ADDENDUM

Public Building Commission of Chicago | Richard J. Daley Center | 50 West Washington Street, Room 200 | Chicago, Illinois 60602 | (312) 744-3090 | pbcchicago.com

ADDENDUM NO.: **01**

PROJECT NAME: **South Loop Elementary School New Construction Project**

PROJECT NO.: **05035**

CONTRACT NO.: **C1578**

DATE OF ISSUE: **June 23, 2017**

NOTICE OF CHANGES, MODIFICATIONS, OR CLARIFICATIONS TO CONTRACT DOCUMENTS

The following changes, modifications, or clarifications are hereby incorporated and made an integral part of the Contract Documents. Unless clearly expressed otherwise by this Addendum, all terms and conditions defined in the original Contract Documents shall continue in full force and effect and shall have the same meaning in this Addendum.

ITEM NO. 1: **CHANGE TO KEY DATES**

None.

ITEM NO. 2: **REVISIONS TO BOOK 1 – PBC INSTRUCTIONS TO BIDDERS**

Change 1. On Page 6 of 103 of Book 1 – PBC Instructions to Bidders, **REMOVE** Section II. E in its entirety and **REPLACE WITH** the following:

E. Time of Completion

Substantial Completion must be achieved no later than November 30, 2018.

Schedule Milestones must be completed as follows:

Milestone Descriptions	Milestone Dates
Schedule Milestone #1: All Work associated with earthwork including excavation and proper handling and disposal of sub-grade obstructions and soil, in accordance with the Contract Documents.	August 31, 2017
Schedule Milestone #2: Area A – All Work associated with Site Improvements within the property line excluding plantings, in accordance with the Contract Documents.	October 1, 2018
Substantial Completion: Area B and Area C – All Work associated with the New Building and Public Right of Way (PROW) Improvements excluding plantings, in accordance with the Contract Documents.	November 30, 2018
Schedule Milestone #3: Landscape plantings Work, in accordance with the Contract Documents.	June 15, 2019

ITEM NO. 3: **REVISIONS TO BOOK 2 – PBC STANDARD TERMS AND CONDITIONS**

None.

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ITEM NO. 4: REVISIONS TO BOOK 3 – TECHNICAL SPECIFICATIONS

Change 1 **Book 3 – Volume 1** – Section 00 03 00 INFORMATION AVAILABLE TO BIDDERS DATED 06.02.2017. **DELETE** paragraph Part 1.2.A.1 and **REPLACE WITH '***Subsurface Exploration and Geotechnical Engineering Report for the Proposed South Loop Elementary School at 19 W. 16th Street, Chicago'* by Ground Engineering Consultants, dated June 22, 2017. The report is included as Attachment A to this Section.' **ADD** new attachment '*Subsurface Exploration and Geotechnical Engineering Report for the Proposed South Loop Elementary School at 19 W. 16th Street, Chicago'* by Ground Engineering Consultants, dated June 22, 2017.

Change 2 **Book 3 – Volume 1** – Section 08 71 00 – HARDWARE dated 06.02.2017: **DELETE** section in its entirety and **REPLACE WITH** Section 08 71 00 – HARDWARE dated 06.21.2017.

Change 3 **Book 3 – Volume 1** – Section 09 05 61.13 – MOISTURE VAPOR EMISSION CONTROL dated 06.02.2017: **APPEND** subsection -1.2A with the following text: "Contractor's base bid shall include all costs to prepare the concrete substrates for the specified floor coverings in a timely manner, including all costs to provide the moisture-vapor emission control assembly if warranted by the moisture test results."

Change 4 **Book 3 – Volume 2** – Section 21 05 00 COMMON WORK RESULTS FOR FIRE SUPPRESSION dated 06.02.2017. **DELETE** section in its entirety and **REPLACE WITH** Section 21 05 00 – COMMON WORK RESULTS FOR FIRE SUPPRESSION dated 06.21.2017.

Change 5 **Book 3 – Volume 2** – Section 21 10 00 WATER BASED FIRE SUPPRESSION SYSTEMS dated 06.02.2017. **DELETE** section in its entirety and **REPLACE WITH** Section 21 10 00 WATER BASED FIRE SUPPRESSION SYSTEMS dated 06.21.2017.

Change 6 **Book 3 – Volume 2** – Section 21 11 00 FACILITY FIRE-SUPPRESSION PIPING dated 06.02.2017. **DELETE** section in its entirety and **REPLACE WITH** Section 21 11 00 FACILITY FIRE-SUPPRESSION PIPING dated 06.21.2017.

Change 7 **Book 3 – Volume 2** – Section 21 31 13 ELECTRIC-DRIVE CENTRIFUGAL FIRE PUMPS dated 06.02.2017. **DELETE** section in its entirety and **REPLACE WITH** Section 21 31 13 ELECTRIC-DRIVE CENTRIFUGAL FIRE PUMPS dated 06.21.2017.

Change 8 **Book 3 – Volume 2** – Section 26 05 43 UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS dated 06.21.2017. **ADD** section in its entirety.

Change 9 **Book 3 – Volume 2** – Section 32 93 11 PLANTINGS dated 06.02.2017. **DELETE** section in its entirety and **REPLACE WITH** Section 32 93 11 PLANTINGS dated 06.21.2017.

ITEM NO. 5: REVISIONS TO DRAWINGS

General

Change 10 **REMOVE** Sheet G5.1 dated 06.02.2017 in its entirety and **REPLACE WITH** G5.1 dated 06.21.2017.

Change 11 Sheet G6.0: **DELETE** drawing sheet in its entirety.

Survey

Change 12 **ADD** Site Demolition As-Built survey reference drawings DSV-1 & DSV-2, dated 06/21/2017 (2 yellow sheets, as issued by Site Demolition Contractor).

Change 13 **ISSUE** for Demolition Drawings

Change 14 **REMOVE** Site Demolition Scope of Work For-Reference Drawings (5 yellow sheets: G1.0, D0.0, D0.1, D1.0, RD1.0).

Excavation Drawings

Change 15 **REMOVE** excavation drawing sheets on yellow paper (3 sheets; ERS/EX-1, ERS/EX-2, ERS/EX-3) and **REPLACE WITH** 3 excavation drawing sheets on white paper: ERS/EX-1, ERS/EX-2, ERS/EX-3; all dated 06.21.2017.

Civil

Change 16 **REMOVE** Sheet C0.1 dated 06.02.2017 in its entirety and **REPLACE WITH** C0.1 dated 06.21.2017.

Change 17 **REMOVE** Sheet C1.0 dated 06.02.2017 in its entirety and **REPLACE WITH** C1.0 dated 06.21.2017.

Change 18 **REMOVE** Sheet C2.0 dated 06.02.2017 in its entirety and **REPLACE WITH** C2.0 dated 06.21.2017.

Change 19 Sheet C3.0: **REVISE** grading along East Elevation. (CSK-01 **ISSUED**).

Change 20 Sheet C3.1: **REVISE** grading at Waste Enclosure. (CSK-02 **ISSUED**).

Change 21 Sheet C4.0: **REVISE** storm routings at Waste Enclosure. (CSK-03 **ISSUED**).

Change 22 **REMOVE** Sheet C5.0 dated 06.02.2017 in its entirety and **REPLACE WITH** C5.0 dated 06.22.2017.

Change 23 **REMOVE** Sheet C5.1 dated 06.02.2017 in its entirety and **REPLACE WITH** C5.1 dated 06.21.2017.

Change 24 **REMOVE** Sheet C5.3 dated 06.02.2017 in its entirety and **REPLACE WITH** C5.3 dated 06.21.2017.

Landscape

Change 25 **REMOVE** Sheet L3.0 dated 06.02.2017 in its entirety and **REPLACE WITH** L3.0 dated 06.22.2017.

Change 26 **REMOVE** Sheet L3.1 dated 06.02.2017 in its entirety and **REPLACE WITH** L3.1 dated 06.22.2017.

Change 27 **REMOVE** Sheet L3.2 dated 06.02.2017 in its entirety and **REPLACE WITH** L3.2 dated 06.22.2017.

Change 28 **REMOVE** Sheet L3.3 dated 06.02.2017 in its entirety and **REPLACE WITH** L3.3 dated 06.22.2017.

Environmental

Change 29 **ADD** Sheet RD2.0 Remediation Excavation Plan dated 06.19.2017.

Architectural

Change 30 Sheet A1.1A: **REVISE** jamb wall construction at elevator door to CMU wall type. **REVISE** wall tags at toilet room block. **ADD** notation to provide 1-HR rated closure below soffit. (ASK-01 **ISSUED**)

Change 31 Sheet A1.1B: **ADD** Note 3 to Fire Extinguisher Schedule: 'Provide three-dimensional signage above all fire extinguishers and fire extinguisher cabinets. Signage product shall be NHE-27897Tri, enamel-coated aluminum, printed with UV stable ink, and shall be 3D triangle projected mount. Mount sign centered on extinguisher and with fasteners. Bottom of sign shall be 88" AFF.

Change 32 Sheet A1.1B: **REVISE** locker quantities. (ASK-06 **ISSUED**.)

Change 33 Sheet A1.2A: **REVISE** jamb wall construction at elevator door to CMU wall type. **REVISE** wall tags at toilet room block. (ASK-02 **ISSUED**)

Change 34 Sheet A1.3A: **REVISE** jamb wall construction at elevator door to CMU wall type. **REVISE** wall tags at toilet room block. (ASK-03 **ISSUED**)

Change 35 Sheet A1.4A: **REVISE** jamb wall construction at elevator door to CMU wall type. **REVISE** wall tags at toilet room block. (ASK-04 **ISSUED**)

Change 36 Dwg. 3/A5.2: **ADDED** brick head-of-wall cell vents in glazed brick veneer at 16" o.c. at 139'-0" and 146'-8" elevations.

Change 37 Dwg. 1/A5.3: **ADDED** brick head-of-wall cell vents in glazed brick veneer at 16" o.c. at 139'-0" and 146'-8" elevations.

Change 38 Dwg. 3/A5.5: Backup wall construction **REVISE** (from CFMF) to 10" CMU from elev. +10'-8" to second floor deck.

Change 39 Sheet A6.1: Keynote 101A **APPENDED** as follows: "Embed ties a minimum of 1 1/2" into veneer with at least 5/8" mortar cover to the outside face. Contractor shall provide anchor ties in extended lengths to meet min. embedment requirement for each varying wall cavity depth. At areas where stacked bond veneer is indicated, add one (1) cont. horizontal hot-dip galvanized No. 9 wire at 16" o.c. vertically in bed joints. Break reinf. at all vertical expansion and movement joints in brick veneer."

Change 40 Sheet A6.1: Keynote 102A **APPENDED** as follows: "Embed ties a minimum of 1 1/2" into veneer with at least 5/8" mortar cover to the outside face. Contractor shall provide anchor ties in extended lengths to meet min. embedment requirement for each varying wall cavity depth. At areas where stacked bond veneer is indicated, add one (1) cont. horizontal hot-dip galvanized No. 9 wire at 16" o.c. vertically in bed joints. Break reinf. at all vertical expansion and movement joints in brick veneer."

Change 41 Dwg. 7/A6.4: **ADDED** brick head-of-wall cell vents in glazed brick veneer at 16" o.c. at 139'-0" and 146'-8" elevations.

Change 42 Dwg. 1/A6.18: Structural steel brace in wall section detail **REVISE** (from cont. horizontal HSS) to vertical HSS w/ stiffener plate spaced below deck edge; to match 7/S2.10.

Change 43 Dwg. 8/A7.2: **REVISE** jamb wall construction at elevator door to CMU wall type. (ASK-05 **ISSUED**)

Change 44 Sheet A9.1, Partition Note #12: **DELETE** text "2/A9.1"; **REPLACE WITH** text "9/A9.2".

Change 45 Sheet A9.2: **ADD** Typical High-Strength Wall Corner Detail 9/A9.2. (ASK-07 **ISSUED**)

Change 46 Sheet A10.1; SOLID SURFACE COUNTERTOPS General Note: **REVISE** Basis of Design (from Design Aristech Acrylics "Avonite Malt") to Corian "Vanilla".

Change 47 Sheet A10.1: PLASTIC LAMINATE SCHEDULE Casework General Note: **REVISE** Basis of Design (from Formica 7813-8 (Cardboard Solidz)) to Formica 961-C "Fog" Microdot Finish.

Change 48 Sheet A10.1: PLASTIC LAMINATE SCHEDULE Countertops, edges and splashes General Note: **REVISE** Basis of Design (from Formica 7018-58 (Navy Grafix)) to Formica 8824-58 (White Drops) Matte Finish.

Change 49 Dwgs 4 and 8/A10.1: **DELETE** text "Wood Blocking w/ Toggle bolts (top-bottom)". **REPLACE WITH** text "Contractor shall provide fire-treated blocking in-wall at all casework anchor locations. Contractor shall coordinate anchorage and resultant loading with framing installer to ensure partition assembly meets performance criteria."

Change 50 **ADD** Dwg 16/A10.2 Detail at Interior Storefront Door Headers. (ASK-08 **ISSUED**.)

Change 51 Dwg 5/A10.2 Detail at Vestibule Door Headers. **REVISED** detail notation. (ASK-09 **ISSUED**.)

Change 52 **REMOVE** Sheet A12.0 dated 06.02.2017 in its entirety and **REPLACE WITH** A12.0 dated 06.21.2017.

Change 53 **REMOVE** Sheet A12.1 dated 06.02.2017 in its entirety and **REPLACE WITH** A12.1 dated 06.21.2017.

Change 54 Sheet A13.0A: FLOOR FINISHES schedule, CPT-1: **DELETE** description, **REPLACE WITH** the following text "Manufacturer: Shaw; Collection: Altered; 30% CPT-1A- Style: Distort #5T127, Color: Sight #26515; 30% CPT-1B- Style: Manipulate #5T130, Color: Interrupt #26505; 20% CPT-1C- Style: Glitch #5T128, Color: Interrupt #26505; Collection: Color Frame and Color Form; 20% CPT-1D- Style: Color Form #5T112, Color: Frolic #81284".

Change 55 Sheet A13.0A: FLOOR FINISHES schedule, CPT-2: **DELETE** description, **REPLACE WITH** the following text "Manufacturer: Shaw; Collection: Altered; 30% CPT-2A- Style: Distort #5T127, Color: Sight #26515; 30% CPT-2B- Style: Manipulate #5T130, Color: Sight #26515; 20% CPT-2C- Style: Glitch #5T128, Color: Sight #26515; Collection: Color Frame and Color Form; 20% CPT-2D- Style: Color Form #5T112, Color: Hyper Blue #81436".

Change 56 Sheet A13.0A: FLOOR FINISHES schedule: **ADD** to VT-1, Color 'A' entry "IQ Granit #417 Dahlia – Accent (in Dining Room only)".

Change 57 Sheet A13.0A: FLOOR FINISHES schedule: **ADD** to VT-3, Color 'A' entry "IQ Granit #426 Acadia – Accent (in Art Rooms only)".

Change 58 Sheet A13.0A: FLOOR FINISHES schedule: **ADD** to VT-4, Color 'A' entry "IQ Granit #405 Vine – Accent (in Music Room only)".

Structural

Change 59 Sheet S0.1: **MODIFY** all instances of the Geotechnical Report date found on this drawing sheet (from May 19, 2017) to "June 22, 2017".

Change 60 Sheet S0.1: **DELETE** General Foundation Note #9.

Change 61 Sheet S0.1: **DELETE** Excavation Notes #2 and #3.

Change 62 Sheet S0.1: **APPEND** Excavation Note #4 with the following text: "Contractor shall provide all excavation and earth retention system design, engineering and installation as part of their base bid work."

Change 63 Sheet S0.1: **ADDED** note to Non-bearing Lintel Schedule: "Add full depth continuous 1/4" stl. plate to multi-angle lintels (as shown in arch.)"

Change 64 Sheet S1.1A; boxed structural slab note; **REMOVE** text "OVER A 6" LAYER OF COMPACTED GRANULAR FILL, 15 MIL VAPOR BARRIER AND ½" STRUCTURAL STYROFOAM." and **REPLACE WITH** text "ON 15 MIL VAPOR BARRIER AND 1/2" STRUCTURAL STYROFOAM OVER A 6" LAYER OF COMPACTED GRANULAR FILL.".

Change 65 Sheet S1.1B: **REMOVE** slab-on-grade note in trash enclosure area; **REPLACE WITH** note reading "SLAB-ON-GRADE (SEE CIVIL)"; **ADDED** note/reference to new detail 15/S2.2. (**ISSUED** SSK-13)

Change 66 Sheet S1.1B; boxed structural slab note; **REMOVE** text "OVER A 6" LAYER OF COMPACTED GRANULAR FILL, 15 MIL VAPOR BARRIER AND ½" STRUCTURAL STYROFOAM." and **REPLACE WITH** text "ON 15 MIL VAPOR BARRIER AND 1/2" STRUCTURAL STYROFOAM OVER A 6" LAYER OF COMPACTED GRANULAR FILL.".

Change 67 Sheet S1.3A: New detail 8/S2.10 **ISSUED** (as SSK-05). Partial plan SSK-01 **ISSUED** to show detail location on sheet S1.3A.

Change 68 Sheet S1.3A: New detail 10/S2.10 **ISSUED** (as SSK-07). Partial plan SSK-03 **ISSUED** to show detail location on sheet S1.3A.

Change 69 Sheet S1.4A: New detail 9/S2.10 **ISSUED** (as SSK-06). Partial plan SSK-02 **ISSUED** to show detail locations in plan.

Change 70 **REMOVE** Sheet S1.5A dated 06.02.2017 in its entirety and **REPLACE WITH** S1.5A dated 06.15.2017.

Change 71 Sheet 1.6A: **REVISE** top of stl. elevation of HSS braces between E-line and E.2-line (from +159'-10") to +159'-3".

Change 72 Dwg. 1/S2.1: **REMOVE** subgrade note; **REPLACE WITH** note reading "SUBGRADE- MIN. 6" LAYER OF COMPACTED GRANULAR FILL, SUBJECT TO THE REQUIREMENTS OF THE GEOTECH REPORT, TYP.".

Change 73 Dwg. 6/S2.2: **REMOVED/REPLACE WITH** SSK-08 (Concrete curb profile reconfigured.)

Change 74 Dwg. 7/S2.2: **REMOVED/REPLACE WITH** SSK-09 (Concrete curb profile reconfigured.)

Change 75 Dwg. 8/S2.2: **REMOVED/REPLACE WITH** SSK-10 (Concrete curb profile reconfigured.)

Change 76 Dwg. 9/S2.2: **REVISE** 7 1/2" curb dimension to 8 1/8".

Change 77 Dwg. 10/S2.2: **REMOVED/REPLACE WITH** SSK-15 (Slab-on-grade, subgrade notes revised.)

Change 78 Sheet S2.2: **DELETE** drawing 12/S2.2.

Change 79 Sheet S2.2: **DELETE** drawing 13/S2.2.

Change 80 Sheet S2.2: **DELETE** drawing 14/S2.2.

Change 81 Sheet S2.2: **ADDED** new detail 15/S2.2 (footing at utility ductbank interference). (**ISSUED** as SSK-14)

Change 82 Dwg. 6/S2.3: **REVISE** B. pile cap elevation (from +96'-0") to +95'-0".

Change 83 Dwg. 3/S2.6: **REVISE** 9 7/8" dimension to 9 1/4".

Change 84 Dwg. 4/S2.6: **REVISE** 9 7/8" dimension to 9 1/4".

Change 85 Dwg. 6/S2.6: **REVISE** 1'-3 7/8" dimension to 1'-3 1/4".

Change 86 Dwg. 7/S2.6: **REVISE** 1'-3 7/8" dimension to 1'-3 1/4".

Change 87 Dwg. 8/S2.6: **REVISE** 1'-3 7/8" dimension to 1'-3 1/4".

Change 88 Dwg. 11/S2.6: **REVISE** 9 7/8" dimension to 9 1/4".

Change 89 Dwg. 12/S2.6: **REVISE** 9 7/8" dimension to 9 1/4".

Change 90 Dwg. 11/S2.7: **REVISE** elevation of HSS braces to T.Stl. = +159'-3".

Change 91 Dwg. 1/S2.10: **DELETE** text of 2'-4" dimension; **REPLACE WITH** text "SEE ARCH".

Change 92 Dwg. 3/S2.10: **REMOVED/REPLACE WITH** SSK-11 (Location of HSS members shifted.)

Change 93 Sheet S2.10: **ADDED** missing composite deck transition detail 11/S2.10 (as SSK-12).

