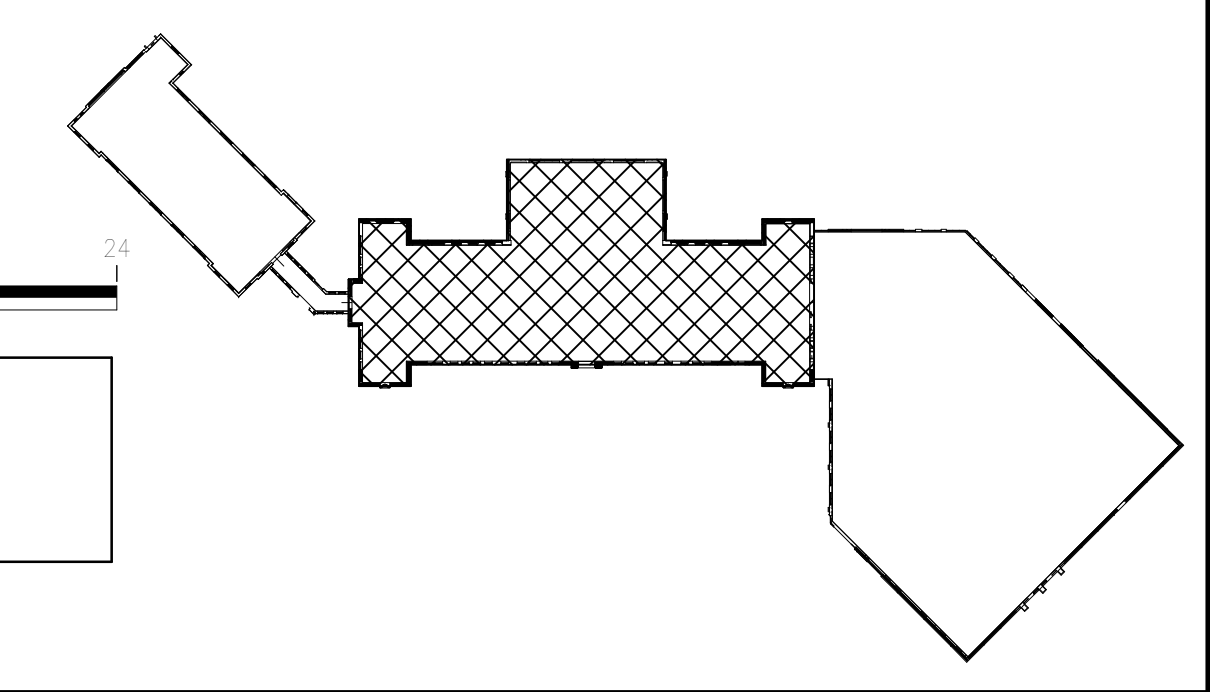
KEYED NOTES:

1. MOUNT FLOODLIGHT FIXTURE TO BUILDING SIDE OF PARAPET WALL. PROVIDE W90 WALL BRACKET AND INSTALL HARDWARE SUCH THAT TOP OF FIXTURE IS EQUAL IN ELEVATION TO TOP OF PARAPET WALL. AIM FIXTURE TO ILLUMINATE AS UNIFORMLY AS POSSIBLE THE PORTION OF BUILDING FACADE ABOVE THE ROOF OF THE NEW ADDITION.
2. DISPLAY CASE LIGHTING TO BE PROVIDED BY CASWORK VENDOR. ELECTRICAL CONTRACTOR SHALL PROVIDE POWER AND CONNECTION TO LIGHT FIXTURES. CONNECT FIXTURES TO NORMAL POWER CIRCUIT FEEDING THE NEAREST CORRIDOR LIGHT FIXTURE.
3. MOUNT EXIT SIGN 1'-0" ABOVE TOP OF DOOR FRAME.
4. NORMAL/EMERGENCY LIGHTING FIXTURES IN THIS AREA TO BE CONTROLLED WITH ADJACENT NORMAL LIGHTING FIXTURES WITHIN SAME CONTROL ZONE OF SAME AREA. PROVIDE BODINE GTD-20A CONTROL UNIT FOR CIRCUIT INTERFACE.
5. MOUNT THIS FIXTURE VIA RIGRID STEM SUSPENSION, AT HEIGHT OF 14'-0" AFF FROM BOTTOM OF FIXTURE TO TOP OF STAIR LANDING DIRECTLY UNDERNEATH.
6. MOUNT THE PENDANT LIGHT FIXTURES IN THIS AREA AT 7'-9" AFF TO BOTTOM OF FIXTURE.