Change 94 Sheet S2.10: **ADDED** deck transition detail 12/S2.10 (**ISSUED** as SSK-16), referenced on revised S1.5A.

Change 95 Sheet S2.10: **ADDED** deck transition detail 13/S2.10 (**ISSUED** as SSK-17), referenced on revised S1.5A.

Change 96 New detail 7/S2.10 **ISSUED** (as SSK-04). Detail applies to continuous window sill at A-line between 4- and 6.7-lines on second floor.

Change 97 Dwg. A/S3.5: **REVISE** T. stl. elevation of HSS braces between E-line and E.2-line (from +159'-10") to +159'-3".

Change 98 Dwg B/S5.1: **ADD** two (2) 'L3' lintels at masonry openings between gridlines 5.8 and 3 at 4th floor.

Plumbing

Change 99 Sheet P2.1A: Partial plan **ISSUED** (as PSK-1) to revise plumbing routing around elevator machine room.

Change 100 Sheet P2.2A: Partial plan **ISSUED** (as PSK-2) to revise plumbing routing around elevator machine room.

Change 101 **DELETE** dwg. 16/P6.01 "UNDERGROUND PIPING SUPPORT DETAIL".

Mechanical

Change 102 Sheet M4.1: Partial diagram **ISSUED** (as MSK-1) revising supply and return line sizing at boiler diagrams.

Change 103 Sheet 3.2. **REMOVE** note "TO 1750 CFM, TYPE I KITCHEN HOOD BY OTHERS" and **REPLACE WITH** "TO 1750 CFM TYPE II KITCHEN HOOD". **REMOVE** note "BLACK IRON KITCHEN GREASE EXHAUST DUCT" and **REPLACE WITH** "KITCHEN EXHAUST DUCT SHALL MEET SPEC. SECTION 23 31 13 -3.1.B REQURIEMENTS. PROVIDE 2-HR FIRE_RATED WRAP TO ROOF EXHAUST".

Electrical

Change 104 Sheet E0.1: **REMOVE** power keynote 6 and **REPLACE WITH** 'Coordinate exact location, scope work, demolition work with respective utility company. Route conduits to new ATT and Comcast pole per drawing C4.0 and coordinate in full with all adjacent work. Provide RGS conduits surface mounted to and up pole and terminate 2 feet above grade for final utility company infrastructure tie-in.'

Change 105 Sheet E0.0: **ADDED** new symbol for wall-mounted WP vacancy sensor (**ISSUED** ESK-1.)

Change 106 Sheet E1.1A: Receptacle **ADDED** to elevator shaft for sump pump. Disconnect w/ J-box **DELETED** from elevator shaft. Telephone outlet **DELETED** from elevator shaft. Note **ADDED** clarifying location of camera in elevator cab. J-box **ADDED** to machine room for camera. Elevator machine room equipment layout **REVISED**. (ESK-2 **ISSUED**)

Change 107 Sheet E1.6A: Lightning protection configuration **REVISED** for Rooftop Playground #401, Chiller Well #432 and chiller equipment within well. (ESK-3 **ISSUED**)

Change 108 Sheet E2.4A: Guards **ADDED** to all lighting fixtures and electrical devices in enclosed playground area. (2) wall-mounted WP vacancy sensors **ADDED** to Rooftop Playground #401. (2) wall-mounted WP vacancy sensors **ADDED** to Chiller Well #432. (ESK-4 **ISSUED**).

Change 109 Sheet E2.1B: **ADD** a vacancy sensor to Pull-In Room 124 & 134.

Change 110 Sheet E2.2B: **ADD** a vacancy sensor to Pull-In Room 215 & 224.

Change 111 Sheet E2.3B: **ADD** a vacancy sensor to Pull-In Room 309 & 318.

Change 112 Sheet E2.4B: **ADD** a vacancy sensor to Pull-In Room 413 & 420.

Change 113 Sheet E4.01: Errant symbol in Elevator Machine Room has been **REVISED** to show Heat Detector. **ADD** notation under FIRE ALARM SYSTEM GENERAL NOTES: '18: REFER TO DRAWING 9/E6.02 FOR ELEVATOR FIRE PROTECTION CONTROL SCHEMATIC.'

Change 114 Dwg 3/E4.02 **ADD** switch LS-C to Lighting Control Riser Diagram. **REVISED** Lighting Control System General Notes and Lighting Controller Notes. (ESK-9 **ISSUED**).

Change 115 Sheet E5.00: Elevator pit pump EPP-1 power connection has been **REVISE** (from hardwired) to plug-type. (ESK-5 **ISSUED**)

Change 116 Dwg. 9/E6.02: **DELETE** Keynote #1. Heat Detector **MOVED** (from elevator shaft) to elevator machine room. (ESK-6 **ISSUED**)

Change 117 Dwg. 2/E6.03: **REVISED** Multi-Scene Lighting Controls Stations. (ESK-7 **ISSUED**)

Change 118 Dwg. 3/E6.03: Kitchen WI Cooler / WI Freezer circuit interface **ADDED**. (ESK-10 **ISSUED**)

Change 119 Dwg. 4/E6.03: Typical FAS Duct Smoke Detector Interface **ADDED**. (ESK-11 **ISSUED**)Dwg. 1/E6.04: Plug-type connection w/ mounting height **ADDED** for Elevator pit sump pump EPP-1. Light fixture types **REVISED** for elevator pit and machine room lights. (ESK-8 **ISSUED**)

ITEM NO. 6: REQUESTS FOR INFORMATION

RFI-1.

Question: **We specialize in building enclosure commissioning and testing services. We actually have worked on a variety of PBC projects in the past most significantly we performed BECx for the Albany Park Branch Library. I am curious to know if the PBC is entertaining BECx (Building Enclosure Commissioning) and would the PBC potentially be issuing a separate BID / RFP for Commissioning Services for these two projects? Not to go into great detail here, but we would be interested in discussing with you / PBC our services and to see if we can support in any manner on these projects.**

Response: The Commissioning Agent will be procured and managed by CPS. The Contractor will coordinate all activities with the Commissioning Agent to ensure compliance with the Contract Documents.

RFI-2.

Question: **Is there a specification for the Area of Rescue System noted on this project?**

Response: There is no two-way voice communication system serving the areas of refuge in the building design, and therefore there is no such equipment specification for the project.

RFI-3.

Question: **The drawings S1.1A, S1.1B and the geotech report dated May 19th, 2017, indicate the use of H-Pile 10x42. I went through the provided documents, and could not find any specifications regarding the installation of the H-pile. I see the capacity of the piles on the drawings, and I see some information in Ground Engineering Consultants report, but I would like to have information on the following:**

- **load testing specifications**
- **number of load tests, there are a total of 208 piles in 1, 2, and 3 pile groups**
- **HP splice requirements**
- **pile shoe requirements**

Response: Refer to the following locations for more information on the requested items:

- Load Testing Specifications - Refer to Pile Foundation Notes #4 and #5 (Sheet S0.1);
- Number of Load Tests - Refer to Pile Foundation Notes #4 and #5 (Sheet S0.1) & Specification Section 31 62 16 - 3.2C;
- Splice Requirements - Refer to Pile Foundation Note #7 (Sheet S0.1) & Specification Sec.31 62 16 - 2.2;
- Pile Shoe Requirements - Refer to Specification Section 31 62 16 - 2.2.

RFI-4.

Question: **Please confirm that the Earth Retention System is to be included in this bid and is not by the separate Demolition Contractor. The ERS drawings are stamped For Reference Only and are bundled together in the electronic version with the documents for the separate Demolition contract which are also stamped For Reference Only. Additionally, there are no ERS Specifications in the Specification manuals.**

Response: Bid should include Earth Retention System, including but not limited to design, engineering, permit securement and installation. For Reference Only ERS/ERX drawings included in bid package represent a preliminary design submitted to OUC, for use by the contractor as part of the contractor's responsibility to obtain permit approval. No Earth Retention System specification has been issued for this project, as the ERS is delegated to the contractor for design, engineering, permitting and construction.

RFI-5.

Question: **We are respectfully requesting a bid extension for the South Loop New School. Please review our request and let me know if this will be granted.**

Response: PBC does not expect to extend the Bid Due Date for this Project as PBC anticipates awarding this Project at our July Board of Commissioners Meeting.

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List of Attachments and Drawings:
(Available at BHFX's Online Planroom: https://www.bhfxplanroom.com/)

This Addendum includes the following attached Specifications and/or Documents:

1. Section 00 03 00 INFORMATION AVAILABLE TO BIDDERS, Attachment A: Geotechnical Report, *Ground Engineering Consultants, Subsurface Exploration and Geotechnical Engineering Report for Proposed CPS South Loop Elementary School at 19 West 16th Street, Chicago*, dated 06.22.2017.
2. Section 08 71 00 – HARDWARE, dated 06/21/2017 (Rev. E)
3. Section 21 05 00 – COMMON WORK RESULTS FOR FIRE SUPPRESSION, dated 06/21/2017 (Rev. E)
4. Section 21 10 00 – WATER BASED FIRE SUPPRESSION SYSTEMS, dated 06/21/2017 (Rev. E)
5. Section 21 11 00 – FACILITY FIRE-SUPPRESSION PIPING, dated 06/21/2017 (Rev. E)
6. Section 21 31 13 – ELECTRIC-DRIVE CENTRIFUGAL FIRE PUMPS, dated 06/21/2017 (Rev. E)
7. Section 26 05 43 – UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS, dated 06/21/2017 (Rev. A)
8. Section 32 93 11 – PLANTINGS, dated 06/21/2017 (Rev. D)

This Addendum includes the following attached General Drawing:

9. G5.1 PHASING PLAN, dated 6/21/2017

This Addendum includes the following attached Survey Drawings:

10. DSV-1 SITE DEMOLITION SURVEY (SITE FEATURES), dated 6/21/2017
11. DSV-2 SITE DEMOLITION SURVEY (SITE GRADES), dated 6/21/2017

This Addendum includes the following attached Excavation Drawings:

12. ERS/EX-1 EXCAVATION PLAN, on white paper, dated 6/21/2017
13. ERS/EX-2 EXCAVATION SECTIONS, on white paper, dated 6/21/2017
14. ERS/EX-3 EXCAVATION SECTIONS, on white paper, dated 6/21/2017

This Addendum includes the following attached Civil Drawings:

15. C.01 SITE EROSION AND SEDIMENTATION CONTROL PLAN, dated 6/21/2017
16. C1.0 SITE DEMOLITION PLAN, dated 6/21/2017
17. C2.0 SITE DIMENSION PLAN, dated 6/21/2017
18. CSK-1 REVISED EXCERPT from C3.0 - SITE GRADING PLAN, dated 6/21/2017
19. CSK-2 REVISED EXCERPT from C3.1 - DETAILED GRADING PLAN, dated 6/21/2017
20. CSK-3 REVISED EXCERPT from C4.0 - SITE UTILITY PLAN, dated 6/21/2017
21. C5.0 - SITE DETAILS, dated 6/22/2017
22. C5.1 - SITE DETAILS, dated 6/21/2017
23. C5.3 - UTILITY DETAILS, dated 6/21/2017

This Addendum includes the following attached Environmental Drawings:

24. RD2.0 REMEDIATION EXCAVATION PLAN, dated 6/19/2017

This Addendum includes the following attached Landscape Drawings:

25. L3.0 LANDSCAPE DETAILS, dated 6/21/2017
26. L3.1 PLANTER DETAILS, dated 6/21/2017
27. L3.2 SITE FURNITURE DETAILS, dated 6/21/2017
28. L3.3 FENCING DETAILS, dated 6/21/2017

This Addendum includes the following attached Architectural Drawings:

29. ASK-01 REVISED EXCERPT from PARTIAL FIRST FLOOR PLAN – NORTH, dated 6/15/2017
30. ASK-02 REVISED EXCERPT from PARTIAL SECOND FLOOR PLAN – NORTH, dated 6/15/2017
31. ASK-03 REVISED EXCERPT from PARTIAL THIRD FLOOR PLAN – NORTH, dated 6/15/2017
32. ASK-04 REVISED EXCERPT from PARTIAL FOURTH FLOOR PLAN – NORTH, dated 6/15/2017

33. ASK-05 (REVISED) 8/A7.2 PARTIAL ELEVATOR PLAN, dated 6/15/2017
34. ASK-06 REVISED EXCERPT from A1.1B (updated locker counts), dated 6/15/2017
35. ASK-07 (NEW) 9/A9.2 TYP. HIGH-STRENGTH WALL CORNER, dated 6/15/2017
36. ASK-08 (NEW) 16/A10.2 HEAD DTL at PULL-IN CR STOREFRONT, dated 6/15/2017
37. ASK-09 (REVISED) 5/A10.2 DETAIL at VESTIBULE DOOR HEADERS, dated 6/15/2017
38. A12.0 OPENING SCHEDULE, dated 6/21/2017
39. A12.1 OPENING SCHEDULE + DETAILS, dated 6/21/2017

This Addendum includes the following attached Structural Drawings:

40. SSK-1 REVISED EXCERPT from S1.3A PARTIAL SECOND FLOOR FRAMING PLAN – NORTH, dated 6/15/2017
41. SSK-2 REVISED EXCERPT from S1.4A PARTIAL THIRD FLOOR FRAMING PLAN – NORTH, dated 6/15/2017
42. SSK-3 REVISED EXCERPT from S1.3A PARTIAL SECOND FLOOR FRAMING PLAN – NORTH, dated 6/15/2017
43. SSK-4 7/S2.10 TYP. WALL BRACING DETAIL AT PERPENDICULAR FLOOR FRAMING, dated 6/15/2017
44. SSK-5 8/S2.10 TYPICAL SHELF ANGLE DETAIL AT VESTIBULE, dated 6/15/2017
45. SSK-6 9/S2.10 TYP. SHELF ANGLE/LINTEL DETAIL AT ATRIUM SPANDREL ON THIRD FLR. , dated 6/15/2017
46. SSK-7 10/S2.10 TYPICAL EXTERIOR WALL WITH CMU BACKUP, dated 6/21/2017
47. SSK-8 (REVISED) 6/S2.2 TYP. FOUNDATION SECTION AT LT.GA. EXTERIOR WALL AT PLANTER, dated 6/15/2017
48. SSK-9 (REVISED) 7/S2.2 TYP. FOUNDATION SECTION AT WINDOW WALL SYSTEM AT LINE '2', dated 6/15/2017
49. SSK-10 (REVISED) 8/S2.2 TYP. FN'DN SECTION AT WINDOW WALL SYSTEM NORTH OF LINE '2', dated 6/15/2017
50. SSK-11 (REVISED) 3/S2.10 TYP. SHELF ANGLE/LINTEL DETAIL AT ATRIUM SPANDREL, dated 6/21/2017
51. SSK-12 (REVISED) 11/S2.10 STEEL FRAMING DETAIL, dated 6/21/2017
52. SSK-13 REVISED EXCERPT from S1.31B PARTIAL FIRST FLOOR FOUNDATION PLAN – SOUTH, dated 6/21/2017
53. SSK-14 15/S2.2 TYPICAL FOOTING DETAIL AT UTILITY INTERFACE, dated 6/21/2017
54. SSK-15 (REVISED) 10/S2.2 TYP. SECTION THRU WASTE/TRANSFORMER ENCLOSURE SCREEN WALL, dated 6/21/2017
55. SSK-16 12/S2.10 TYP. LOW ROOF SECTION AT PARALLEL COMPOSITE JOIST FRAMING, dated 6/21/2017
56. SSK-17 13/S2.10 TYP. LOW ROOF SECTION AT PERPENDICULAR COMPOSITE JOIST FRAMING, dated 6/21/2017
57. S1.5A PARTIAL 4TH FLOOR FRAMING PLAN NORTH, dated 6/15/2017

This Addendum includes the following attached Mechanical Drawings:

58. MSK-1 REVISED EXCERPT from M4.1 MECHANICAL SYSTEM DIAGRAMS – PIPING, dated 6/15/2017

This Addendum includes the following attached Plumbing Drawings:

59. PSK-1 REVISED EXCERPT from P2.1A PARTIAL FIRST FLOOR PLUMBING PLAN – NORTH, dated 6/15/2017
60. PSK-2 REVISED EXCERPT from P2.2A PARTIAL SECOND FLOOR PLUMBING PLAN – NORTH, dated 6/15/2017

This Addendum includes the following attached Electrical Drawings:

61. ESK-1 REVISED EXCERPT from E0.0 ELECTRICAL SYMBOLS, NOTES & ABREVIATIONS, dated 6/15/2017
62. ESK-2 REVISED EXCERPT from E1.1A PARTIAL FIRST FLOOR PLAN – POWER NORTH, dated 6/15/2017
63. ESK-3 REVISED EXCERPT from E1.6A PARTIAL ROOF PLAN – LIGHTNING PROTECTION NORTH, dated 6/15/2017
64. ESK-4 REVISED EXCERPT from E2.4A PARTIAL FOURTH FLOOR PLAN – LIGHTING NORTH, dated 6/15/2017
65. ESK-5 REVISED EXCERPT from E5.00 ELECTRICAL SCHEDULES – POWERED EQUIPMENT, dated 6/15/2017
66. ESK-6 (REVISED) 9/E6.02 ELEVATOR FIRE PROTECTION CONTROL SCHEMATIC, dated 6/15/2017
67. ESK-7 (REVISED) 2/E6.03 MULTI-SCENE LIGHTING CONTROL STATIONS, dated 6/15/2017
68. ESK-8 (REVISED) 1/E6.04 CBC ELEVATOR ANCILLARY POWER/CONTROL WIRING DIAGRAM, dated 6/15/2017
69. ESK-9 (REVISED) 3/E4.02 LIGHTING CONTROL RISER DIAGRAM, dated 6/15/2017
70. ESK-10 3/E6.03 KITCHEN W.I. COOLER-W.I. FREEZER CIRCUIT INTERFACE, dated 6/15/2017
    ESK-11 4/E6.03 TYPICAL FAS DUCT-SMOKE-DETECTORS INTERFACE, dated 6/15/2017

END OF ADDENDUM NO. 01

GROUND ENGINEERING CONSULTANTS, INC.

350 PFINGSTEN ROAD, SUITE 106
NORTHBROOK, ILLINOIS 60062
TELEPHONE: 847-559-0085
FAX: 847-559-0181

June 22, 2017

Ms Molly Kinsella AIA
SMNG-A Architects Ltd.
943 West Superior Street
Chicago, IL 60642

SUBJECT: *Subsurface Exploration and Geotechnical Engineering Report for Proposed CPS South Loop Elementary School at 19 West 16th Street, Chicago*

Dear Ms. Kinsella,

We had submitted our geotechnical report for the Project on March 15, 2017. Since then, various comments have been received from the City Building Department and various site conditions have neen discovered from the ongoing demolition work. We were asked to submit a revised geotechnical report addressing the City comments and geotechnical recommendation considering the discovered site conditions. This report includes our revised recommendations.

As per your authorization, our initial subsurface exploration consisted of 10 soil borings extending to depths of 71 ft to 81 ft. below grade. Subsequently, 4 shallow borings were made for obtaining soil samples for corrosion testing. Approximate locations of the borings are shown on the enclosed location diagram. This letter report presents the results of this exploration and our recommendations for the design of foundations and floor slab support for the proposed school building.

Subsurface Exploration Procedures

The soil borings were performed by our subcontractor, Strata Earth Services, Inc. A truck mounted power auger type drilling rig equipped with an automatic sampling hammer was used for the drilling and sampling at 5 borings located outside existing buildings. The other 5 borings were located inside existing buildings and these were drilled with a skid mounted drill rig which is also equipped with an automatic sampling hammer.

Soil samples were obtained by the split barrel sampling procedure in accordance with ASTM specifications D -1586. In this procedure the number of blows required to drive a

heavy walled split barrel sampler, 2 inch OD, 1.375 inch ID, 2 ft. long, by a 140 pound hammer are recorded. The sum of the resistance values for 12 inch of penetration after an initial 6 inch penetration is called the standard penetration resistance (SPT or N) value. This value gives an indication of the relative density of granular soils in place. To some extent it can also be used to estimate the consistency of cohesive soils. The soil samples so obtained were classified by the drill crew and then placed in sealed glass jars for further examination and testing in the laboratory.

At one boring number B-2, in-situ vane shear tests were performed at depths of 20 ft. and 25 ft. in soft clay stratum to measure shear strength of undisturbed soil.

Water level readings were also taken in the boreholes at the time of drilling. On completion of the drilling the boreholes were grouted and surface restored.