NEW WORK THIRD FLOOR PLAN B - LIGHTING
1/8" = 1'-0"

NOTE:
CONTRACTOR SHALL CHECK &
VERIFY ALL DIMENSIONS &
EXISTING CONDITIONS AT SITE.



GENERAL NOTES:

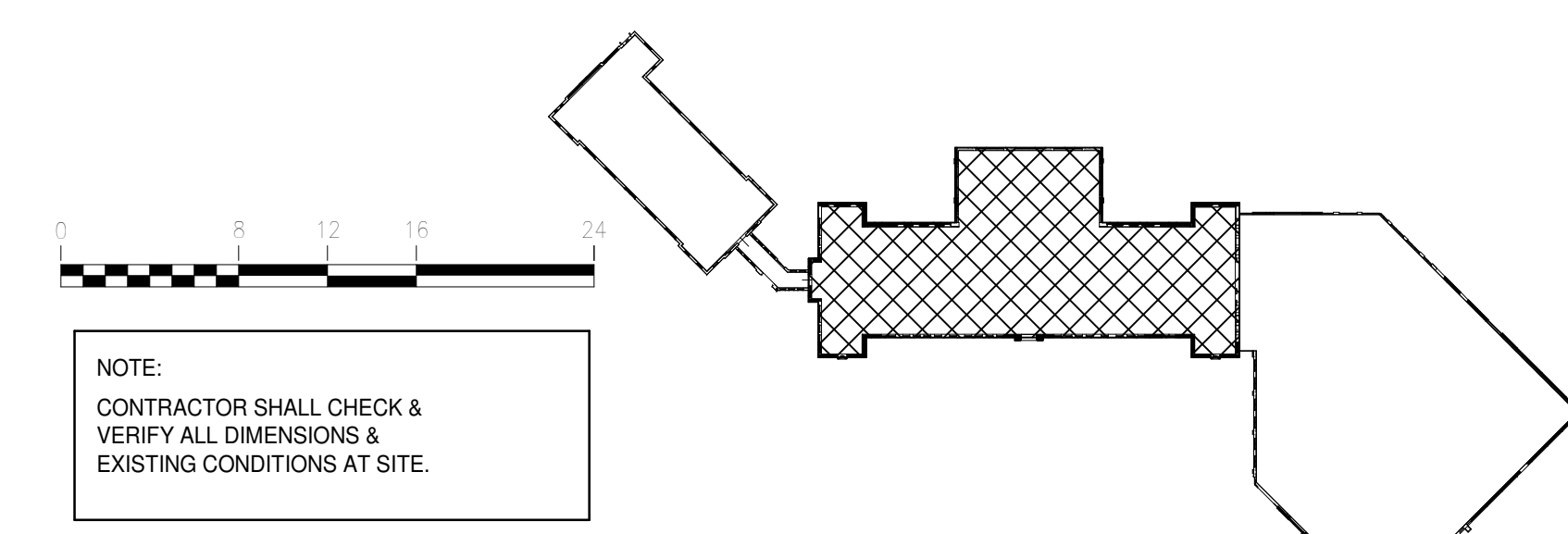
A REFER TO MECHANICAL SCHEDULES ON M-600 SERIES DRAWINGS FOR ELECTRICAL CHARACTERISTICS OF MECHANICAL EQUIPMENT.

KEYED NOTES:

- 1 MOUNT SWITCH OR DISCONNECT IN LOCATION TO NOT INTERFERE WITH ANY ACCESS PANELS. MAKE FINAL CONNECTION TO UNIT. TYPICAL FOR ALL MECHANICAL UNIT CONNECTIONS.
- 2 PROVIDE 240V-30A-3P-3F NEMA TYPE 1 FUSED SAFETY SWITCH, FUSED TO 15A. MOUNT SWITCH IN LOCATION TO NOT INTERFERE WITH ANY ACCESS PANELS. MAKE FINAL CONNECTION TO UNIT.
- 3 PROVIDE 480V-30A-3P-3F NEMA TYPE 1 FUSED SAFETY SWITCH, FUSED TO 15A. MOUNT SWITCH IN LOCATION TO NOT INTERFERE WITH ANY ACCESS PANELS. MAKE FINAL CONNECTION TO UNIT.
- 4 PROVIDE 240V-30A-3P-2F NEMA TYPE 4X FUSED SAFETY SWITCH, FUSED TO 15A. MOUNT SWITCH ADJACENT TO UNIT AT FINAL MOUNTING HEIGHT.
- 5 PROVIDE 240V-30A-3P-3F NEMA TYPE 4X FUSED SAFETY SWITCH, FUSED TO 20A. MOUNT SWITCH ADJACENT TO UNIT AT FINAL MOUNTING HEIGHT.
- 6 PROVIDE 480V-30A-3P-3F NEMA TYPE 1 FUSED SAFETY SWITCH, FUSED TO 20A. MOUNT SWITCH IN LOCATION TO NOT INTERFERE WITH ANY ACCESS PANELS. MAKE FINAL CONNECTION TO UNIT.
- 7 POWER CONNECTION TO SEWAGE EJECTOR PUMP CONTROL PANEL. PROVIDE FINAL CONNECTION TO PUMPS P-I AND P-J.



1 NEW WORK BASEMENT FLOOR PLAN B - MECHANICAL POWER
E 313 1/8" = 1'-0"



NOTE:
CONTRACTOR SHALL CHECK &
VERIFY ALL DIMENSIONS &
EXISTING CONDITIONS AT SITE.

Baltimore City Public Schools
Additions & Renovations at Robert Poole
Building #056
1300 W 36TH ST., BALTIMORE, MD 21211

HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: 1594
EXPIRATION DATE: 12/14/2015

No.	DATE	DESCRIPTION
1	04/22/16	ADDENDUM #2

BID ISSUE
PROJECT No.: 152-01
DATE: 03/31/16
SCALE: AS NOTED
DRAWING NAME
**NEW WORK
BASEMENT PLAN
B - MECHANICAL
POWER**
E 313

Baltimore City Public Schools Additions & Renovations at Robert Poole Building #056 1300 W 36TH ST., BALTIMORE, MD 21211

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 15046 LICENSE EXPIRATION DATE: 12/31/2016

Table with 2 columns: No., DATE, DESCRIPTION. Row 1: 1, 04/22/16, ADDENDUM #2

BID ISSUE

PROJECT No.: 152-01

DATE: 03/31/16

SCALE: AS NOTED

DRAWING NAME

ELECTRICAL PANEL SCHEDULES

E 606

PANEL SCHEDULES

HP6 CP7
RP7-1 RP7-2
RP7-3

Panel Schedule for HP6. Includes table with columns: OKT NO, DESCRIPTION, BREAKER, POLES, LOAD (KW), WIRE, GND, COND, COND SIZE, WIRE NO, LOAD (KW), BREAKER, DESCRIPTION, OKT NO. Includes summary table and notes.

Panel Schedule for CP7. Includes table with columns: OKT NO, DESCRIPTION, BREAKER, POLES, LOAD (KW), WIRE, GND, COND, COND SIZE, WIRE NO, LOAD (KW), BREAKER, DESCRIPTION, OKT NO. Includes summary table and notes.

Panel Schedule for RP7 (SECTION 1). Includes table with columns: OKT NO, DESCRIPTION, BREAKER, POLES, LOAD (KW), WIRE, GND, COND, COND SIZE, WIRE NO, LOAD (KW), BREAKER, DESCRIPTION, OKT NO. Includes summary table and notes.

Panel Schedule for RP7 (SECTION 2). Includes table with columns: OKT NO, DESCRIPTION, BREAKER, POLES, LOAD (KW), WIRE, GND, COND, COND SIZE, WIRE NO, LOAD (KW), BREAKER, DESCRIPTION, OKT NO. Includes summary table and notes.

Panel Schedule for RP7 (SECTION 3). Includes table with columns: OKT NO, DESCRIPTION, BREAKER, POLES, LOAD (KW), WIRE, GND, COND, COND SIZE, WIRE NO, LOAD (KW), BREAKER, DESCRIPTION, OKT NO. Includes summary table and notes.