Water infiltration tests were performed at 2 locations labelled P-1 and P-2 in the southern area. Results of these tests are enclosed.

The later shallow borings for corrosion testing wer performed by Chicago Drilling Company. Soil samples were obtained by pushing plastic lined tube by GeoProbe.

Laboratory Testing

In the laboratory each of the soil samples was tested for its natural moisture content. The cohesive soils were tested for their unconfined compressive strength by using a calibrated hand penetrometer. Each of the soil samples was examined by an experienced soil engineer and classified according to the Unified Soil Classification System. The group symbol according to this method of classification is shown in parentheses following the textural description of the soil on the boring logs. Based on a review of the test data and the examination of the soils, the soils are grouped into various strata as shown on the boring logs. However, the demarcation lines should be considered approximate because in situ the transition between the soil types is more gradual.

Corrosion tests were performed on 4 soil samples from fill soils obtained by pushing Geoprobe to depths of 10 ft at 3 locations and to 2 ft. depth at one location where refusal was met. Locations of these borings are included in the Appendix. Corrosion tests were perfomed on representative samples by Terracon Consultants. Results of the tests are included in the Appendix. Tests show that soils are non corrosive.

Soil Conditions

The soil conditions encountered at each of the borings are shown on the enclosed boring logs. Ground surface at the site was generally level with a relief of about 1 ft. Elevations relative to Chicago City Datum (CCD) are shown on the logs. Average soil conditions may be described in terms of the following strata. Generalized profile is plotted on the enclosed sheets.

1. Fill

The near surface material consisted of concrete at the borings inside existing buildings and asphaltic concrete in paved areas at the outside borings. Underneath these materials are variable fill soils consisting of silty clay, stone , sand and a trace of brick and gravel extending to depths of 4 ft. to 10.5 ft. The fill is in a loose to medium dense condition.

2. Silt and fine sand

Below the fill the borings encountered variable thick layers of silt, clayey silt and silty fine sand to depths of about 18 ft. to 23 ft. below grade. These soils are mostly in a loose condition. Petroleum odor was noted in the samples at borings B-3 to B-7 in these strata.

3. Soft Silty Clay

Below the silt and sand layers the borings encountered soft to very soft silty clay or loose clayey silt to depths of 33 ft. to 43 ft. below grade. Some samples had inclusions of peat and organic soil. Relatively high moisture contents are noted in the zone from 20 ft. to 43 ft. At several borings pentration resistance for sampling was zero (weight of hammer). This zone is thinner at the southern area borings.

4. Sand

Below the soft clay, borings B-1A to B-5 located in the northern area encontered silty sand or fine sand to depths of 42 ft. to 50 ft. followed by coarse sand to depths of 58 ft. to 64.5 ft. The sand is in a medium dense condition. No sand was encountered in the southern area borings B-6 to B-10. In the latter borings, stiff to very stiff silty clay was encountered in this zone. At boring B-9 lenses of peat were encountered in the samples from 40 ft. to 50 ft.

5. Very Stiff to Hard Silty Clay or Clayey Silt

The above described soils are underlain by very stiff to hard silty clay or clayey silt to depths of 71 ft. to 74 ft. below grade. Five borings terminated in this stratum.This is the stratum called Hardpan in Chicago area. This layer is thin and moisture contents are high.

6. Weathered Limestone, Sand and Gravel

At five borings B-1A, B-2, B-3 B-8 and B-10 which were extended to refusal, sand, gravel and weathered limestone were encountered at depths of 75.25 ft. to 78 ft. The driller drilled with rock bit to refusal on solid bedrock which was encountered at depths of 75.25 ft. to 78 ft. below grade.

For the actual conditions of the soil please refer to the boring logs.

Water Table Conditions

Ground water was encountered at a depth of 8 ft. to 15 ft. below grade. Drilling mud was used to maintain stability of the boreholes and this masks ground water level. The boreholes were grouted after the borings and time was not available for long term monitoring of the water table. Based on a change in the color of soils from brown to gray it is estimated that water table had been at a depth of 10 ft. or more. Seasonal fluctuations in the water table should be anticipated.

Analysis and Recommendation

It is our understanding that the proposed structure will be 4 stories in height with slab on grade. The building will have steel framing. Estimated column loads are in the range of 300 to 400 kips.

Soil conditions are not suitable for support of the building on spread footing type foundations. Deep foundations are necessary for support of the building. Feasible foundations are driven piles and rock bearing straight shaft drilled shafts. These are discussed below.

Pile Foundations

Based on soil conditions we recommend Steel H piles driven to the criteria specified in the City Building Code. The driving criteria will be provided after the selected contractor has provided details of his selected pile driving hammer. We estimate that pile tips will be on or close to rock. Calculations for estimate of pile depth by static analysis are included in the Appendix.

For piles driven to rock, available capacity will depend on steel area of the pile. Chicago Building Code allows compressive stress of 35% of yield strength of steel. We recommend minimum HP 10x42 piles. A maximum allowable load of 110 tons for 50 ksi steel can be considered for this pile. As mentioned under Laboratory Testing, corrosion tests were performed on 4 representative samples from Fill soils and these are found to be non-corrosive. Hence, it is not necessary to allow for sacrificial steel area for pile design capacity.

A group of 3 piles will be required at each column unless the pile caps are tied by grade beams.. Pile spacing should be 3 times pile diameter. New City Foundation Memorandum requires pile load test for pile capacity of 100 tons for piles driven to rock and 60 tons for piles in soil.

Exterior footings or pile caps and footings in non-heated areas should be located at 3.5 ft. below adjacent grade for protection against frost.

For foundations supported on piles we estimate settlement of 1/2 inch and differential

settlement of 0.25 inch.

Drilled Shaft Foundations

We recommend straignt shaft drilled shaft foundations bearing on surface of sound rock. Drilling mud will be required for stability of the drilled shaft during drilling. A short temporary steel casing is required at the top in fill soils. After the drilling is completed and weathered rock is removed, concrete is placed by the tremie method.

For drilled shafts bearing on rock without coring into rock we recommend a design bearing pressure of 100 kips per square foot. Drilled shaft diameter should be at least 2.5 feet..

We estimate settlement of less than 0.5 inch and differential settlement of less than 0.25 inch for drilled shaft foundations.

Resistance to Lateral Loads

Resistance to lateral loads will be available from passive pressure on piles or drilled shafts. We give below parameters for analysis of lateral load on piles or drilled shafts by soil structure interaction software.

0 to 8 ft. No resistance in fill soils.
8 ft. to 47 ft. Linearly increasing subgrade modulus of 2 tons per cubic ft./ft. depth.
47 ft. to 56 ft. Linearly increasing subgrade modulus of 14 tons per cubic ft./ft. depth.
Below 58 ft to rock level. Constant subgrade modulus of 300 ton per cubic foot.

Floor Slab

Due to existence of deep loose fill and thick strata of loose to very loose soil below the fill, and excavations for removal of old pile caps and other buried structures at many and random locations, floor slab on grade will be subject to more than normal total and differential settlement. We recommend structural support for the floor slab.

Since the slab will be structurally supported it is not necessary to over cut and provide compacted soil support. Any site preparation for contractor's operation should be at his discretion. However, to minimize the occurrence of a void under the slab we recommend that bakfill in overcut areas should be with crushed stone CA-6 or CA-7 gradation,placed in 9 inch loose lifts and rolled once in each direction by the excavator working in the area. No other compaction control is necessary. Th prevent concrete adhering to the stone, a rigid stryrofoam board and vapor barrier may be placed on the subgrade below the slab.

Support for Utilities

There will be some utilities below the structurally supported slab. In order to minimize their settlement we recommend that excavations made for whatever reasons be backfilled

with suitable material and compacted in place. Replacement of the cut and overcut, if required, should be with crushed stone meeting IDOT gradation CA-7 or CA-6 depending on the soil below. The former is recommended if soils are soft or wet. If soils are very soft CA-1 or CA-3 gradation is preferred. Light weight fill is preferred. However it has some environmental concerns We therefore recommend use of regular crushed stone backfill. The new fill should be placed in 8 inch loose layers and each lift compacted to 90% of Modified Proctor maximum density. This treatment should provide suitable support for utilities and minimize differential settlement.

Water Infiltration Tests

Results of percolation tests show large infiltration in the first few minutes due to flow into porous fill materials and very low infiltration after 15 minutes varying from zero at P-1 to 0.005 inches per minute at P-2.

Support of Small Outdoor Structures

Small outdoor structures can be supported on spread footings. We recommend over cut of 2 ft. below the design base of the footing and replacing with crushed stone CA-6 or CA-7 in 8 inch layers and compacting each layer to 95% of Modified Proctor maximum density. The zone of over cut must extend 1 ft. beyond the edges of the footing. Base of outdoor footings should be at 3.5 ft. below finished grade for protection against frost. We recommend design bearing pressure of 2,000 psf for footings on compacted fill. Strip footings should be at least 24 inch wide.

At storm detention structure we recommend over cut of 2 ft. and replacement with compacted stone placed in 8 inch layers and compacted as described above. Similar treatment is recommended at landscape planters and planter foundations.

Design of Pavements

Subgrade preparation for pavements should consist of stripping existing pavements and other unsuitable materials as determined by the testing agency Minimum stripping of 2 ft. is recommended. The stripped surface should be proofrolled with a fully loaded tamdem axle truck to detemine areas of weak or loose soils or hard objects which will require removal. The excavated material should be replaced with crushed stone of CA-6 or CA-7 gradation placed in 8 inch loose lifts and each lift compacted to 90% of Modified Proctor Maximum density. The compacted subgrade will provide CBR value of 3 or better for design of pavements.

Similar procedures are recommended in areas of permeable paved areas. However, backfill should be of claen stone such as IDOT CA-7 gradation/.

Construction Problems and Procedure

Vibrations from pile driving will occur. These should be monitored. Obstructions from

previous construction should be anticipated both for pile driving and for drilled shaft construction.

General Qualifications

The recommendations presented above are based on our understanding of the proposed Project. Some variations in soil conditions away from the borings should be anticipated. These conditions may not become evident until the course of construction. If significant variations are observed we should be informed so that we may review these conditions and revise or modify our recommendations as appropriate.

Our exploration does not include any evaluation for contamination of the soils or for any environmental aspects.

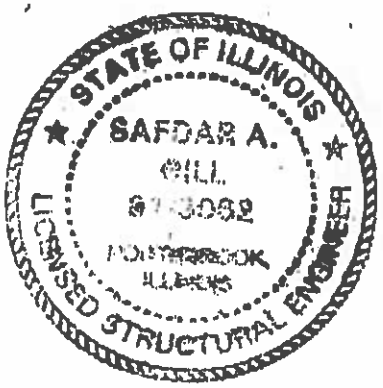
We appreciate this opportunity to be of service. If there are any questions on this letter report please do not hesitate to contact us.

Very truly yours,

GROUND ENGINEERING CONSULTANTS, INC.

Safdar A. Gill

Safdar A. Gill, Ph. D., P. E.
Consultant



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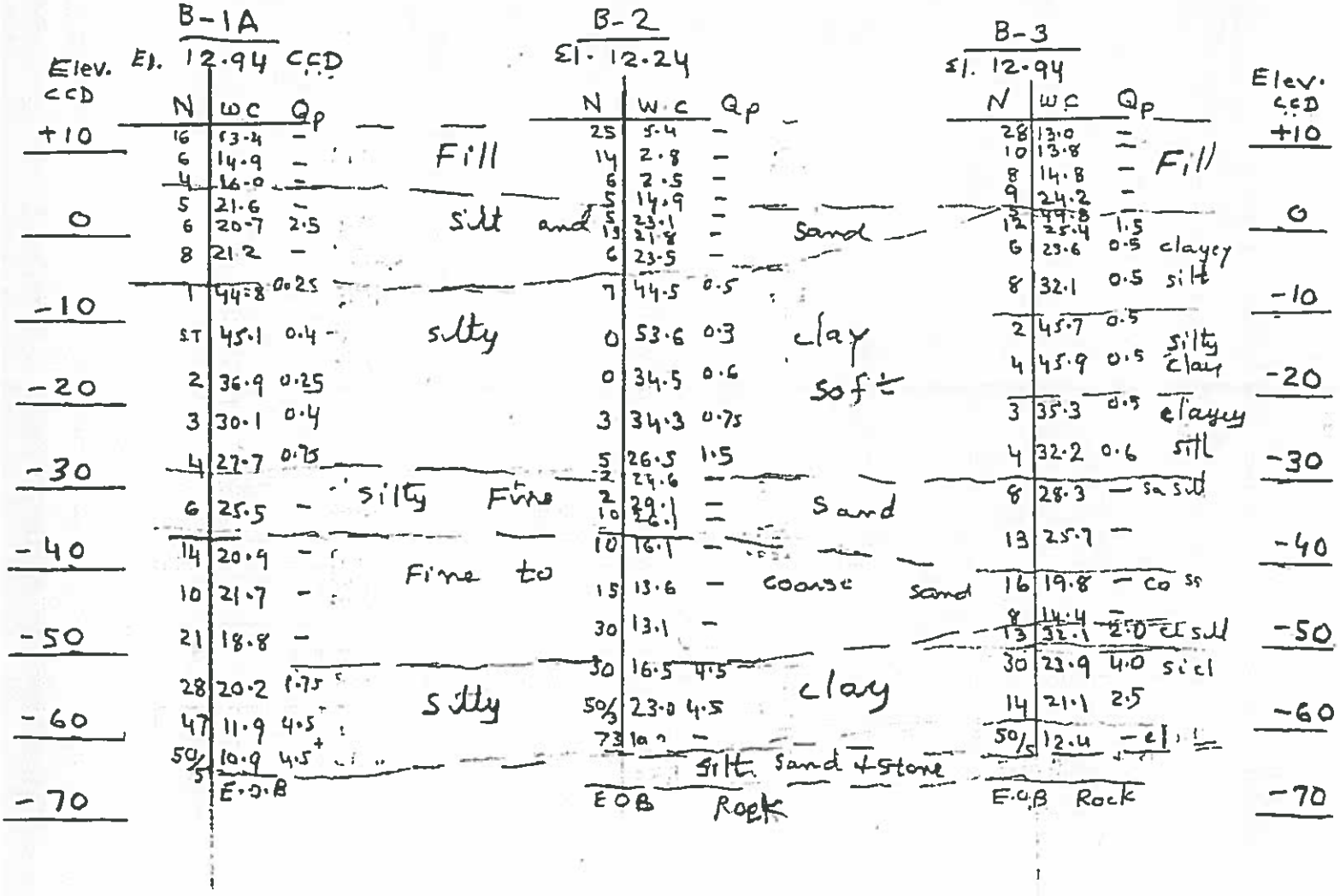
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2 36.9 0.25
3 30.1 0.4
4 27.7 0.75
6 25.5 –
14 20.9 –
10 21.7 –
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3 34.3 0.75
5 26.5 1.5
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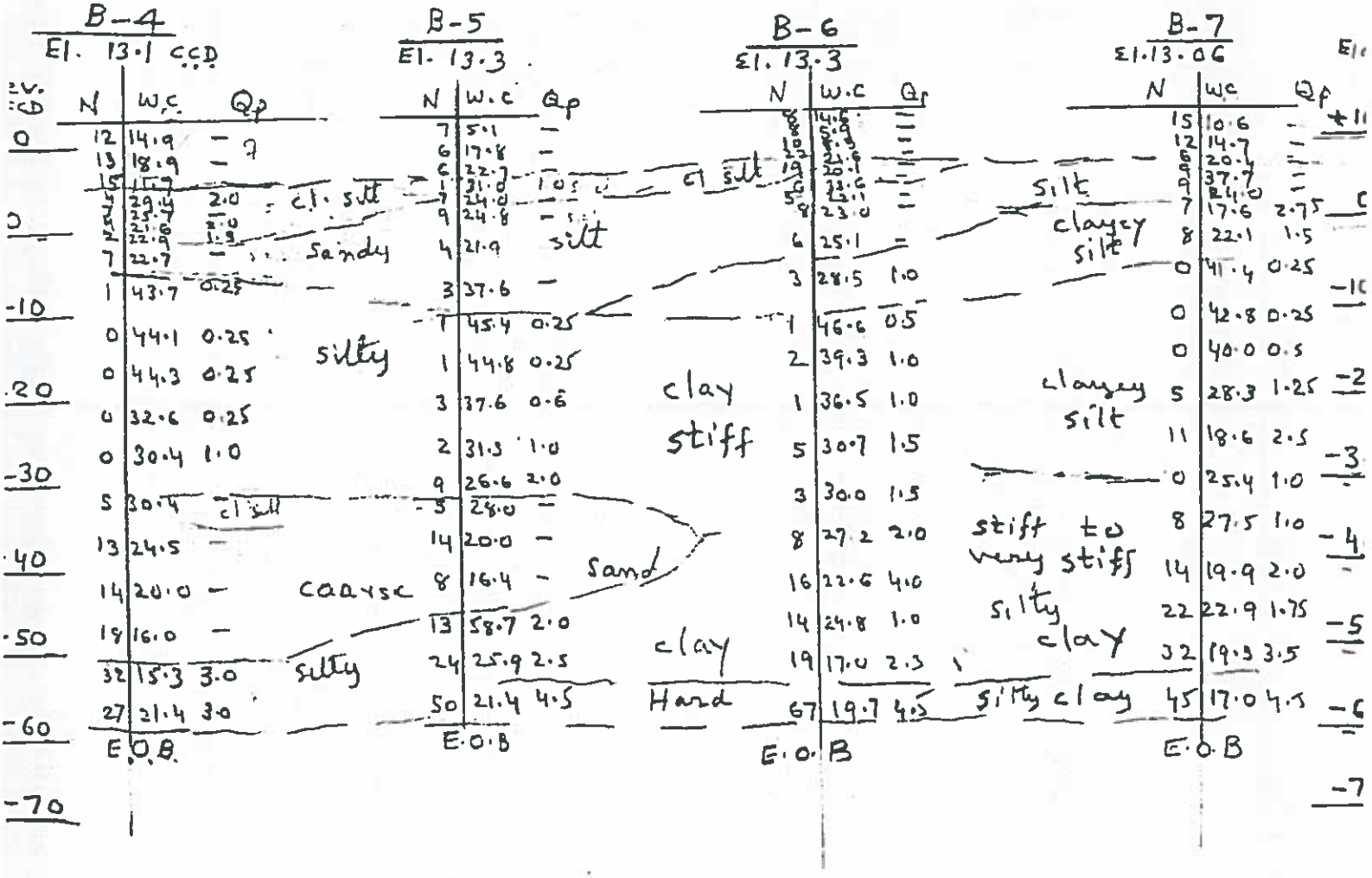
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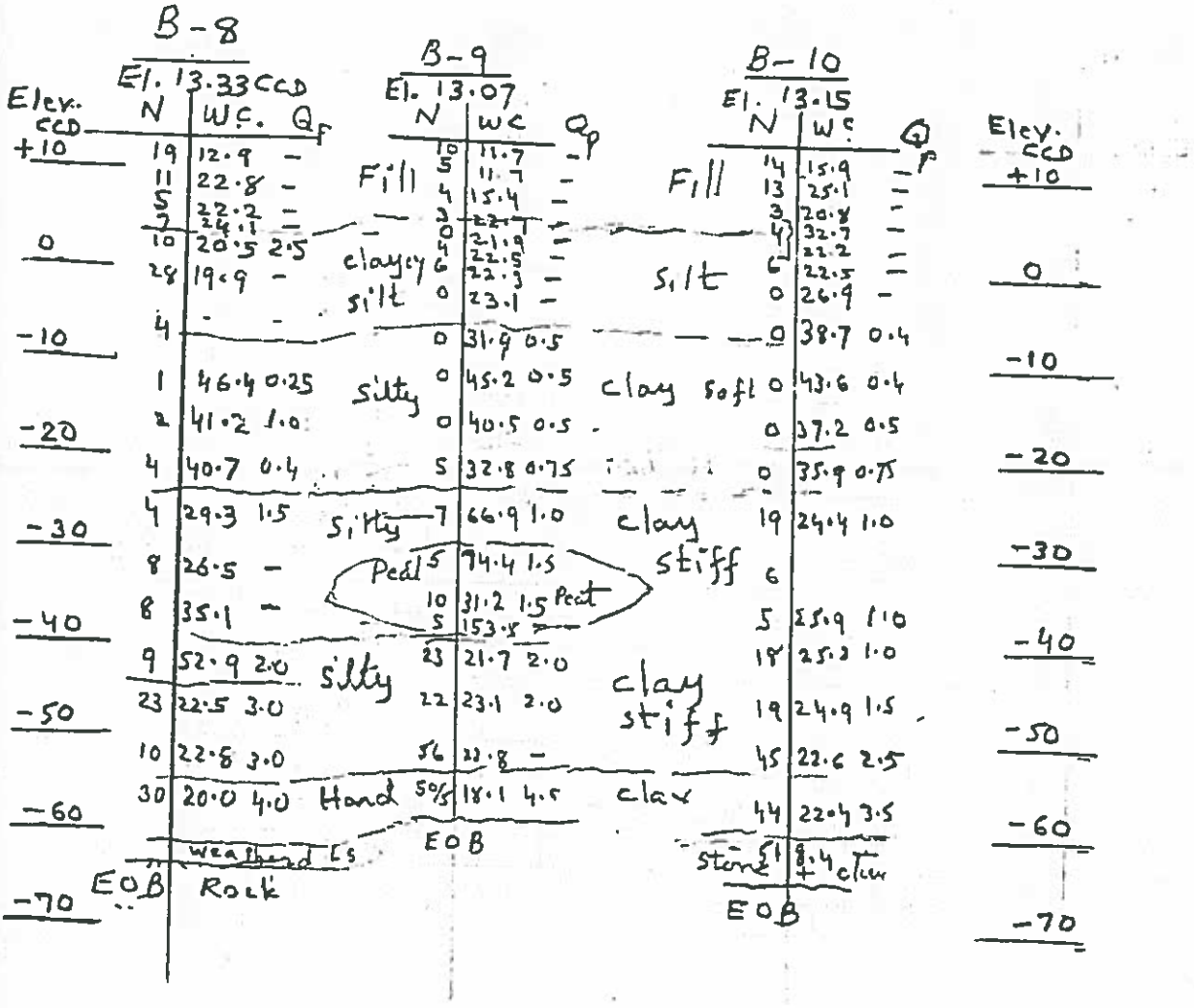
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5 22.2 -
7 24.1 -
10 20.5 2.5
28 19.9 -
4 - -
1 46.4 0.25
2 41.2 1.0
4 40.7 0.4
4 29.3 1.5
8 26.5 -
8 35.1 -
9 52.9 2.0
23 22.5 3.0
10 22.8 3.0
30 20.0 4.0
Weathered Ls
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5 11.7 -
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3 22.7 -
0 22.1 -
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6 22.5 -
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0 23.1 -
0 31.9 0.5
0 45.2 0.5
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19 24.9 1.5
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44 22.4 3.5
51 8.4 clay
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BORING LOCATION DIAGRAM