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Baltimore City Public Schools Additions & Renovations at Robert Poole Building #056 1300 W 36TH ST., BALTIMORE, MD 21211

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 1504060000 EXPIRATION DATE: 12/31/2025

Table with 3 columns: No., DATE, DESCRIPTION. Row 1: 11, 04/22/16, ADDENDUM #2

BID ISSUE

PROJECT No.: 152-01

DATE: 03/31/16

SCALE: AS NOTED

DRAWING NAME

ELECTRICAL PANEL SCHEDULES

E 608

PANEL SCHEDULES

CP8 LP8 RPB-1 RPB-2 ESRPB-1 ESRPB-2

Panel Schedule for LP8. Includes header with bus amp (225A), min. a.i.c. (14,000), main breaker (125A), and a detailed table of circuit descriptions, breaker types, wire sizes, and loads. Includes a summary table for LITS, RECP, HVAC, MISC, and a total demand of 57 AMPS.

Panel Schedule for CP8. Includes header with bus amp (225A), min. a.i.c. (10,000), main breaker (150A), and a detailed table of circuit descriptions, breaker types, wire sizes, and loads. Includes a summary table for LITS, RECP, HVAC, MISC, and a total demand of 46 AMPS.

Panel Schedule for RPB (SECTION 2). Includes header with bus amp (225A), min. a.i.c. (10,000), main breaker (MLO), and a detailed table of circuit descriptions, breaker types, wire sizes, and loads. Includes a summary table for LITS, RECP, HVAC, MISC, and a total demand of 120 AMPS.

Panel Schedule for RPB (SECTION 1). Includes header with bus amp (225A), min. a.i.c. (10,000), main breaker (225A), and a detailed table of circuit descriptions, breaker types, wire sizes, and loads. Includes a summary table for LITS, RECP, HVAC, MISC, and a total demand of 120 AMPS.

Panel Schedule for ESRPB (SECTION 2). Includes header with bus amp (225A), min. a.i.c. (10,000), main breaker (MLO), and a detailed table of circuit descriptions, breaker types, wire sizes, and loads. Includes a summary table for LITS, RECP, HVAC, MISC, and a total demand of 119 AMPS.

Panel Schedule for ESRPB (SECTION 1). Includes header with bus amp (225A), min. a.i.c. (10,000), main breaker (150A), and a detailed table of circuit descriptions, breaker types, wire sizes, and loads. Includes a summary table for LITS, RECP, HVAC, MISC, and a total demand of 119 AMPS.

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LIGHTING CONTROL/SWITCHING SCHEDULE