and

BORING LOGS

BORING LOCATION DIAGRAM

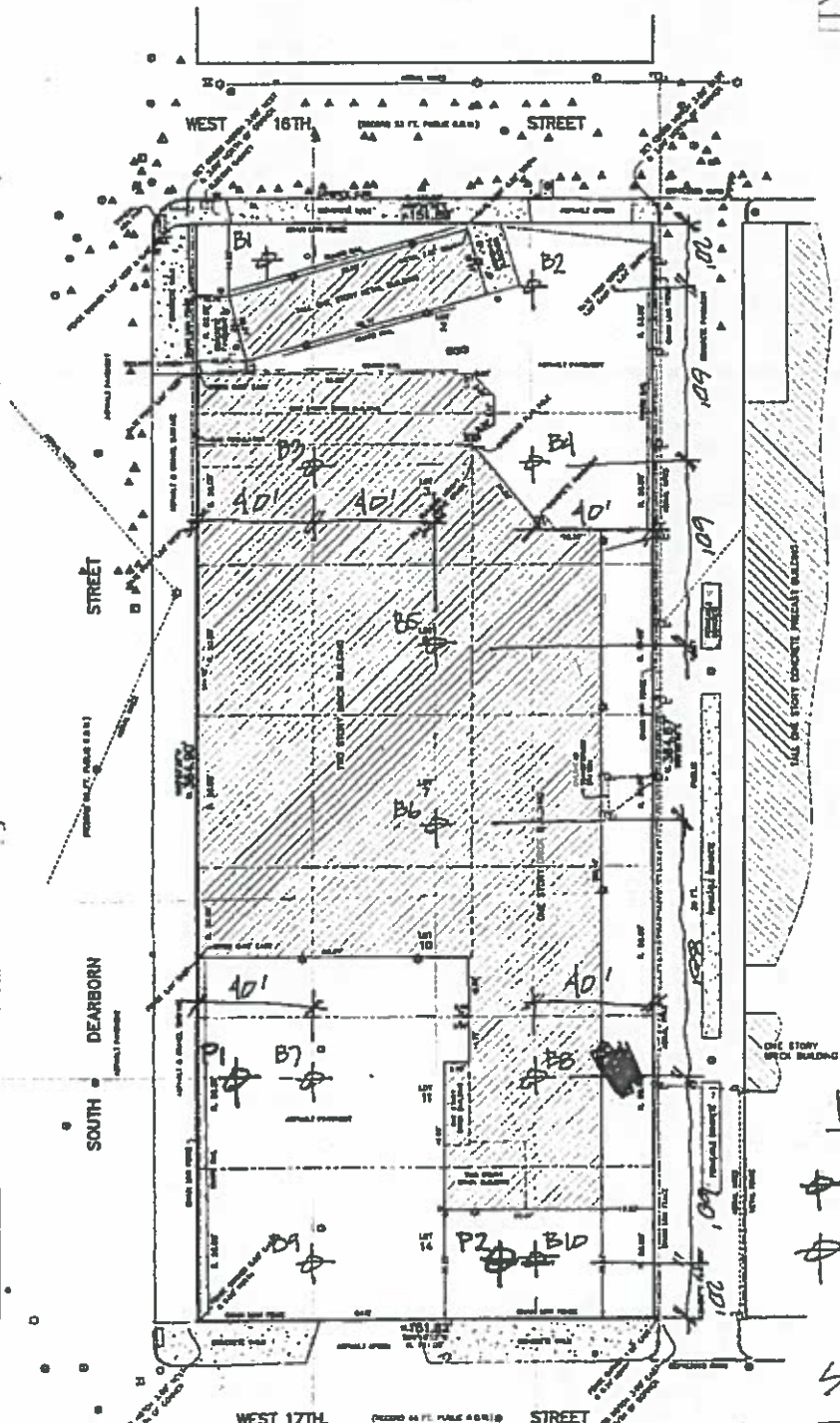
and

BORING LOGS

GREMLEY & BIEDERMANN

PLCS Corporation

ALTA / ACSM Land Title Survey



Legend

- proposed location percolation test
- proposed location boring

South Loop

Proposed Borings

1" = 40' 09-22-16

Date of Issue: June 23, 2017

GEC Job #

LOG OF BORING NO. B-1A

SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						GROUND SURFACE ELEVATION CCD 12.94	
						4 inches of asphalt on sandy base 1.0 11.9	
	1	SS		100		Silty fine sand, brown, moist, medium dense, (SP) 2.5 10.4	
	2	SS		79		Sand, brick & stone, dark brown, moist, loose, (FILL)	
5	3	SS		100		7.5 5.4	
	4	SS		100		Silt & fine sand, brown, wet, loose, (ML) 10.0 2.9	
10	5	SS		100		Silt, some clay, moist, very stiff, (ML-CL) 15.0 -2.1	
15	6	SS		100		Silty fine sand, gray, wet, loose, (SM-ML) 20.0 -7.1	
20	7	SS		100		Clayey silt, gray, loose, (ML-CL) 25.0 -12.1	
25	8	SS		9		Silty clay, gray, soft, (CL)	
30							

Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	7 WS	▽
W.L.		▼
W.L.		▼

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/11/16	
BORING COMPLETED	10/12/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-1A

SHEET 2 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
35	9	SS		100		Silty clay, gray, soft, (CL) *(continued)*	
40	10	SS		100		38.0 -25.1 Organic clayey silt, gray, wet, loose, (ML-CL)	
	11	SS		83		41.0 -28.1	
	11A	SS		100		Silty fine sand, gray, wet, loose, (SM)	
45	12	SS		78		43.0 -30.1 Silty fine to medium sand, gray, medium dense, (SP)	
50	13	SS		89		48.0 -35.1 Fine to coarse sand, gray, wet, medium dense, (SW)	
55	14	SS		100			
60							

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	7 WS	
W.L.		
W.L.		

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/11/16	
BORING COMPLETED	10/12/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-1A

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

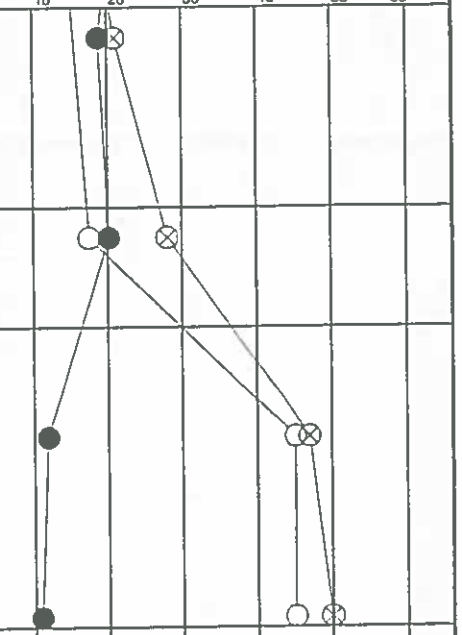
1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						(CONTINUED)	
65	15	SS		100		Fine to coarse sand, gray, wet, medium dense, (SW) *(continued)*	
						65.0 -52.1	
	16	SS		12		Silty clay, trace sand & gravel, gray, stiff, (CL)	
						68.0 -55.1	
70						Silty clay, trace sand & gravel, gray, hard, (CL)	
	17	SS		79			
75							
	18	SS		50		75.5 -62.6	



WATER LEVEL OBSERVATIONS		
W.L.	7 WS	▽
W.L.		▼
W.L.		▼

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/11/16	
BORING COMPLETED	10/12/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-2

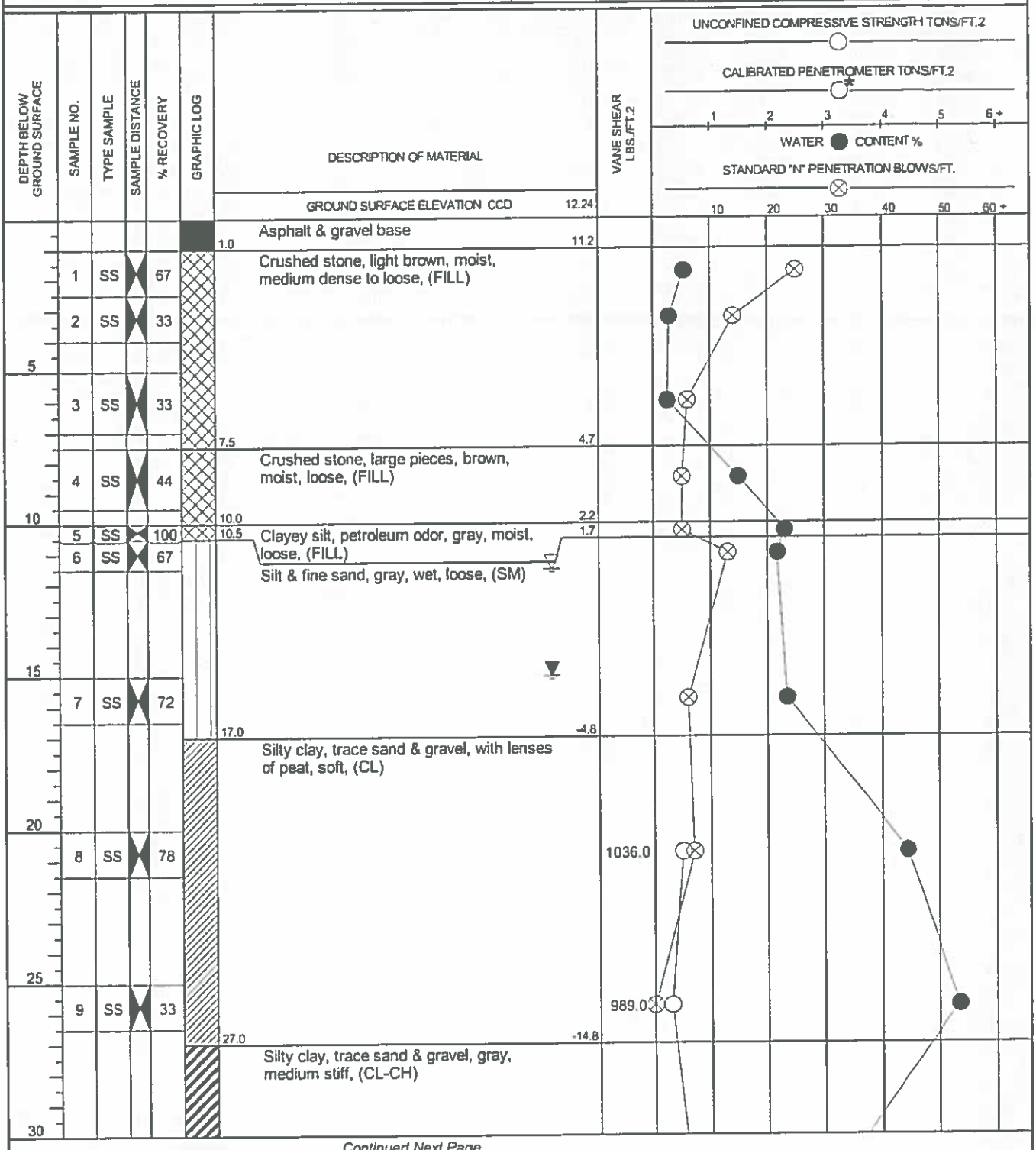
SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois



Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	11.5 WS	▽
W.L.	15 AB	▼
W.L.		

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/27/16	
BORING COMPLETED	9/27/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job # | LOG OF BORING NO. B-2 | SHEET 2 OF 3

CLIENT: SMNG-A Architects, Ltd. | PROJECT: CPS South Loop Elementary School

STATION: | LOCATION: 19 West 16th Street, Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
35	10	SS		100		Silty clay, trace sand & gravel, gray, medium stiff, (CL-CH) *(continued)*	
	11	SS		100			
38.0							-25.8
40						Silty clay, trace sand & gravel, gray, stiff, (CL-ML)	
	12	SS		67			
	13	SS		100			
42.0							-29.8
45						Silty fine sand, gray, wet, (SM)	
	14	SS		100			
	15	SS		92			
47.0							-34.8
50						Fine to coarse sand & fine gravel, limestone gravel at tip, gray, wet, medium dense, (SW)	
	16	SS		78			
55							
	17	SS		61			
60							

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	11.5 WS	▽
W.L.	15 AB	▼
W.L.		

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/27/16	
BORING COMPLETED	9/27/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-2

SHEET 3 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL		VANE SHEAR LBS./FT.2
						(CONTINUED)		
65	18	SS		39		Fine to coarse sand & fine gravel, limestone gravel at tip, gray, wet, medium dense, (SW) *(continued)*		
					65.0		-52.8	
70	19	SS		50		Silty sandy clay, trace gravel & broken limestone, gray, hard, (CL-ML)		
	20	SS		67				
75					75.0		-62.8	
	21	SS		83		Silty sand & limestone gravel, gray, wet, very dense, (GM) Refusal on bedrock at 79.5'		
80					80.0		-67.8	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

>>

WATER LEVEL OBSERVATIONS		
W.L.	11.5 WS	▽
W.L.	15 AB	▼
W.L.		▼

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350 Pfingsten Road, Suite 106
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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/27/16	
BORING COMPLETED	9/27/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-3

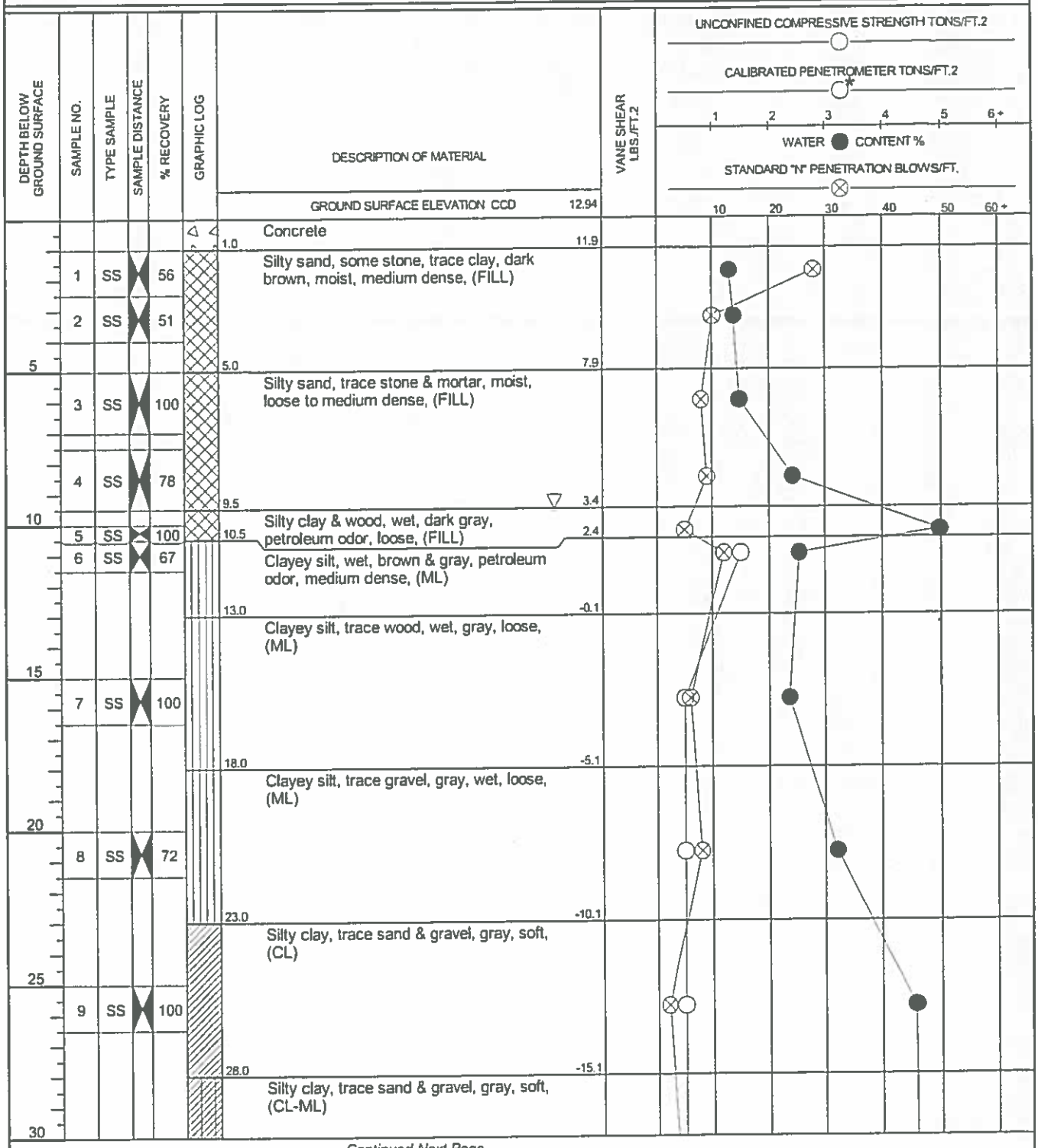
SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois



Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	9.5 WD	▽
W.L.		▼
W.L.		▼

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/3/16	
BORING COMPLETED	10/4/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job # | LOG OF BORING NO. B-3 | SHEET 2 OF 3

CLIENT: SMNG-A Architects, Ltd. | PROJECT: CPS South Loop Elementary School

STATION: | LOCATION: 19 West 16th Street Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
35	10	SS		100		Silty clay, trace sand & gravel, gray, soft, (CL-ML) *(continued)*	
						33.0 -20.1 Clayey silt, gray, loose, (ML-CL)	
40	11	SS		100			
	12	SS		100		42.0 -29.1 Sandy silt, trace clay, gray, moist, loose, (ML-SM)	
45	13	SS		100		47.0 -34.1 Silty sand, trace clay & gravel, gray, wet, medium dense, (SM)	
50	14	SS		100			
55	15	SS		100		53.0 -40.1 Coarse sand & fine gravel, gray, wet, medium dense, (SW)	
60							

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS	
W.L.	9.5 WD
W.L.	
W.L.	

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BORING STARTED	10/3/16		
BORING COMPLETED	10/4/16		
BORING DRILLED BY	FOREMAN	Baker	
Strata	APPROVED	SAG	

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-3

SHEET 3 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						(CONTINUED)	
	16	SS		100		60.5 -47.6	
	17	SS		67		Clayey silt, gray, very stiff, (ML)	
						64.0 -51.1	
65						Silty clay, trace sand & gravel, gray, hard, (CL)	
	18	SS		50		69.0 -56.1	
70						Silty clay, trace sand & gravel, gray, very stiff, (CL)	
	19	SS		100		73.0 -60.1	
75						Clayey silt & broken stone, gray, wet, very dense, (GM) Driller reported extremely difficult drilling below 74' Solid limestone, bedrock at 79'	
	20	SS		28		79.0 -66.1	

WATER LEVEL OBSERVATIONS		
W.L.	9.5 WD	▽
W.L.		▼
W.L.		▽

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350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/3/16	
BORING COMPLETED	10/4/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-4

SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						GROUND SURFACE ELEVATION CCD 13.10	
						2" asphalt, 6" concrete, 4" stone 1.0 / 12.1	
	1	SS		67		Sand, cinders, clay & brick, moist, med. dense, (FILL)	
5	2	SS		78			
	3	SS		100		6.5 / 6.6	
						SILT, dk. gray, moist, petroleum odor, stiff, (ML)	
	4	SS		100		8.5 / 4.6	
	4A	SS		100		SANDY SILT, dk. gray, wet, petroleum odor, loose, (ML)	
10						10.0 / 3.1	
	5	SS		75		CLAYEY SILT, moist, gray, stiff, (ML)	
	5A	SS		100		11.0 / 2.1	
						SILTY CLAY, gray, stiff, (CL-ML)	
						13.0 / 0.1	
						SANDY SILT, one stone, gray, wet, loose, (ML) ▽	
15	6	SS		83			
						18.0 / -4.9	
						SILTY CLAY, gray, soft, (CL)	
20	7	SS		100			
25							
	8	SS		100			
30							

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	15 BCR	▽
W.L.		▼
W.L.		▽

Ground Engineering Consultants, Inc.
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Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/27/16		
BORING COMPLETED	9/28/16		
BORING DRILLED BY	FOREMAN	Baker	
Strata	APPROVED	SAG	

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-4

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
35	9	SS		100		SILTY CLAY, gray, soft, (CL) *(continued)*	
						34.0 -20.9	
40	10	SS		100		SILTY CLAY, gray, med. stiff, (CL)	
	11	SS		100		43.0 -29.9	
45						CLAYEY SILT, gray, stiff, (ML-CL)	
	12	SS		100		45.8 -32.7	
	12A	SS		100		SANDY CLAYEY SILT, gray, moist to wet, med. dense, (ML)	
50						47.0 -33.9 CLAYEY FINE TO COARSE SAND, gray, wet, med. dense, (SC)	
	13	SS		100			
55							
	14	SS		100			
60						58.0 -44.9 COARSE SAND & FINE GRAVEL, gray, wet, med. dense, (SW)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	15 BCR	▽
W.L.		▼
W.L.		▼

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/27/16	
BORING COMPLETED	9/28/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job # | LOG OF BORING NO. B-4 | SHEET 3 OF 3

CLIENT: SMNG-A Architects, Ltd. | PROJECT: CPS South Loop Elementary School

STATION: | LOCATION: 19 West 16th Street Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						(CONTINUED)	
	15	SS		100		COARSE SAND & FINE GRAVEL, gray, wet, med. dense, (SW) *(continued)*	
64.5							-51.4
65	16	SS		100		SILTY CLAY, tr. sand & gravel, gray, very stiff, (CL)	
70							
	17	SS		100			
71.5							-58.4

WATER LEVEL OBSERVATIONS		
W.L.	15 BCR	▽
W.L.		▼
W.L.		▼

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Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/27/16	
BORING COMPLETED	9/28/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-5

SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL		VANE SHEAR LBS./FT.2
						GROUND SURFACE ELEVATION CCD	13.30	
						Concrete	1.0 / 12.3	
	1	SS		50		Sand & Gravel, dk. brown, moist, loose, (FILL)	2.5 / 10.8	
	2	SS		50		Sandy Silt, tr. clay & brick, dk. brown & red, moist, loose, (FILL)	4.0 / 9.3	
5						Sand, Silt & Brick, dk. brown & red, moist, loose, (FILL)	7.0 / 6.3	
	3	SS		33				
	4	SS		75		SILTY CLAY, some stone, dk. gray, petroleum odor, moist, loose, (CL-ML)	8.5 / 4.8	
	4A	SS		92		SANDY SILT, gray, wet, petroleum odor, loose, (ML)		
10								
	5	SS		100				
15							15.0 / -1.7	
	6	SS		100		SILTY FINE SAND, gray, wet, loose, (SM-ML)		
20								
	7	SS		100				
25							24.0 / -10.7	
						SILTY CLAY, gray, soft, (CL)		
	8	SS		100				
30								

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS

W.L.	8.5 WS
W.L.	
W.L.	

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/28/16	
BORING COMPLETED	9/28/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-5

SHEET 2 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)		VANE SHEAR LBS./FT.2
	9	SS		100		SILTY CLAY, gray, soft, (CL) *(continued)*		
						33.0	-19.7	
35						SILTY CLAY, gray, med. stiff, (CL-ML)		
	10	SS		100				
40						40.0	-26.7	
	11	SS		100		SILTY CLAY, gray, stiff, (CL)		
45								
	12	SS		100		46.0	-32.7	
	12A	SS		100		SILTY FINE SAND, gray, wet, med. dense, (SP)		
50						50.0	-36.7	
	13	SS		100		FINE TO COARSE SAND, gray, wet, med. dense, (SW)		
						53.0	-39.7	
55						FINE TO MEDIMN SAND, gray, wet, med. dense, (SP)		
	14	SS		100				
						58.0	-44.7	
60						SILT, tr. clay & organic, dk. gray, moist, med. dense, (ML)		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	8.5 WS	▽
W.L.		▼
W.L.		▼

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350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/28/16	
BORING COMPLETED	9/28/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-5

SHEET 3 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						(CONTINUED)	
	15	SS		100		SILT, tr. clay & organic, dk. gray, moist, med. dense, (ML) *(continued)*	
65						65.0 -51.7	
	16	SS		100		SILTY CLAY, tr. sand & gravel, gray, very stiff, (CL-ML)	
						68.0 -54.7	
70						SILTY CLAY, tr. stone, gray, hard, (CL-ML)	
	17	SS		46		71.5 -58.2	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

WATER LEVEL OBSERVATIONS	
W.L.	8.5 WS
W.L.	
W.L.	

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/28/16	
BORING COMPLETED	9/28/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-6

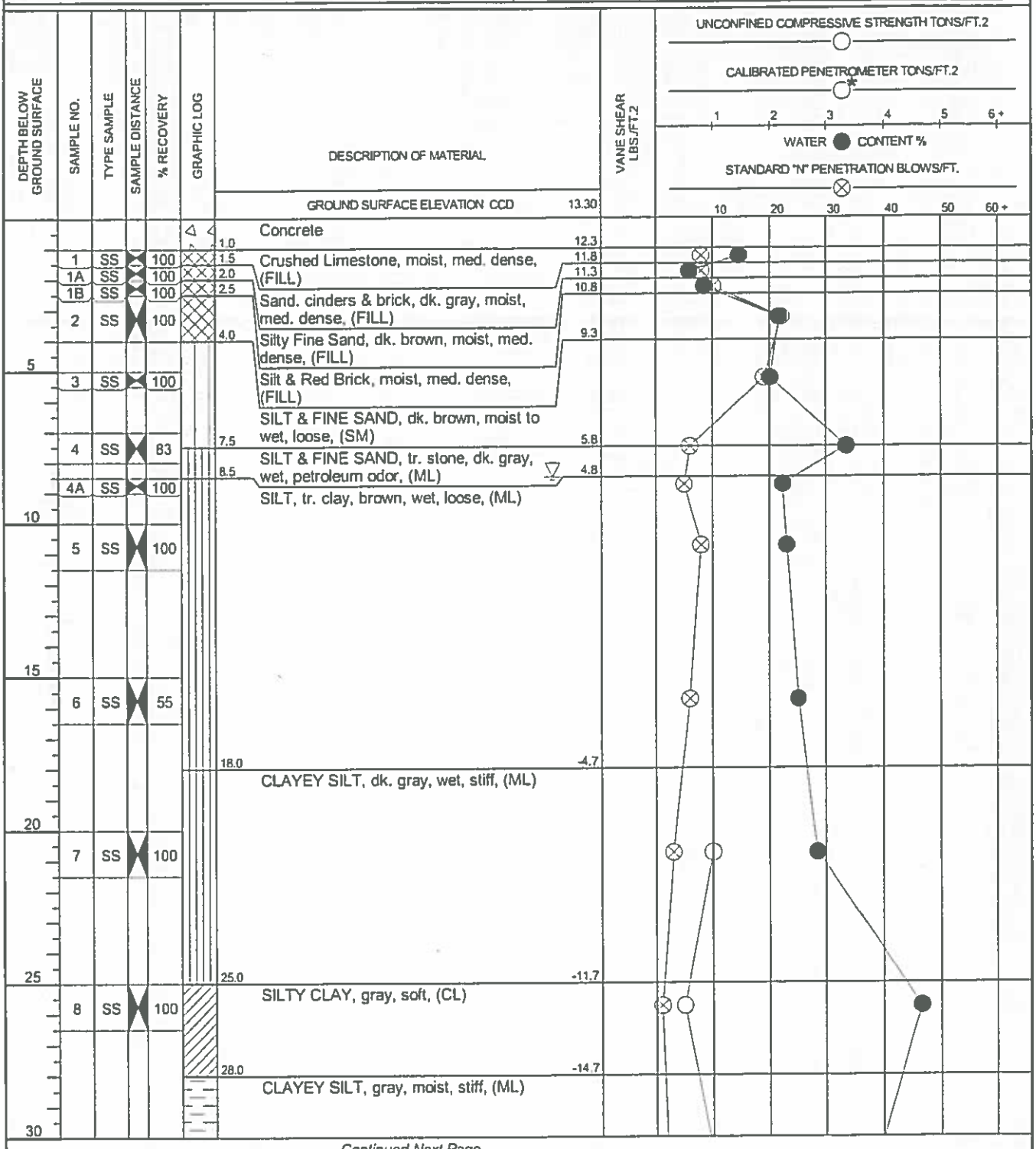
SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois



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WATER LEVEL OBSERVATIONS	
W.L.	8.5 WS
W.L.	
W.L.	

Ground Engineering Consultants, Inc.
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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/6/16
BORING COMPLETED	10/7/16
BORING DRILLED BY	FOREMAN Baker
Strata	APPROVED SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job # | LOG OF BORING NO. B-6 | SHEET 2 OF 3

CLIENT: SMNG-A Architects, Ltd. | PROJECT: CPS South Loop Elementary School

STATION: | LOCATION: 19 West 16th Street, Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						(CONTINUED)	
35	9	SS		100		CLAYEY SILT, gray, moist, stiff, (ML) *(continued)*	
40	10	SS		100			
	11	SS		100			
45							
50	12	SS		100			
						50.0 -36.7	
	13	SS		100		SILTY CLAY, gray, stiff, (CL-ML)	
55						54.0 -40.7	
	14	SS		100		SILTY CLAY, gray, hard, (CL)	
60						59.0 -45.7	
						SILTY CLAY, gray, stiff, (CL-CH)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS		
W.L.	8.5 WS	▽
W.L.		▼
W.L.		▼

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350 Pfingsten Road, Suite 106
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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/6/16	
BORING COMPLETED	10/7/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-6

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
65	15	SS		100		SILTY CLAY, gray, stiff, (CL-CH) *(continued)*	
	16	SS		100			
						69.0 -55.7	
70						SILTY CLAY, tr. sand & gravel, gray, hard, (CL)	
	17	SS		83		71.5 -58.2	

>>

WATER LEVEL OBSERVATIONS		
W.L.	8.5 WS	▽
W.L.		▼
W.L.		▼

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/6/16	
BORING COMPLETED	10/7/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job # | LOG OF BORING NO. B-7 | SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd. | PROJECT: CPS South Loop Elementary School

STATION: | LOCATION: 19 West 16th Street, Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						GROUND SURFACE ELEVATION CCD 13.06	
						2" asphalt over 8" concrete & 2" stone base 1.0 / 12.1	
	1	SS		100		Sand, Stone & Silt, tr. clay, brown, moist, med. dense, (FILL)	
	2	SS		22		4.0 / 9.1	
5						Clayey Sandy Silt, tr. stone, moist to wet, loose, (FILL)	
	3	SS		22		6.0 / 7.1	
	3A	SS		100		CLAYEY SILT, dk. gray, petroleum odor, moist to wet, loose, (ML) 7.0 / 6.1	
	4	SS		100		SILT, brown, moist to wet, loose, (ML) ▽	
10						10.0 / 3.1	
	5	SS		100		CLAYEY SILT, brown to gray, moist, very stiff, (ML-CL)	
						13.0 / 0.1	
15						CLAYEY SILT, gray, wet, loose, (ML-CL)	
	6	SS		100			
20							
	7	SS		100			
25							
	8	SS		100			
30							

Continued Next Page

WATER LEVEL OBSERVATIONS	
W.L.	8.5 WS ▽
W.L.	▼
W.L.	▼

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/30/16	
BORING COMPLETED	9/3/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-7

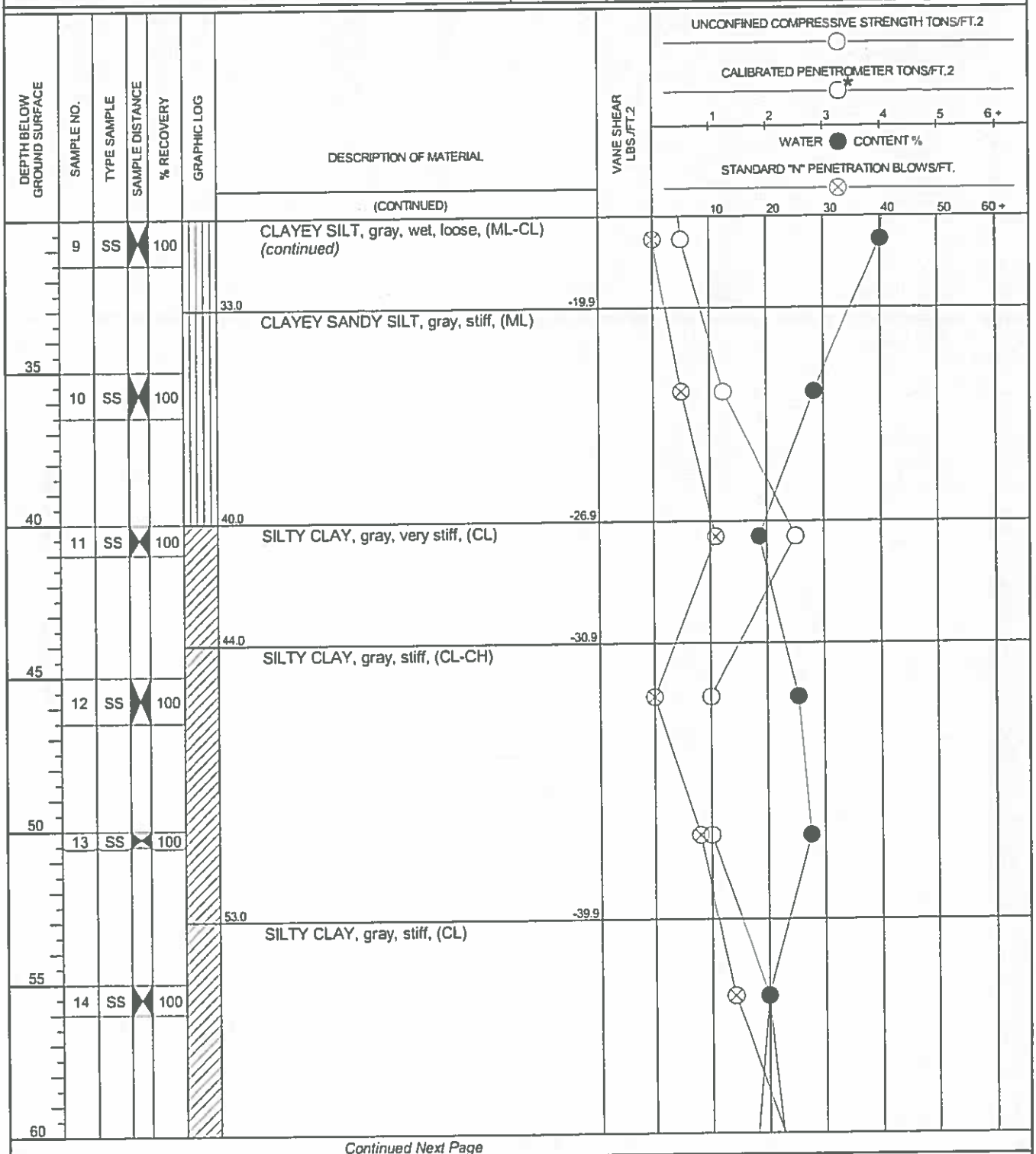
SHEET 2 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois



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WATER LEVEL OBSERVATIONS		
W.L.	8.5 WS	▽
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W.L.		▽

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/30/16	
BORING COMPLETED	9/3/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-7

SHEET 3 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
	15	SS		100		SILTY CLAY, gray, stiff, (CL) *(continued)*	
						62.0 -48.9	
65						CLAYEY SILT, gray, moist to wet, very stiff, (ML)	
	16	SS		100		67.0 -53.9	
						SILTY CLAY, tr. sand & gravel, gray, hard, (CL)	
70							
	17	SS		100		71.5 -58.4	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

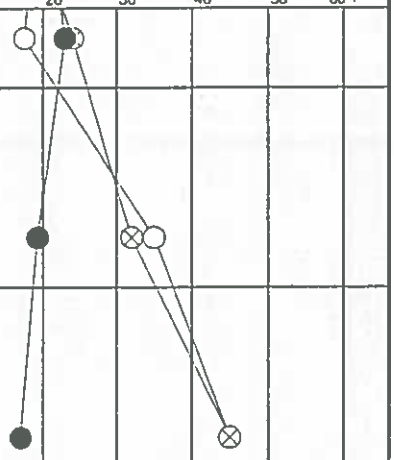
CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+



WATER LEVEL OBSERVATIONS		
W.L.	8.5 WS	▽
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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/30/16	
BORING COMPLETED	9/3/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-8

SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						GROUND SURFACE ELEVATION CCD 13.33	
						8 inches of concrete on limestone base 1.0 / 12.3	
	1	SS		100		Sand, cinders, brick & stone, dark gray, moist, medium dense, (FILL) 2.5 / 10.8	
	2	SS		100		Silty clay, brown, stiff, (FILL) 4.0 / 9.3	
5						Silt, brown & dark gray, moist, loose, (FILL)	
	3	SS		100		7.0 / 6.3	
	4	SS		100		Silt & fine sand, dark gray, moist, loose, (FILL) 8.0 / 5.3	
	4A	SS		100		Silt & fine sand, trace clay, gray, wet, loose, (ML)	
10						10.0 / 3.3	
	5	SS		100		Silt, some clay, gray, moist, very stiff, (ML-CL)	
15						15.0 / -1.7	
	6	SS		100		Silt & fine sand, gray, wet, medium dense, (ML-SM)	
20						20.0 / -6.7	
	7	SS		100		Clayey silt, gray, wet, loose, (ML-CL)	
25							
	8	SS		100			
30							

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS	
W.L.	8 WS
W.L.	
W.L.	