ROOM DESIGNATION	SWITCH TYPE(S)/CONTROL	SWITCH TYPE(S)/CONTROL DESCRIPTION	CONTROL UNIT(S)/ZONE(S)	CONTROL UNIT(S)/ZONE(S) DESCRIPTION
Typical Classroom 003, 004, 007, 012, 013, 014 018, 020, 044, 046, 106, 106B 122, 123, 124, 201A, 202A, 203 204A, 206B, 205, 206, 207, 208 209, 211, 211, 212, 213, 214 220, 228, 229, 230, 233, 301 301A, 302, 303, 304, 305, 306 311, 312, 313, 314, 315, 321 327, 328, 329, 330, ,	5-Button LV (teacher) 1-100%, 2-50%, 3-AV1, 4-AV2, 5-OFF 3-Button LV (entry) 1-100%, 2-50%, 3-OFF Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Daylighting Sensor Continuous dimming Target lighting level at 100% 40 FC	100% All Lights at 100% 50% All Lights at 50% AV1 Front of Room (Teaching Wall) Lights OFF Back of Room Lights at 50% AV2 Front of Room (Teaching Wall) Lights OFF Back of Room Lights at 100% OFF All Lights OFF	4-Zone Control Panel Zone 1 - Window Wall, Back of Room Zone 2 - Interior Wall, Back of Room Zone 3 - Window Wall, Front of Room Zone 4 - Interior Wall, Front of Room	Zone 1 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 2 Occupancy Sensor (Vacancy Mode) Zone 3 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 4 Occupancy Sensor (Vacancy Mode)
Typical Classroom (Receptacle Control) See List Above	Occupancy Sensor Occupancy mode - Auto Off/Auto ON	N/A	4-Zone Control Panel Zone 1 - Classroom A Receptacles/UC Lights Zone 2 - Classroom B Receptacles/UC Lights Zone 3 - Classroom C Receptacles/UC Lights Zone 4 - Classroom D Receptacles/UC Lights	Zone 1 Occupancy Sensor Classroom A Zone 2 Occupancy Sensor Classroom B Zone 3 Occupancy Sensor Classroom C Zone 4 Occupancy Sensor Classroom D
Typical Office 002, 002A, 002B, 002C, 005, 030 040, 043, 101B, 101C, 101D, 101E 101G, 101I, 102A, 102C, 102E, 102F 102G, 102K, 103A, 103B, 103C, 103D 103F, 103H, 103L, 104A, 104F, 105D 107A, 107B, 107C, 107D, 107E, 107F 107G, 109, 109B, 142, 142C, 142H 142I, 142K, 149, 153B, 154B, 202D 209A, 223, 226, 227, 309, 324	3-Button LV (entry) 1-100%, 2-50%, 3-OFF Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Target lighting level at 100% 30 FC 50 FC (103F, 103H, 142I, 142K) 20 FC (103A, 109, 142H) 10 FC (103C, 103D)	100% All Lights at 100% 50% All Lights at 50% OFF All Lights OFF	4-Zone Control Panel Shared as required for multiple rooms	N/A
Typical Office (With Daylighting) 006, 015, 041, 101A, 101H, 102H 104E, 221, 224, 307, 308, 323	3-Button LV (entry) 1-100%, 2-50%, 3-OFF Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Daylighting Sensor Continuous dimming Target lighting level at 100% 30 FC	100% All Lights at 100% 50% All Lights at 50% OFF All Lights OFF	4-Zone Control Panel Shared as required for multiple rooms	Zone 1 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 2 Occupancy Sensor (Vacancy Mode) Note: Refer to drawings for daylighting zone. Where no zone is shown, the entire room is Zone 1 and there is no zone 2 required.
Restrooms 008, 019D, 050, 052, 103G, 103K 109C, 125, 126, 143, 144, 215	Occupancy Sensor Occupancy mode - Auto Off/Auto ON 15 minute unoccupied period shut-off Target lighting level at 100% 5 FC 15 FC (at vanity)	Switch Type Occupancy Sensor Use Switch Type OS where shown on plans	N/A	N/A