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/7/16	
BORING COMPLETED	10/10/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-8

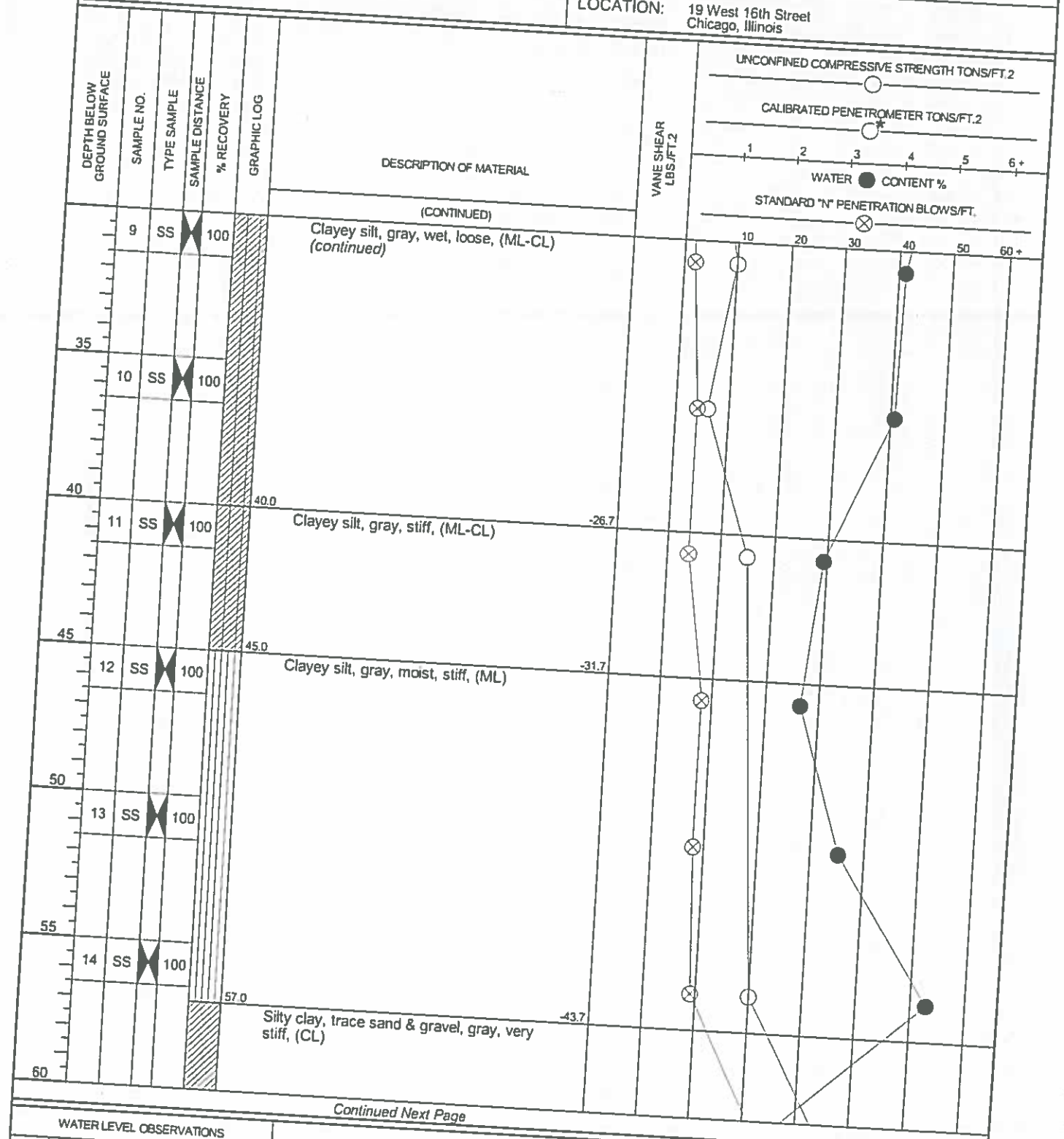
SHEET 2 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois



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WATER LEVEL OBSERVATIONS		
W.L.	8 WS	▽
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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/7/16	
BORING COMPLETED	10/10/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job # | LOG OF BORING NO. B-8 | SHEET 3 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						(CONTINUED)	
65	15	SS		100		Silty clay, trace sand & gravel, gray, very stiff, (CL) *(continued)*	
	16	SS		67			
						68.0 -54.7	
70						Silty clay, trace sand & gravel, gray, hard, (CL)	
	17	SS		100			
						74.0 -60.7	
75						No recovery, weathered limestone	
						75.3 Solid limestone reported by driller at 75.25 ft -61.9	

WATER LEVEL OBSERVATIONS

W.L.	8 WS	▽
W.L.		▼
W.L.		▼

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	10/7/16	
BORING COMPLETED	10/10/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-9

SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						GROUND SURFACE ELEVATION CCD 13.07	
						2" asphalt on 6" cinders & stone base 1.0 12.1	
	1	SS		83		Crushed slag, brown, moist, med. dense, (FILL) 2.0 11.1	
	1A	SS		100			
	2	SS		94		Silty Fine Sand, tr. asphalt, brown, moist, loose, (FILL) 5.0 8.1	
5							
	3	SS		100		Silt & Fine Sand, tr. stone, dk. brown, moist, loose, (FILL)	
	4	SS		61		8.0 5.1	
	4A	SS		94		SILT & CLAY, wet, dk. brown, loose, (ML) ▽	
10						10.0 3.1	
	5	SS		78		CLAYEY SILT, tr. stone, brown & gray, loose, (ML-CL)	
						13.0 0.1	
						CLAYEY SILTY SAND, gray, wet, loose, (ML-SC)	
15							
	6	SS		100			
20						20.0 -6.9	
	7	SS		100		SILTY CLAY, tr. sand & gravel, gray, soft, (CL)	
25							
	8	SS		100			
30							

Continued Next Page

WATER LEVEL OBSERVATIONS	
W.L.	9 WS ▽
W.L.	▼
W.L.	▼

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/29/16		
BORING COMPLETED	9/3/16		
BORING DRILLED BY	Strata	FOREMAN	Baker
		APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-9

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
	9	SS		100		SILTY CLAY, tr. sand & gravel, gray, soft, (CL) *(continued)*	
						33.0 -19.9	
35						SILTY CLAY, tr. sand & gravel, gray, med. stiff, (CL)	
	10	SS		100			
40						40.0 -26.9	
	11	SS		100		SILTY CLAY WITH PEAT LENSES, gray, stiff, (CL-OL)	
45							
	12	SS		100			
50							
	13	SS		50			
	13A	SS		100		51.0 -37.9	
						CLAYEY SILT & WOOD FRAGMENTS, dk. gray, stiff to very stiff, (CL)	
						54.0 -40.9	
55						SILTY CLAY, tr. sand & gravel, gray, stiff to very stiff, (CL)	
	14	SS		100			
60							

Continued Next Page

WATER LEVEL OBSERVATIONS

W.L. 9 WS

W.L.

W.L.

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/29/16	
BORING COMPLETED	9/3/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-9

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER ● CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL		VANE SHEAR LBS./FT.2
						(CONTINUED)		
	15	SS		100		SILTY CLAY, tr. sand & gravel, gray, stiff to very stiff, (CL) *(continued)*		
							-49.9	
65						63.0 CLAYEY SILT, tr. gravel, moist to wet, dense, (ML)		
	16	SS		100				
						68.0 SILTY CLAY, some gravel, gray, hard, (CL-ML)	-54.9	
70								
	17	SS		67		71.0	-57.9	

WATER LEVEL OBSERVATIONS		
W.L.	9 WS	▽
W.L.		▼
W.L.		▼

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Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/29/16	
BORING COMPLETED	9/3/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job # | LOG OF BORING NO. B-10 | SHEET 1 OF 3

CLIENT: SMNG-A Architects, Ltd. | PROJECT: CPS South Loop Elementary School

STATION: | LOCATION: 19 West 16th Street Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL	VANE SHEAR LBS./FT.2
						GROUND SURFACE ELEVATION CCD 13.15	
						1.0 12.2 2" asphalt, 6" concrete over gravel base	
	1	SS		100		Silty Sand & gravel, tr. brick, moist, dk. brown, med. dense to loose, (FILL)	
5	2	SS		100			
	3	SS		67		7.0 6.2	
	4	SS		100		8.0 5.2 Silt & Clay, some brick, moist, dk. gray, loose, (FILL)	
	4A	SS		100		Silt & Fine Sand, gray, wet, loose, (ML)	
10	5	SS		100			
						13.0 0.2	
15						CLAYEY SILT, gray, wet, loose, (MI-SC)	
	6	SS		100			
20						20.0 -6.9	
	7	SS		100		SILTY CLAY, tr. sand & gravel, gray, soft, (CL)	
25							
	8	SS		100			
30							

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS	
W.L.	8.5 WS
W.L.	
W.L.	

Ground Engineering Consultants, Inc.
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BORING STARTED	9/28/16	
BORING COMPLETED	9/29/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-10

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
35	9	SS		100		SILTY CLAY, tr. sand & gravel, gray, soft, (CL) *(continued)*	
	10	SS		100			
						37.0 -23.9	
40						SILTY CLAY, tr. sand & gravel, gray, stiff, (CL)	
	11	SS		100			
45							
	12	SS		100			
50							
	13	SS		100			
55							
	14	SS		67			
60							

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

Continued Next Page

WATER LEVEL OBSERVATIONS	
W.L.	8.5 WS
W.L.	
W.L.	

Ground Engineering Consultants, Inc.
350 Pfingsten Road, Suite 106
Northbrook, Illinois 60062
Tel: (847) 559-0085 Fax: (847) 559-0181

BORING STARTED	9/28/16	
BORING COMPLETED	9/29/16	
BORING DRILLED BY	FOREMAN	Baker
Strata	APPROVED	SAG

LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

GEC Job #

LOG OF BORING NO. B-10

SHEET 3 OF 3

CLIENT: SMNG-A Architects, Ltd.

PROJECT: CPS South Loop Elementary School

STATION:

LOCATION: 19 West 16th Street
Chicago, Illinois

DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	% RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIAL (CONTINUED)	VANE SHEAR LBS./FT.2
65	15	SS		89		SILTY CLAY, tr. sand & gravel, gray, stiff, (CL) *(continued)*	
						64.0 -50.9	
	16	SS		100		CLAYEY SILT, gray, very stiff, (ML-CL)	
						68.0 -54.9	
70						SILTY CLAY, tr. sand & gravel, gray, very stiff, (CL)	
	17	SS		94		74.0 -60.9	
75						SILTY CLAY & STONE, gray, dense, (CL-ML-GM)	
	18	SS		89		78.0 -64.9	
80						Drilled by rock bit to 80 feet, Solid rock at 78 feet	
						80.0 -66.9	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2

CALIBRATED PENETROMETER TONS/FT.2

1 2 3 4 5 6+

WATER CONTENT %

STANDARD "N" PENETRATION BLOWS/FT.

10 20 30 40 50 60+

WATER LEVEL OBSERVATIONS	
W.L.	8.5 WS
W.L.	
W.L.	

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BORING STARTED	9/28/16	
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LOG OF BORING 19 WEST 16TH STREET - CHICAGO.GPJ 12/8/16

PERCOLATION TEST DATA

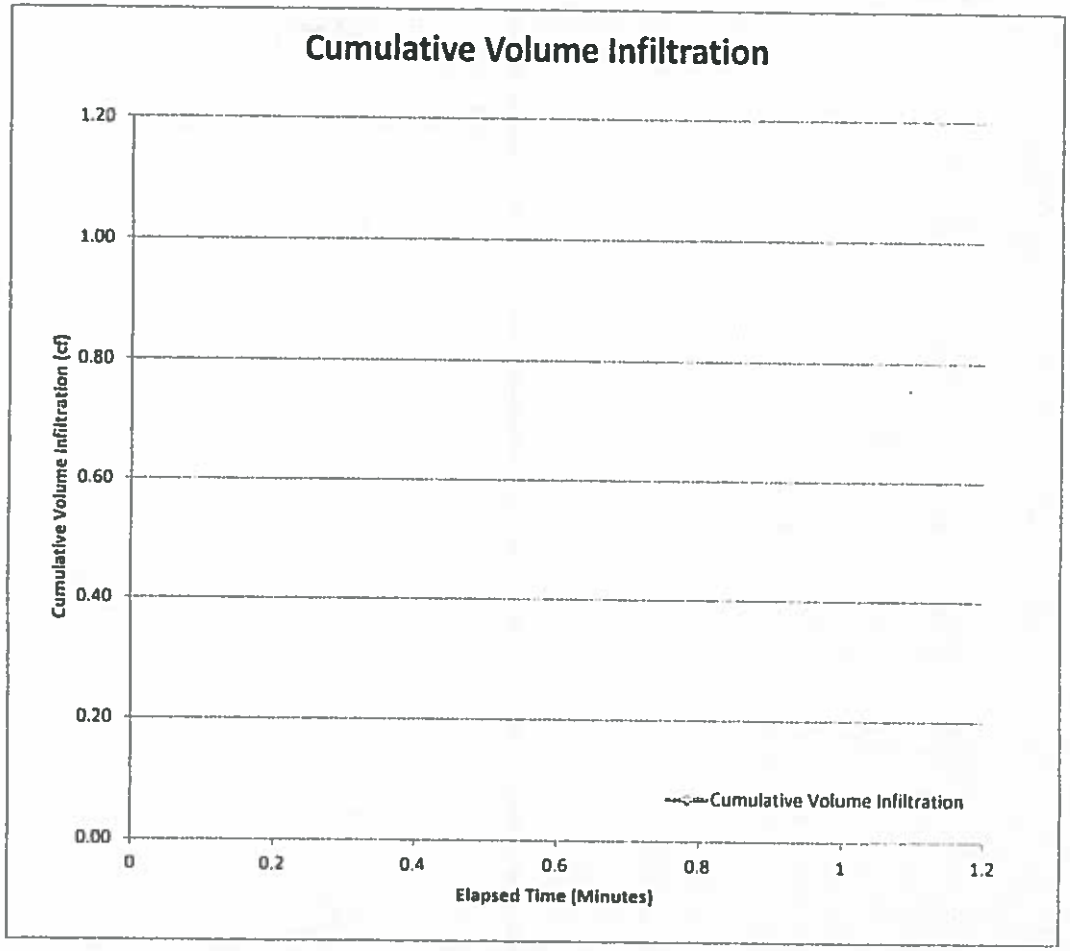
Single Ring Infiltrometer - Infiltration Rate Determination
Chicago Stormwater Ordinance

12" PVC
3' BGS
2' AGS

STRATA

12-Inch Infiltrometer Volume Rate = 0.785 **cubic feet/foot of drop**

Elapsed Time (minutes)	Change in time (minutes)	Water Decline (inches)	Cum. Water Decline (inches)	Water Decline (feet)	Cumulative Volume (cubic feet)
1	1	1.5"	1.5		
1	2	1"	2.5		
1	3	.5"	3		
2	5	.5	3.5		
5	10	.5	4		
5	15	.125	4.125		
10	25				
10	35				
15	50				
15	65				
15	80				
15	95				
15	110				
15	125				
15	140				
15	155				
15	170				
	Totals	0.00	0.00	0.00	0.00



Operator MARK BAKER

Date of Test 10/12/16

Test Location P-1

Proj. Name 116th STREET

Client Project No. _____

Strata Project No. 11292

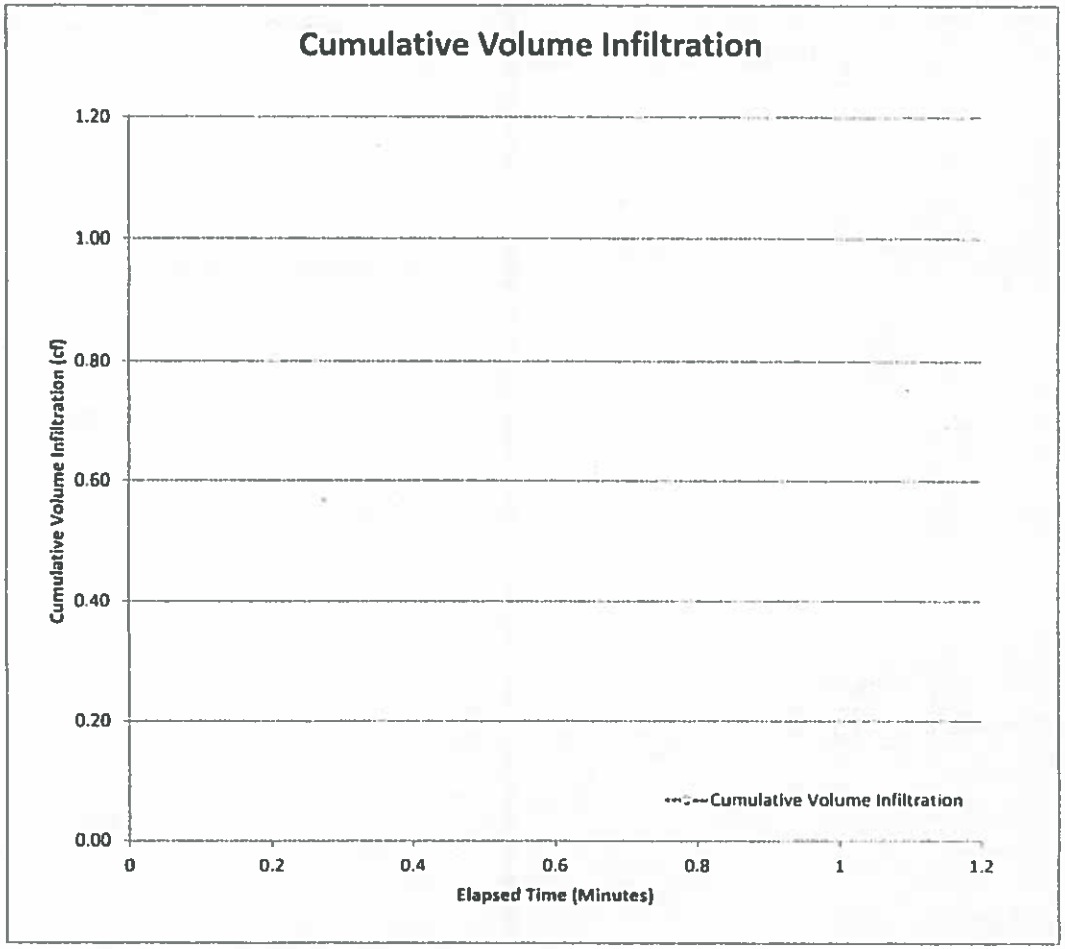
Single Ring Infiltrometer - Infiltration Rate Determination
Chicago Stormwater Ordinance

12" PVC
3.5' BGS
2.5' AGS

STRATA

12-Inch Infiltrometer Volume Rate = **0.785** **cubic feet/foot of drop**

Elapsed Time (minutes)	Change in time (minutes)	Water Decline (inches)	Cum. Water Decline (inches)	Water Decline (feet)	Cumulative Volume (cubic feet)
1	1	.5	.5		
1	2	.25	.75		
1	3	.25	1		
2	5	—	1		
5	10	—	1		
5	15	.25	1.25		
10	25	—	↓		
10	35	—	↓		
15	50	—	↓		
15	65	.25	1.5		
15	80	.25	1.75		
15	95	—	↓		
15	110	—	↓		
15	125	.25	2		
	Totals	0.00	0.00	0.00	0.00



Operator BAKER

Proj. Name 116th STREET

Date of Test 10/12/16

Client Project No. _____

Test Location P-2

Strata Project No. 11292

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

SUMMARY

A. Section Includes: Finish hardware as required and as specified.

1.2 SUBMITTALS

A. Complete the **MATERIALS CREDITS DOCUMENTATION SHEET** attached to Section 01352 for products in this section.

B. Product Data: Submit manufacturers' technical product data for each item of hardware. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

C. LEED Submittal:
1. Product Data as required to show compliance with the following credits:
a. LEED MR Credit 5.1 and 5.2 – Regional Materials, Extracted, Processed and Manufactured Regionally.
2. See Section 01352 LEED Requirements and this Section for more information.

D. Hardware Schedule: Submit finish hardware schedule in a vertical format separate from door and frame schedule, conforming to "Sequence and Format for the Hardware Schedule" published by the Door and Hardware Institute (DHI). Horizontal and coded schedules are not acceptable.
1. Finish Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Schedules not having the following information will be rejected:
a. Type, style, function, size and finish of each hardware item.
b. Name and manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
f. Mounting locations for hardware.
g. Door and frame sizes and materials.
2. All hardware for Aluminum doors shall be grouped and segregated from other hardware in the schedule, and may be processed separately. Only the portion of hardware schedule pertaining to Aluminum doors and frames should be forwarded to the aluminum door contractor.
3. Submit schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) that is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule. Review and acceptance by the Owner or Architect does not relieve Contractor of responsibility to fulfill requirements of Contract Documents.

E. Samples: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.
   1. Samples may be retrieved by the supplier. Units that are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

F. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

G. Keying Schedule: Submit keying schedule after meeting with Owner's agent for keying instructions.

H. Electrified Hardware Coordination: Where electric strikes, magnetic locks, low energy door operators are listed, provide power supplies by the device manufacturer and wiring diagrams for all items, whether listed in the sets or not. Provide elevations of each system showing locations for each item and description of system operation. Coordinate with electric contractor.

I. LEED Submittals: Submit data on rapidly renewable materials (agricultural products harvested within a 10-year cycle), regionally manufactured materials (within 500 miles of the Project), regionally extracted, harvested, or recovered materials (within 500 miles), and recycled content (percentage by weight of constituents pre-consumer and post-consumer) as applicable to the product.

1.3 QUALITY ASSURANCE

A. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or employs an experienced Architectural Hardware Consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.

C. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware that has been tested and listed by UL or FM or WHI for types and sizes of doors required and complies with requirements of door and door frame labels.
   1. Exit Devices: Where required on fire-rated doors (with supplementary marking on doors' UL, FM, or WHI labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL, FM, or WHI label on exit devices indicating "Fire Exit Hardware".
   2. Fire exit devices and door closers shall be certified to be in compliance with UBC7.2 and UL 10C.

PREINSTALLATION CONFERENCE:

D. Conduct Pre-Installation Conference in accordance with Book 2A Section 3.5.

E. Contractor shall notify hardware supplier two weeks prior to beginning of hardware installation to set up pre-installation meeting with installation carpenters. Hardware supplier shall provide a qualified Architectural Hardware Consultant to personally meet with, and instruct installers on job site in proper techniques for installation and adjustment of locks, closers and exit devices, and advise on required wire types and gauges for access control/electrical locking hardware.
   1. Lock, Door Closer and Exit Device Manufacturer's representative shall be available for a post installation walk and punch list assistance on behalf of the General Contractor, Architect and Owner.
   2. Review electrical roughing-in and preparatory work.
   3. Review construction keying and final keying.

1.4 DELIVERY, STORAGE AND HANDLING

A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.

C. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

D. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 - PRODUCTS

2.1 SCHEDULED HARDWARE

A Requirements for design, grade, function, finish, size and other distinctive qualities of each type of door hardware item is indicated in the Schedule of Hardware sets.

B Manufacturer's Product Designations: A manufacturer's symbol in the hardware sets indicates whose product designation is used in the Schedule *of Hardware Sets* for purposes of establishing minimum requirements. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers that comply with requirements including those specified elsewhere in this section.

C ANSI/BHMA designations used elsewhere in this section or in schedules to describe hardware Items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this section.
   1. Butts and Hinges: ANSI/BHMA A156.1
   2. Locks & Lock Trim: ANSI/BHMA A156.13
   3. Exit Devices: ANSI/BHMA A156.3
   4. Door Controls - Closers: ANSI/BHMA A156.4
   5. Auxiliary Locks: ANSI/BHMA A 156.5
   6. Architectural Door Trim: ANSI/BHMA A156.6

7. Template Hinge Dimensions: ANSI//BHMA A156.7.
8. Door Controls - Overhead Holders: ANSI/BHMA A156.8
9. Closer Holder Release Devices: ANSI/BHMA A156.15
10. Auxiliary Hardware: ANSI//BHMA A156.16
11. Materials & Finishes: ANSI/BHMA A156.18
12. Power Assist and Low Energy Operated Door: ANSI/BHMA 156.19
13. Thresholds: ANSI/BHMA A156.21
14. Door Gasketing Systems: ANSI/BHMA A156.22
15. Continuous Hinges: ANS/BHMA 156.26

2.2 MATERIALS AND FABRICATION, GENERAL

A. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement shown.

B. Manufacturer's Name Plate: Do not use manufacturer's products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Architect.

C. Manufacturer's identification will be permitted on rim of lock cylinders, and armor front.

D. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

E. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

F. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

G. Provide concealed fasteners for hardware units that are exposed when door is closed, except to extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

2.3 HARDWARE FINISHES

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch- lock sets) for color and texture.

B. Provide finishes that match those established by BHMA as indicated in the hardware schedule or, if none indicated, match the finish to which the item is applied.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.

D. Finish Designations: Scheduled designations refer to ANSI A156.18 "Materials & Finishes Standard", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

2.4 HINGES, BUTTS

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template- produced units.

B. Screws: Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.

C. Hinge Pins: Except as otherwise indicated in the hardware schedule, provide hinge pins as follows:
1. Material: Stainless steel pins.
2. Exterior Doors: Non-removable pins (NRP).
3. Interior Doors: Non-removable pins (NRP).
4. Tips: Flat button and matching plug, finished to match leaves.
5. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.
6. All hinges shall be ball bearing type.
7. Provide safety stud and locking hole for hinges where scheduled.

D. Manufacturer, (Butts**)**: Subject to compliance with requirements, provide products of one of the following:
1. Butts and Hinges:
   a. Bommer Industries.
   b. Hager Hinge Co.
   c. Ives; Ingersoll-Rand Co.
   d. McKinney Mfg. Co.; Assa Abloy Co.
   e. PBB, Inc.
   f. Stanley Hardware.

E. Manufacturer, **(**Geared Continuous Hinges): Provide products having UL listed units equal to or better than the rating of the opening of one of the following manufacturers:

1.	ABH, Inc.	4240HD series
2.	Hager/Roton	780-224-HD series
3.	Pemko	FMHD series
4.	Select Products	SL-24-HD series
5.	Stanley	520 series
6.	Zero	914DB series

2.5 LOCK CYLINDERS AND KEYING

A. General: Supplier shall meet with Owner to finalize keying requirements and obtain final instructions in writing. Comply with Owner's instructions for master keying and except as otherwise indicated, provide individual change key for each lock which is not designed to be keyed alike with a group of related locks.

B. Standard System: Except as otherwise indicated, provide new master key system for project. The following is standard system for keying hierarchy per CPS MASTER KEY ORGANIZATION.
   1. Great grand master
   2. Grand master: Principal and Building Engineer.
   3. Sub Master for the following areas and conditions:
      a. Exterior doors
      b. Special Rooms: Including rooms such auditorium, gymnasium and special use classrooms.
      c. Single User Keys: Teacher's classroom key

C. All cylinder cores shall be keyed at the factory by the cylinder manufacturer where records will be established and maintained.

D. Provide construction cores and keys during the construction period. Construction control and operating keys and cores shall not be part of the Owner's permanent key system or be furnished on the same key way as the Owner's permanent key system. Permanent core and keys shall be furnished by the hardware supplier direct to the Contractor as specified in part 3All cylinders shall be not less than six (6) pin interchangeable core and keyed into a new factory registered Grand Master Key System with a restricted key way.

E. Permanent keys shall be stamped with the key system symbol (VKC). Do not mark the keys with the cylinder biting. Permanent cores shall be marked with the key system symbol in such a manner that the mark is not visible when the core is installed in the cylinder (CVKC).

F. Except where otherwise specified, locksets, cylinders and cores shall be by the same manufacturer, to assure proper operations.

G. During construction, all cylinder cores shall be keyed alike. The Contractor shall receive three (3) copies of this key. Under no circumstances shall the Contractor receive any of the permanent building master keys or changes keys. The construction master key shall operate on no less than six (6) pins.
   1. Quantity of Keys:
      a. 3 Great Grand Master
      b. 3 Grand Master Keys
      c. 3 Master Keys
      d. 4 Keys per lock or cylinder
      e. 50 key blanks
      f. 3 Control keys

H. Provide two key control systems, including envelopes, labels, tags with self locking key clips, receipt forms, 3-way visible card index, temporary markers and standard metal cabinet, all as recommended by system manufacturer with capacity for 150% of the number of locks required for the project.
   1. The hardware supplier shall set up complete cross index system and place keys on markers and hooks in the cabinet as determined by the final key schedule.

I. Provide two hinges type wall mounted key cabinets for the above system to be installed as directed by the Owner.

2.6 LOCKS, LATCHES AND BOLTS

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.
   1. Foot Bolts: Provide dust-proof strikes, except where special threshold construction provides non-recessed strike for bolt.
   2. Roller Strikes: Provide where recommended by manufacturer of the latch and lock units.
   3. Pairs of doors with over lapping astragal provide strike with a 7/8inch lip to center (LTC).

B. Mortise Locks:
   1. Locks shall have all functions available in one size case, manufactured from heavy gauge steel, minimum thickness 3/32", completely chrome plated for corrosion resistance and lubricity of parts. Cases shall be closed on all sides to protect internal parts. Locks shall have adjustable, beveled and armored fronts, secured with spanner head security screws. Standard 2-3/4" backset convertible from one function to another, with a full 3/4" throw two-piece, or approved one-piece anti-friction latch bolt and 1" throw dead bolt with hardened steel insert and available for a minimum door thickness of 1-3/4". Internal parts shall be heavy gauge steel, zinc dichromate-plated and nickel steel hubs.
   2. All locksets with latch bolts, regardless of trim, shall be listed by UL for A and lesser labeled doors, single or pairs.
   3. Lock trim shall be solid stainless steel levers with wrought rose, through bolted through the lock case to assure correct alignment.
   4. Lockset shall conform to, and be certified as meeting, ANSI A156.13 Grade 1 requirements.
   5. Subject to compliance with specifications, provide one of the following:
      a. Best Lock; Stanley Works, Inc. 45H-14H series
      b. Corbin Russwin; Assa Abloy Co. ML2200 LSA series
      c. Dorma Architectural Hardware. M9000 LTB
      d. Sargent; Assa Abloy Co. 8200 LNJ series
      e. Schlage; Ingersoll-Rand Co. L9000-B03 series
      f. Yale Security; Assa Abloy Co. CRR 8800FL series

C. Exit Devices:
   1. Surface applied rim, mortise and vertical rod exit devices shall be available as a complete series, listed in UL "Accident Equipment List-Panic Hardware" and "Fire Exit Hardware". All devices shall be the modern push type. These devices shall have met Performance Test Requirements in accordance with ANSI Standard A156.3 for Grade 1 exit devices. All exit devices shall be furnished with thru-bolts and sex nuts. Provide cylinder dogging for all devices except “Fire Exit Devices”
   2. Rim exit device for single doors and pairs of doors with fixed or removable mullions shall be equipped with one of the following type of latch bolts, deadlocking, guarded or square bolt with a minimum ¾” throw.
   3. All rim exit devices for single doors and pairs of doors with fixed or removable mullions shall have two-piece interlocking stabilizer blocks installed above and below the latch case.
   4. Exit devices shall be the type, function, and design as listed in the schedule of finish hardware sets and shall have a manufacturer’s warranty of five (5) years.
   5. Removable Mullions:

a. Constructed of 2 inch by 3 inch steel tubing prepared to receive the required strike plates.
b. The top mounting shall be self-locking key removable type.
c. Provide a wall mounted storage mount for each mullion by the same manufacturer.
d. Provide stainless steel bottom floor fitting.
e. Provide stabilizers above and below each exit device latch case.
f. Provide factory applied paint finish conforming to ANSI/BHMA 689.

6. Subject to compliance with specifications, provide one of the following:
   a. Dorma; Dorma Co. 9000 Series
   b. Precision; Prevision Co. Apex Series
   c. Sargent; Assa Abloy Co. 80 Series
   d. Yale Security; Assa Abloy Co. 7000 Series
   e. Von Duprin; Ingersoll-Rand Co. 98 Series

D. Multi-Point Lock: Three Point Lock.
1. Description: Three ½" x 1" solid steel bolts with 3/4" throw; 16 gauge galvanized steel case; 12 gauge plated steel strikes; 3" backset.
2. Function: Levers on both sides of lock. Turning lever retracts bolts in unison. Bolts are held retracted and are released when door closes.
3. Acceptable Product/Manufacturer: Lock 301C; Wm. J. Perkinson Co., Inc.

2.7 PUSH/PULL UNITS

A. Concealed Fasteners: Provide manufacturer's special concealed fastener system for installation; through-bolted for matched pairs, but not for single units. Pulls to have 2-½" clearance from face of the door to the underside of the pull.

B. Acceptable Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Rockwood
2. Hager
3. Ives
4. Trimco
5. Hiawatha

2.8 CLOSERS AND DOOR CONTROL DEVICES

A. Closers shall be rack and pinion construction with both rack and pinion of heat treated steel and with a cast iron or cast aluminum case. Closing of door will be controlled by 2 valves, one to control closing speed and one to control latching speed. Closers shall be regularly furnished with fully adjustable back check allowing approximate 70 degrees backcheck on both regular and parallel are closers. Delayed action shall be available. Valves shall be concealed against unauthorized adjustment and non-critical needle valve type. Spring power adjustment shall be standard with an adjustment size 1 to size 6. Closers shall be surface applied with rectangular metal covers, void of manufacturers' trademarks. All door closers mounted to the door shall be furnished with thru-bolts and sex nuts.

B. Closers shall be certified as meeting the ANSI A156.4 Grade 1 requirements, be listed by UL for all classes of labeled doors and shall have a manufacturer’s warranty of ten (10) years.

C. Size of units: Except as otherwise specifically indicated, comply with the manufacturers recommendations for size of door control unit depending upon size of door, exposure to weather and anticipated frequency of use.
   1. Provide heavy duty arms.
   2. Provide spring cushion stops on parallel arm closers.
   3. Provide heavy duty dead stop parallel arms on doors equipped with electric hold open/release devices.
   4. Provide all necessary plates, brackets, arms and shoes required for proper installation of closer.

D. Acceptable Manufacturers:
   1. Dorma 8900 Series
   2. LCN 4040 Series
   3. Norton 7500 Series
   4. Sargent 281 Series

E. Door Holder/Release: Provide electric holder/release meeting the requirements of ANSI Standard A156.15.
   1. Holder/release: Surface, wall-mounted
   2. Door Armature: Cast aluminum furnished with Through-bolted and sex nuts with the projection required for wall and door conditions. Armatures requiring rod or tube extensions are not acceptable. Where required to make contact, provide shims of the same material and shape as the armature base.
   3. Electric boxes, conduit and wiring to be provided under Division 16.
   4. Voltage to be as required under Division 16.
   5. Acceptable manufacturers:
      a. LCN SEM7800 Series and SEH Series
      b. Sargent 1500 Series
      c. Rixson 900 Series
      d. Dorma EM Series

2.9 DOOR TRIM UNITS

A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units (kick plates, edge trim, viewers, knockers, mail drops and similar units); either machine screws of self-tapping screw.

B. Door protection plates will be stainless steel 18-8 type 302, 0.050" thick, beveled three sides with vertical finish grain.

2.10 STOP AND HOLDERS

A. Provide wall mounted door stops and wall mounted door stop and holders as required to protect the wall and door lever.
   1. Wall door stops: BHMA Type L52261
   2. Door Holders, Interior Doors: BHMA Type L1191
   3. Door Holders, Exterior doors: BHMA Type L11271

B. Acceptable Manufacturers:
   1. Rockwood Mfg. Co.
   2. Lock Manufacturer
   3. Hager

4. Architectural Builders Hardware (ABH)
5. Trimco

2.11 THRESHOLDS, WEATHER SEALS, RAIN DRIPS AND SOUND SEALS

A. Provide thresholds and weather seals on all exterior doors as scheduled.

B. Provide Sound Seals where indicated in the Opening Schedules. Pemko is basis of design, other products meeting design criteria will be considered subject to compliance with project requirements,
1. 30STC rating provide a single row of Pemko S88 Gasketing for head and jambs. Door Bottom Pemko 234AV, and Pemko threshold 271A.
2. 40 STC rating provide a double row of Pemko S88 perimeter Gasketing for head and jamb, door bottom Pemko AV and Pemko threshold 2005AT

C Subject to compliance with the specifications provide products of one of the following manufacturers.
1. National Guard Products
2. Pemko
3. Hager
4 Zero
5 Reese

PART 3 EXECUTION

3.1 INSTALLATION

A. Mounting Locations: As indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, and "ADA Accessibility Guidelines for Buildings and Facilities", except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

B Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

C. Install door hardware units using fasteners provided by the manufacturer as specified.
1. Hinges: Phillips flat head wood screws into wood, Phillips flat head machine screws into metal.
2. Exit devices: Through bolts and sex nuts.
3. Closers Through bolts and sex nuts.
4. Door holder/release; armature mounted with through bolts and sex nuts.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds for exterior doors in full bed of butyl- rubber or polyisobutylene mastic sealant. Thresholds shall be notched or coped to fit around removable mullions.

G. Removable mullion sill brackets shall be secured to the concrete floor with approved fasteners and anchors.

H. Hardware shall be installed with the fasteners and anchors provided by the manufacturer of that hardware item.

3.02 ADJUSTMENT, CLEANING AND KEYING

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Permanent cores and keys: shall be delivered by the hardware supplier directly to the contractor. The contractor and representative of the hardware supplier shall jointly install the permanent cores in the presence of the Owner’s agent who shall receive the keys. Hardware supplier shall return the construction cores and construction keys to the manufacturer.

D. Tools and instructions: At the time the permanent cylinder cores are delivered, the hardware supplier shall provide a complete set of specialized tools and maintenance instructions and shall instruct the Owner’s agent in the proper maintenance of the hardware.

E. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
   1. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

F. Continued Maintenance Service: Approximately three months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re- adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items that have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

2.3 SCHEDULE OF FINISH HARDWARE SETS

A. Provide finish hardware for each door to comply with requirements of this Section, hardware set numbers indicated on Door Schedule and the schedule of hardware sets on drawings.

B. Manufacturer's function and catalog numbers used in the hardware sets are identified by the following symbols.
   1. Hager Hinge Co. H
   2. Yale Security Y

3.	LCN Closers	L
4.	Glynn Johnson	G
5.	Rockwood Mfg. Co	R
6.	Architectural Builders Hardware Products	A
7.	Von Duprin	V
8.	National Guard	N
9.	Larco	LA
10.	Wm J. Perkenson	WP
11.	Du Seung	D
12.	Dorma Architectural Hardware	DO
13.	Don-Jo Manufacturing, Inc.	DJ

FINISH HARDWARE SETS.
HARDWARE SET # 1

DOOR NO. D121, D122, D123A, D124, D125A, D126, D132, D133A, D134, D135A, D136, D139, D142, D145, D212, D213, D214A, D215, D216A, D217, D223A, D224, D225A, D226, D227, D228, D230, D233B, D306, D307, D308A, D309, D310A, D311, D317A, D318, D319A, D320, D321, D322, D324, D327, D329, D410, D411, D412A, D413, D414A, D415, D419A, D420, D421A, D422, D423, D424, D426

HINGES	BB1279 4 ½ X 4 ½	HA	652
CLASSROOM LOCK	8808-2FL (F32)	Y	630
CLOSER	4041 EDA	L	689
KICK PLATE	15” X 2” LDW	R	630
WALL DOOR STOP	WS406/407CCV	I	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK

HARDWARE SET # 2

DOOR NO. D108A

HINGES	BB1191 4 ½ X 4 ½ NRP	HA	630
STOREROOM LOCK	8805FL (FO7)	Y	630
LATCH PROTECTOR	MLP 111 X 3” X 11” X 12GA.	DJ	630
DOOR CLOSER	4041 SPRING-CUSH	L	689
THRESHOLD	621S 5”	HA	TBS
WEATHERSTRIP	2891-S HEAD	P	TBS
WEATHERSTRIP	303-S JAMB	P	TBS
SWEEPS	18100CNB	P	TBS
DRIP CAP	346	P	TBS

NOTE: KNURL OUTSIDE LEVER ON ELECTRICAL/ELEVATOR ROOMS DOOR NO. 108B, OVERHEAD ROLL UP DOOR PROVIDED BY OTHERS.

HARDWARE SET # 3

DOOR NO. D111, D120, D203, D204, D211, D222, D231, D232, D305, D316, D325, D326A, D326B, D409, D427, D435

HINGES	BB1279 4 ½ X 4 ½	HA	652
STOREROOM LOCK	8805FL (FO7)	Y	630
KICK PLATE	15” X 2” LDW	R	630
WALL DOOR STOP	WS406/407CCV	G	630
DOOR CLOSER	4041-ST2795	L	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK
CONCEALED O.H. STOP	4000 SERIES STOP	A	630

(AT DOOR NO. D232, D326A, D326B, D328)

NOTE: KNURL OUTSIDE LEVER ON ELECTRICAL/ELEVATOR ROOMS
AT D232, PROVIDE PEMKO ACOUSTIC AUTOMATIC DOOR BOTTOM PDB4131 CL ANODIZED AND PEMKO JAMB WEATHERSTRIP 379PK.