Corridors, Lobbies 001A, 001B, 001D, 001E, 001F, 001G 001H, 001K, 100A, 100B, 100C, 100D 100F, 100G, 100H, 100I, 100K, 101J 104, 105B, 106A, 107, 110, 120 120A, 121A, 200A, 200B, 200C, 200D 200F, 200G, 300B, 300D, 300E, 300F 326, , , , ,	Occupancy Sensor (Normal Lighting) Occupancy mode - Auto Off/Auto ON 30 minute unoccupied period shut-off Timeclock (Emergency Lighting) School OPEN (Lights on 100%) School CLOSED (Lights OFF) Target lighting level at 100% 10 FC	N/A	HUB Control Panel (Shared Unit) Zone 1 - Corridor Emergency Lighting Zone 2 - Corridor Normal Lighting	Zone 1 Timeclock 6A-6P(Confirm hours with Owner) Provide GTD-20A emergency bypass for emergency circuit in each corridor space.
Stairs SA1-0, SA1-1, SA1-2, SA2-0, SA2-1, SB1-0 SB1-1, SB1-2, SB1-3, SB2-0, SB2-1, SB2-2 SB2-3, SB3-0, SB3-1, SB3-2, SB3-3, SC1-1 SC1-2, SC1-3, , , , ,	Occupancy Sensor Occupancy mode - Auto Off/Auto ON 10 minute unoccupied period shut-off Target lighting level at 100% 10 FC	N/A	HUB Control Panel (Shared Unit) Zone 3 - Stair Lighting	Zone 2 Occupied - Lights at 100% Unoccupied - Lights at 50% Provide GTD-20A emergency bypass for emergency circuit in each stairwell.
Storage Rooms Telecom Rooms Similar Spaces 016, 019B, 019C, 023, 024, 027 028, 029, 031, 042, 045, 047 049, 049A, 051, 100M, 101F, 101N 102B, 102C, 103I, 104B, 104D, 105C 107H, 107I, 109A, 113, 114, 115A 115B, 116, 121B, 122A, 123A, 124A 140, 142A, 142B, 142D, 142E, 145 146, 147, 148, 148A, 148B, 148C 150, 151, 152, 153A, 153C, 153D 153E, 153F, 154A, 154C, 154D, 154E 154F, 201B, 201C, 202B, 202C, 207A 216, 219, 220A, 221A, 222, 225 231A, 233A, 310, 317, 320, 321A 322, 323A, 325, 327A, 328A, 329A	Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Target lighting level at 100% 20 FC 30 FC (031, 146) 5 FC (023, 150, 151, 153A, 154A) 10 FC (Janitors Closets, Closets, Storage) 10 FC (Shower Rooms)	Switch Type Occupancy Sensor Use Switch Type OS where shown on plans Switch Type - Single Toggle Use low-voltage momentary contact switch where ceiling sensors are shown.	N/A	N/A
Media Center 105A	7-Button LV (main desk) 1-100%, 2-50%, 3-AV1, 4-AV2, 5-AV3, 6-AV4, 7-OFF 3-Button LV (entry) 1-100%, 2-50%, 3-OFF 3-Button LV (Zone 3) 1-100%, 2-50%, 3-OFF 3-Button LV (Zone 4) 1-100%, 2-50%, 3-OFF Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Daylighting Sensor Continuous dimming Target lighting level at 100% 50 FC (Circulation Desk) 40 FC (Reading/Learning Area) 30 FC (Stacks, Computer Area) 10 FC (General Circulation)	100% All Lights at 100% 50% All Lights at 50% AV1 All Lights in Zone 1, 2 & 4 at 100% All Lights in Zone 3 OFF AV2 All Lights in Zone 1, 2 & 3 at 100% All Lights in Zone 4 OFF AV3 All Lights in Zone 1, 2 at 100% All Lights in Zone 3, 4 OFF AV4 All Lights in Zone 1, 2 at 50% All Lights in Zone 3, 4 OFF OFF All Lights OFF	4-Zone Control Panel Zone 1 - Window Wall Zone 2 - Room Interior Zone 3 - AV area 1 Zone 4 - AV area 2	Zone 1 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 2 Occupancy Sensor (Vacancy Mode) Zone 3 Occupancy Sensor (Vacancy Mode) Zone 4 Occupancy Sensor (Vacancy Mode)

LIGHTING CONTROL/SWITCHING SCHEDULE

ROOM DESIGNATION	SWITCH TYPE(S)/CONTROL	SWITCH TYPE(S)/CONTROL DESCRIPTION	CONTROL UNIT(S)/ZONE(S)	CONTROL UNIT(S)/ZONE(S) DESCRIPTION
CTE Flex Space 121C	5-Button LV (teacher) 1-100%, 2-50%, 3-AV1, 4-AV2, 5-OFF 3-Button LV (entry) 1-100%, 2-50%, 3-OFF Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Daylighting Sensor Continuous dimming Target lighting level at 100% 40 FC	100% All Lights at 100% 50% All Lights at 50% AV1 Front of Room (Teaching Wall) Lights OFF Back of Room Lights at 50% AV2 Front of Room (Teaching Wall) Lights OFF Back of Room Lights at 100% OFF All Lights OFF	4-Zone Control Panel Zone 1 - Front of Room (5 type P3-109) Zone 2 - Back of Room (Remaining P3-109) Zone 3 - All type WG-141	Zone 1 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 2 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 3 Occupancy Sensor (Vacancy Mode)
Dining 141	5-Button LV (main entry) 1-100%, 2-50%, 3-AV1, 4-AV2, 5-OFF 3-Button LV (alternate entry) 1-100%, 2-50%, 3-OFF Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Daylighting Sensor Continuous dimming Target lighting level at 100% 40 FC	100% All Lights at 100% (Zones 1-6 at main entry) All Lights at 100% (Zones 5&6 at alternate entry) 50% All Lights at 50% (Zones 1-6 at main entry) All Lights at 50% (Zones 5&6 at alternate entry) AV1 Zone 1&2 (Projection Wall) Lights OFF Zone 3-6 Lights at 50% AV2 Zones 1&2 (Projection Wall) Lights OFF Zones 3-6 Lights at 100% OFF All Lights OFF (Zones 1-6 at main entry) All Lights OFF (Zones 5&6 at alternate entry)	4-Zone Control Panel (2 units) Zone 1 - West Side, Window Wall Zone 2 - West Side, Interior Zone 3 - Center of Room, Window Wall Zone 4 - Center of Room, Interior Zone 5 - East Side, Window Wall Zone 6 - East Side, Interior	Zone 1 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 2 Occupancy Sensor (Vacancy Mode) Zone 3 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 4 Occupancy Sensor (Vacancy Mode) Zone 5 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 6 Occupancy Sensor (Vacancy Mode)
Gymnasium 155, Auxiliary Gym 156	5-Button LV (main entry) 1-100%, 2-50%, 3-GYM1, 4-GYM2, 5-OFF 3-Button LV (Gym 155) 1-100%, 2-50%, 3-OFF Zone 1&2 ONLY 3-Button LV (Gym 156) 1-100%, 2-50%, 3-OFF Zone 3 ONLY Occupancy Sensor Vacancy mode - Auto Off/Manual ON 10 minute unoccupied period shut-off Daylighting Sensor Continuous dimming Target lighting level at 100% 50 FC	100% All Lights at 100% (Zone 1, 2, 3&4 at main entry) 50% All Lights at 50% (Zone 1, 2, 3&4 at main entry) GYM1 Zone 1 & 2 Lights 100% Zone 3 & 4 Lights OFF GYM2 Zone 1 & 2 Lights OFF Zone 3 & 4 Lights 100% OFF All Lights OFF	4-Zone Control Panel Zone 1 - Gymnasium 155 Lights Zone 2 - Gymnasium 155 Lights (daylighting) Zone 3 - Auxiliary Gym 156 Lights Zone 4 - Auxiliary Gym 156 Lights (daylighting)	Zone 1 Occupancy Sensor (Vacancy Mode) Zone 2 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming) Zone 3 Occupancy Sensor (Vacancy Mode) Zone 4 Occupancy Sensor (Vacancy Mode) Daylighting Sensor (Continuous Dimming)
Theater/Dance CR 231	5-Button LV (main unit/control) 1-100%, 2-50%, 3-25%, 4-10%, 5-OFF 3-Button LV (alternate entries) 1-100%, 2-50%, 3-OFF Occupancy Sensor Vacancy mode - Auto Off/Auto ON 30 minute unoccupied period shut-off Target lighting level at 100% 40 FC	100% All Lights at 100% 50% All Lights at 50% 25% All Lights at 25% 10% All Lights at 10% OFF All Lights OFF	4-Scene Dimming Control Panel Scene 1 - All 100% (Zone 1&2) Scene 2 - All 50% (Zone 1&2) Scene 3 - All 25% (Zone 1&2) Scene 4 - All 10% (Zone 1&2) OFF	Zone 1 Type P3-109 fixtures Zone 2 Type RB-28 fixtures Note: Prior to scene programming, coordinate final light levels with owner.
Mechanical/Electrical Rooms	Toggle Switch (single/three-way as shown) Target lighting level at 100% 20 FC	N/A	N/A	N/A
Elevator Spaces	Toggle Switch Target lighting level at 100% (minimum) 10 FC (Elev. Plat. Landing in front of doors) 19 FC (machine room floor)	N/A	N/A	N/A
Exterior Lighting Building Mounted Parking Lot/Path Lighting Building Flood	Photocell School OPEN (Lights on 100%) School CLOSED (Lights at 50%) Timeclock School OPEN (Photocell ON, Timeclock OFF) School CLOSED (Lights OFF)	HUB Control Panel (Shared Unit) Zone 4 - Exterior Lighting (Building) Zone 5 - Exterior Lighting (Pedestrian) Zone 6 - Exterior Lighting (Parking Lot) Zone 7 - Exterior Lighting (Flood Lights) Note: Zone numbers may vary based on location of HUB.	Zone 4-7 Timeclock (Confirm hours with Owner) Zone 4 - 10P (50%), 12A (OFF) Zone 5 - 12A (OFF) Zone 6 - 12A (50%) Zone 7 - 10P (50%)	
Electric Water Coolers	Timeclock School OPEN (Recp. ON) School CLOSED (Recp. OFF)	N/A	HUB Control Panel (Shared Unit) Zone 8 - Electric Water Coolers Note: Zone numbers may vary based on location of HUB.	Zone 8 Timeclock 6A-6P(Confirm hours with Owner)
Cupola Lights, Canopy Lights	Photocell Photocell ON/OFF Timeclock OFF Switch Manual Override (All Times)	Switch Type Momentary Contact	HUB Control Panel (Shared Unit) Zone 10 - Cupola Lights Zone 11 - Canopy Lights Note: Zone numbers may vary based on location of HUB.	Zone 10 Timeclock (Confirm hours with Owner) Zone 11 Timeclock (Confirm hours with Owner)

GENERAL LIGHTING CONTROL NOTES:
All specific times for Timeclock programming shown shall be confirmed with owner's representative prior to completion of final system programming.
All locations with daylighting controls shall be programmed to allow keypad control to lower the lighting level in the daylighting zone, but may not increase the lighting level in the daylighting zone.
All specific target lighting levels shown are averages across the task plane.

Baltimore City Public Schools
Additions & Renovations at Robert Poole
Building #056
1300 W 36TH ST., BALTIMORE, MD 21211

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 1504
EXPIRATION DATE: 12/31/2019

No.	DATE	DESCRIPTION
1	04/22/16	ADDENDUM #2

BID ISSUE

PROJECT No.: 152-01

DATE: 03/31/16

SCALE: AS NOTED

DRAWING NAME
LIGHTING CONTROL SCHEDULE

LIGHTING FIXTURE SCHEDULE

Table with columns: FIXTURE TYPE, MANUFACTURER / CATALOG NUMBER, LIGHT FIXTURE DESCRIPTION, LIGHT SOURCE, MAXIMUM FIXTURE INPUT POWER, MINIMUM LUMINOUS FLUX (INITIAL DELIVERED LUMENS), MOUNTING LOCATION, FIXTURE VOLTAGE, REMARKS/INSTRUCTIONS.

GENERAL NOTES:

- 1. UNLESS OTHERWISE NOTED, ALL FIXTURES SHALL BE DIMMABLE VIA 0-10V CONTROL. PROVIDE DIMMING CONTROL INTERFACE EQUIPMENT AS REQUIRED FOR SPECIFIC LEADS AND DRIVER IN RESPECTIVE FIXTURE SUBMITTED FOR APPROVAL.
2. THE MAJORITY OF THE FIRST NAME SPECIFIED LIGHTING PRODUCTS ARE LISTED WITH ENERGY STAR OR THE DESIGN LIGHTS CONSORTIUM (DLC) OR HAVE NOT BEEN SUBMITTED BY THE MANUFACTURER, BUT HAVE ENERGY EFFICIENT CHARACTERISTICS THAT WOULD QUALIFY THEM FOR LISTING.

LIGHTING FIXTURE SCHEDULE

Table with columns: FIXTURE TYPE, MANUFACTURER / CATALOG NUMBER, LIGHT FIXTURE DESCRIPTION, LIGHT SOURCE, MAXIMUM FIXTURE INPUT POWER, MINIMUM LUMINOUS FLUX (INITIAL DELIVERED LUMENS), MOUNTING LOCATION, FIXTURE VOLTAGE, REMARKS/INSTRUCTIONS.

JRS ARCHITECTS
2010 Clipper Park Rd.
Suite 101
Baltimore, MD 21211
410.235.7256

ASSOCIATE ARCHITECT
SCHEIDER GROUP ARCHITECTURE LLC
161 LEVERINGTON AVE. SUITE 105
PHILADELPHIA, PA 19127

LANDSCAPE ARCHITECT
MANN RYNEK ASSOCIATES
1826A FLOWER HILL WAY SUITE 100
BALTIMORE, MD 21211

CIVIL ENGINEER
7125 AMBASSADOR DR. SUITE 200
BALTIMORE, MD 21244

STRUCTURAL ENGINEER
ALBRECHT ENGINEERING
3500 BOSTON ST. SUITE 320
BALTIMORE, MD 21224

MEP ENGINEER
BRUNAC ENGINEERING
1800 N. CHARLES ST. SUITE 310
BALTIMORE, MD 21201

FOOD SERVICE
NYKOS ASSOCIATES
800 WYMAN PARK DR. SUITE 100
GAITHERSBURG, MD 20879

AVIT CONSULTANT
EDUCATIONAL SYSTEMS PLANNING
49 OLD SOLOMONS ISLAND RD. SUITE 301
ANNAPOLIS, MD 21401

Baltimore City Public Schools
Additions & Renovations at Robert Pool
Building #056
1300 W 36TH ST., BALTIMORE, MD 21211

HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR SUPERVISED BY ME, AND THAT I AM A LICENSURED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 2024
EXPIRATION DATE 12/31/2026

Table with columns: No., DATE, DESCRIPTION. Row 1: 1 | 04/22/16 | ADDENDUM #2

BID ISSUE

PROJECT No.: 152-01
DATE: 03/31/16

SCALE: AS NOTED

DRAWING NAME
LIGHTING FIXTURE SCHEDULE

E 700