HARDWARE SET # 4

DOOR NO. D116, D148, D163, D431

HINGES	BB1279 4 ½ X 4 ½	HA	652
CLASSROOM LOCK	8808-2FL (F32)	Y	630
DOOR CLOSER	4041-ST2795	L	689
KICK PLATE	15” X 2” LDW	R	630
WALL DOOR STOP	WS406/407CCV	I	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK

HARDWARE SET # 5

DOOR NO. D109B, D117, D300C

HINGES	BB1279 4 ½ X 4 ½	HA	652
STORE ROOM LOCK	8805FL (FO7)	Y	630
DOOR CLOSER	4041 SPRING-CUSH	L	689
KICK PLATE	15” X 2” LDW	R	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK

NOTE: KNURL OUTSIDE LEVER ON ELECTRICAL/ELEVATOR ROOMS
AT D117, PROVIDE PEMKO ACOUSTIC AUTOMATIC DOOR BOTTOM PDB4131 CL ANODIZED AND PEMKO JAMB WEATHERSTRIP 379PK.

HARDWARE SET # 8

PAIR OF DOOR NO. D201C, ST4-2, D404

GEARED HINGES	780-224-HD-UL-STUD	HA	TBS
EXIT DEVICES	9827L-F-LBR-994L	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041 EDA	L	689
DOOR CLOSER	4041 SPRING CUSH	L	689
KICKPLATES	15” X 1” LDW	R	630
WALL DOOR STOPS	WS406/407CCV	I	630

ACOUSTICAL/RATED SEALS S88B		P	BLK

NOTE: IF ASTRAGAL IS REQUIRED BY UL LISTING FURNISH
1 MORTISE DEVICE 9875F-2-994L
1 VERTICAL ROD DEVICE 9827EO
1 COORDINATOR 1600 SERIES W/CLOSER BRACKETS

HARDWARE SET # 9

DOOR NO. D107

HINGES	BB1279 4 ½ X 4 ½	HA	652
CLASSROOM LOCK	8808FL (FO5)	Y	630
DOOR CLOSER	4041 SPRING-CUSH	L	689
KICK PLATE	15” X 2” LDW	R	630
ACOUSTICAL/RATED SEALS S88B		P	BLK

HARDWARE SET # 12

DOOR NO. D106, D123B, D125B, D133B, D135B, D166, D206, D214B, D216B, D223B, D225B, D308B, D310B, D317B, D319B, D412B, D414B, D419B, D421B

HINGES	BB1279 4 ½ X 4 ½	HA	652
CLASSROOM LOCK	8808FL (FO5)	L	630
WALL DOOR STOP	WS406/407CCV	I	630
ACOUSTICAL/RATED SEALS S88B		P	BLK

NOTE: PROVIDE DOOR CLOSER AND KICK PLATE FOR FIRE RATED DOORS

HARDWARE SET # 15

DOOR NO. D112, D113, D114, D115, D161, D210, D219, D304, D313, D405, D406, D432

HINGES	BB1279 4 ½ X 4 ½	HA	652
PRIVACY LOCK	8802 FL (F19 OR F22)	Y	630
DOOR CLOSER	4041-ST2795	L	689
KICK PLATE	15” X 2” LDW	R	630
WALL DOOR STOP	WS406/407CCV	I	630
ACOUSTICAL/RATED SEALS S88B		P	BLK

HARDWARE SET # 17

PAIR OF DOOR NO. D429

GEARED HINGES	780-224-HD-UL-STUD	HA	652
EXIT DEVICES	9827L-F-LBR-994L	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041 EDA	L	689
KICKPLATES	15” X 1” LDW	R	630
WALL DOOR STOP	WS406/407CCV	I	630

ACOUSTICAL/RATED SEALS S88B		P	BLK

NOTE: IF ASTRAGAL IS REQUIRED BY UL LISTING FURNISH
1 MORTISE DEVICE 9875F-2-994L
1 VERTICAL ROD DEVICE 9827EO
1 COORDINATOR 1600 SERIES W/CLOSER BRACKETS
AT D429, PROVIDE PEMKO ACOUSTIC AUTOMATIC DOOR BOTTOM PDB4131 CL ANODIZED AND PEMKO JAMB WEATHERSTRIP 379PK.

HARDWARE SET # 18

DOOR NO. D138, D140, D144, D146

HINGES	BB1279 41/2 X 41/2	HA	652
PRIVACY LOCK	8802FL (F19 OR F22)	Y	630
WALL DOOR STOP	WS 406/407 CCV	I	630

NOTE: KINDERGARDEN ROOMS, PROVIDE PASSAGE LATCH 8701FL (F01)

HARDWARE SET # 19

PAIR OF DOOR NO. D103, D205, D207, D301

HINGES	BB1279 4 ½ X 4 ½	HA	652
STOREROOM LOCK 8805FL (FO7)		Y	630
AUTO FLUSH BOLTS 1842 OR 1942		R	626
DOOR CLOSERS	4041 EDA	L	689
COORDINATOR	1600 SERIES W/CLOSER BRACKETSR		600
KICKPLATES	15” X 1” LDW	R	630
DUST PROOF STRIKE	570	R	626
WALL DOOR STOP	WS406/407CCV	I	630
ACOUSTICAL/RATED SEALS S88B		P	BLK

NOTE: FOR DOORS 3’-6” WIDE OR GREATER PROVIDE BB1168 EXTRA HEAVY HINGES.
NOTE: IF ASTRAGAL IS REQUIRED BY UL LISTING PROVIDE
NOTE: KNURL OUTSIDE LEVER AT MECHANICAL ROOMS.

HARDWARE SET # 22

DOOR NO. ST4-1A

GEARED HINGES	780-224-HD-UL-STUD	HA	TBS
EXIT DEVICES	98L-2-F-994L	V	630
DOOR CLOSERS	4041 EDA	L	689
ELEC. HOLDER/RELEASE	SEM 7800 SERIES	L	689
CYLINDERS	AS REQUIRED	Y	626
KICKPLATES	15” X 1” LDW	R	630
ACOUSTICAL/RATED SEALS S88B		P	BLK

HARDWARE SET # 23

PAIR OF DOOR NO. D102A, D102B, D110B, ST2-1A, ST3-1A, D201A, D201B, D223A, ST2-2, ST3-2, ST2-3, ST3-3, ST2-4, ST3-4

GEARED HINGES	780-224-HD-UL-STUD	HA	TBS
EXIT DEVICES	9827L-F-LBR-994L	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041 EDA	L	689
ELEC.HOLDER/RELEASE	SEM 7800 SERIES	L	689
KICK PLATES	15” X 1” LDW	R	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK

NOTE: IF ASTRAGAL IS REQUIRED BY UL RATING FURNISH:

1	MORTISE DEVICE	9875L-2-F-994L
1	VERTICAL ROD DEVICE	9827 EO-F
1	COORDIINATOR	1600 SERIES W/CLOSER BRACKET

HARDWARE SET # 24

PAIR OF DOOR NO. D166

HINGES	BB1279 4 ½ X 4 ½	HA	652
CLASSROOM LOCK	8808FL(FO5)	Y	630
AUTO FLUSH BOLTS	1842 OR 1942	R	626
DUST PROOF STRIKE	570	R	626
O.H. FRICTION STOP/HOLD	4430 SERIES	A	630
ROLLER LATCH	590 SERIES (INACTIVE DOOR)	R	626
KICKPLATES	15” X 1” LDW	R	630

HARDWARE SET # 25

DOOR NO. D105, D233B, D430

GEARED HINGE	780-224-UL-STUD	HA	TBS
EXIT DEVICE	98L-2-F-994L	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSER	4041 EDA	L	689
WALL DOOR STOP	WS406/407CCV	I	630
KICK PLATES	15” X 2” LDW	R	630
ARMOR PLATES	32” X 2” LDW (AT DOOR NO. D105)	R	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK

AT D232, PROVIDE PEMKO ACOUSTIC AUTOMATIC DOOR BOTTOM PDB4131 CL ANODIZED AND PEMKO JAMB WEATHERSTRIP 379PK.

HARDWARE SET # 27

PAIR OF DOOR NO. ST1-1B, D200B, D300B, D400B

GEARED HINGES	780-224-UL-STUD	HA	TBS
EXIT DEVICES	9827L-F-994L LBR	B	630
DOOR CLOSER	4041 EDA RHR	L	689

DOOR CLOSER	4041 -CUSH LHR	L	689
DOOR HOLDER/RELEASE	SEM 7800 SERIES RHR	L	689
DOOR HOLDER/RELEASE SEH	LHR	L	689
KICKPLATES	15” X 1” LDW	R	630
CYLINDERS	AS REQUIRED	Y	626
ACOUSTICAL/RATED SEALS	S88B	P	BLK
DOOR SWEEPS	18100CNB	P	628
POWER SUPPLY	PS861 120V 12/24 VDC (VERIFY)	V	-----
WIRING DIAGRAM		-----	-----

NOTE: IF ASTRAGAL IS REQUIRED BY UL LISTING PROVIDE

MORTISE DEVICE	9875lL-F
VERTICAL ROD DEVICE	9827EO-F
COORDINATOR	1600SERIESW/CLOSER BRACKET

CONDUIT AND WIRING BY ELECTRICIAN.

HARDWARE SET #33

DOOR NO. D229, D323, D425, D328, D330

HINGES	BB1279 4 ½ X 4 ½	HA	652
CLASSROOM LOCK	8808FL (FO5)	L	630
O.H. STOP	4430 SERIES	A	630

PROVIDE KNURLED HARDWARE ON ALL SCIENCE AND ART STORAGE ROOMS

HARDWARE SET # 34

DOOR NO. D137, D141, D143, D147

HINGES	BB1168 5” X 4 ½	HA	632
CLASSROOM LOCK	8808FL (FO5)	L	630
WALL DOOR STOP	WS406/407CCV	I	630
KICKPLATE	15” X 2” LDW	R	630

HARDWARE SET #36

PAIR OF DOOR NO. ST1-1A, D200A, D300A, D400A

GEARED HINGES	780-224-HD-UL-STUD	HA	TBS
EXIT DEVICES	9827L-F-994L LBR	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSER	4041 EDA LHR	L	689
DOOR CLOSER	4041 CUSH RHR	L	6889
DOOR HOLDER/RELEASE	SEM 7800 SERIES LHR	L	689
DOOR HOLDER/RELEASE	SEH RHR	L	689
KICKPLATES	15” X 1” LDW	R	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK
DOOR SWEEPS	18100CNB	P	628
POWER SUPPLY	PS861 120V 12/24 VDC (VERIFY)	V	-----
WIRING DIAGRAM		-----	-----

NOTE: IF ASTRAGAL IS REQUIRED PROVIDE

MORTISE DEVICE	9875L-F-994L
VERTICAL ROD DEVICE	9827EO-F
COORDINATOR	1600 SERIES W/CLOSER BRACKET

CONDUIT AND WIRING BY ELECTRICIAN.

HARDWARE SET #39

DOOR NO. ST4-1B

GEARED HINGE	780-224-HD SERIES		HA	TBS
EXIT DEVICES	CD98NL-2-697NL		V	630
STABILIZER SETS	154		V	---
CYLINDERS	AS REQUIRED		Y	626
DOOR CLOSER	4041 CUSH/SPRING		L	689
KICKPLATES	15” X 2” LDW		R	630
THRESHOLD	626S 5”		HA	---
WEATHERSTRIP	2891-S	HEAD	P	TBS
WEATHERSTRIP	303-S	JAMBS	P	TBS
SWEEP	345-P		P	TBS
DRIP CAP	346		P	TBS

HARDWARE SET #40

DOOR NO. ST4-1C

GEARED HINGES	780-224-HD SERIES		HA	TBS
EXIT DEVICES	CD98-DT-697DT		V	630
STABILISER SETS	154		V	…
CYLINDERS	AS REQUIRED		Y	626
DOOR CLOSER	4041 CUSH-SPRING		L	689
KICK PLATE	15’’ X 2’’ LDW		R	630
THRESHOLD	626S 5’’		H	---
WEATHERSTRIP	2891-S	HEAD	P	TBS
WEATHERSTRIP	303-S	JAMBS	P	TBS
SWEEP	345-P		P	TBS
DRIP CAP	346		P	TBS

DOOR NO. TE-1A & TE-1B TRASH ENCLOSURE PROVIDED BY OTHERS.

HARDWARE SET # 42

PAIR OF DOOR NO. D110A

GEARED HINGES	780-224-HD SERIES	HA	TBS
POWER TRANSFER	EPT SERIES	V	689
EXIT DEVICE	EL98NL-697DT	V	630
EXIT DEVICE	CD98DT-697DT	V	630
REMOVABLE MULLION	KR4954	V	689
STORAGE MOUNT	MT54	V	689
STABILIZERS	154	V	---

CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041H-CUSH/SPRING	L	689
DOOR SCOPES	DS/2000	D	---
ARMOR PLATES	30'' X 2'' LDW	R	630
THRESHOLD	621S 5"	HA	TBS
WEATHERSTRIP	2891-S HEAD	P	TBS
WEATHERSTRIP	303-S JAMB	P	TBS
SWEEPS	345-P	P	TBS
DRIP CAP	346	P	TBS
POWER SUPPLY	PS873-2	V	-----
WIRING DIAGRAM		-----	-----

CONDUIT AND WIRING BY ELECTRICIAN.
AI PHONE, KEYPAD AND DOOR CONTACT PROVIDED BY SECURITY CONTRACTOR.

HARDWARE SET # 42A

DOOR NO. D100C, D127B, D127D

GEARED HINGES	780-224-HD SERIES	HA	TBS
POWER TRANSFER	EPT SERIES	V	689
ELECTRIC LATCH RETRACTION DEVICE	ELCD98NL-696NL	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041 SPRING CUSH	L	689
POWER SUPPLY	PS873-2 (VERIFY)	V	-----
WIRING DIAGRAM		-----	-----

NOTE: THRESHOLDS, WEATHERSTRIPPING AND SWEEPS TO BE FURNISHED BY THE ALUMINUM DOOR AND FRAME MANUFACTURER.
DOOR CONTACT PROVIDED BY SECURITY CONTRACTOR.
CONDUIT AND WIRING BY ELECTRICIAN.

HARDWARE SET #43

PAIR OF DOOR NO. D401A, D401B, D402A

GEARED HINGES	780-224-HD SERIES	HA	TBS
EXIT DEVICE	CD98NL-697NL	V	630
EXIT DEVICE	CD98EO	V	630
CYLINDERS	AS REQUIRED	Y	626
REMOVABLE MULLION	KR4954	V	689
STORAGE MOUNT	164	V	689
STABILIZER SETS	154	V	---
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041 SPRING-CUSH	L	689
KICKPLATES	15" X 2" LDW (AS REQUIRED)	R	630

NOTE: THRESHOLDS, WEATHERSTRIPPING AND SWEEPS TO BE FURNISHED BY THE ALUMINUM DOOR AND FRAME MANUFACTURER.
MOUNT EXIT DEVICE ON EXTERIOR SIDE.

HARDWARE SET # 44A

DOOR NO. D100D, D127A, D127C

GEARED HINGES	780-224-HD SERIES	HA	TBS
POWER TRANSFER EPT	SERIES	V	689
ELECTRIC LATCH RETRACTION DEVICE	ELCD98NL-697DT	V	630
CYLINDERS	AS REQUIRED	Y	626
LOW ENERGY OPERATOR	FURNISHED IN SECTION 08716	--	---
CONCEALED O.H. STOP	910S SERIES	DO	689
WIRING DIAGRAM		-----	-----

NOTE: THRESHOLDS, WEATHERSTRIPPING AND SWEEPS TO BE FURNISHED BY THE ALUMINUM DOOR AND FRAME MANUFACTURER.
AI PHONE, KEYPAD AND DOOR CONTACT PROVIDED BY SECURITY CONTRACTOR.
CONDUIT AND WIRING BY ELECTRICIAN.
ELECTRIC LATCH RETRACTION INSTALL WITH LOW ENERGY DOOR OPERATOR.

HARDWARE SET #47

DOOR NO. D100A, D100B, D165A, D165B

GEARED HINGES	780-224-HD SERIES	HA	TBS
EXIT DEVICE	CD98DT-697DT	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041 SPRING-CUSH	L	689

NOTE: THRESHOLDS, WEATHERSTRIPPING AND SWEEPS TO BE FURNISHED BY THE ALUMINUM DOOR AND FRAME MANUFACTURER.
DOOR CONTACT PROVIDED BY SECURITY CONTRACTOR.

HARDWARE SET #48

DOOR NO. D101A, D101B, D101C, D165C, D165D

GEARED HINGES	780-224-HD SERIES	HA	TBS
DOOR CLOSERS	4041 SPRING-CUSH	L	689
DUMMY PUSH BARS	350	V	630
PULLS	697DT	V	630

NOTE: THRESHOLDS, WEATHERSTRIPPING AND SWEEPS TO BE FURNISHED BY THE ALUMINUM DOOR AND FRAME MANUFACTURER.

HARDWARE SET # 49

DOOR NO. D101D

GEARED HINGES	780-224-HD SERIES	HA	TBS
LOW ENERGY OPERATOR	FURNISHED IN SECTION 08716 --	---	
ADA PUSH BUTTON		-----	630
DUMMY PUSH BAR	350	V	630
PULL	697DT	V	630

WIRING DIAGRAM		-----	-----

NOTE: THRESHOLDS, WEATHERSTRIPPING AND SWEEPS TO BE FURNISHED BY THE ALUMINUM DOOR AND FRAME MANUFACTURER.
CONDUIT AND WIRING BY ELECTRICIAN.
KEYPAD PROVIDED BY SECURITY CONTRACTOR.

HARDWARE SET # 50

DOOR NO. D158

HINGES	BB1279 4 ½ X 4 ½	HA	652
STOREROOM LOCK	8805FL (F07)	Y	630
DOOR CLOSER	4041-ST2795	L	689
DOOR HOLDER/RELEASE	SEM 7800 SERIES	L	689
ACOUSTICAL/RATED SEALS	S88B	P	BLK

HARDWARE SET # 52

PAIR OF DOOR NO. D402B

GEARED HINGES	780-224-HD SERIES	HA	628
EXIT DEVICE	CD98NL-697NL	V	630
EXIT DEVICE	CD98EO	V	630
CYLINDERS	AS REQUIRED	Y	626
REMOVABLE MULLION	KR4954	V	630
STORAGE MOUNT	MT54	V	689
STABILIZERS	154	V	---
CYLINDERS	AS REQUIRED	--	626
DOOR CLOSERS	4041H SPRING-CUSH	L	689
KICK PLATES	32” X 2” LDW	R	630
THRESHOLD	626S 5” (AS REQUIRED)	HA	---
WEATHERSTRIP	2891-1 HEAD	P	TBS
WEASTHERSTRIP	303-S JAMBS	P	TBS
SWEEPS	345-P	P	TBS

HARDWARE SET # 56

PAIR OF DOOR NO. D104A, D104B, D104C

GEARED HINGES	780-224-HD	HA	628
EXIT DEVICES	CD9827L-994L LBR	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSER	4041 HEDA	L	689
WALL DOOR STOP	WS406/407CCV	I	630
KICKPLATES	15” X 1” LDW	R	630

HARDWARE SET # 57

PAIR OF DOOR NO. D128, D218, D312, D403, D417, D428

HINGES	BB1279	4 ½ X 4 ½	HA	652
STOREROOM LOCK	8805FL (F32)		Y	630
AUTO FLUSH BOLTS	1845 OR 1945		R	626
COORDINATOR	1600 SERIES W/CLOSER BRACKETS		R	600
DOOR CLOSER	4041-ST2795		L	630
CONCEALED O.H. STOP	4000 SERIES STOP		A	630
KICKPLATES	15” X 1” LDW		R	630
ACOUSTICAL/RATED SEALS	S88B		P	BLK

NOTE: KNURL OUTSIDE LEVER ON WATER PUMP ROOMS.

HARDWARE SET # 58

DOOR NO. D202A, D202B

GEARED HINGES	780-224-HD-UL-STUD	SERIES	HA	626
EXIT DEVICE	98L-F-994L-BE		V	630
DOOR CLOSER	4041 EDA		L	689
WALL DOOR STOP	WS 406/407 CCV		I	630
ACOUSTICAL/RATED SEALS	S88B		P	BLK

DOOR NO. D202C, DOOR, FRAME & HARDWARE PROVIDED BY PLATFORM LIFT MANUFACTURER.

HARDWARE SET # 59

DOOR NO. D109A

GEARED HINGES	780-224-HD-UL-STUD	SERIES	HA	626
EXIT DEVICE	CD98L-F-994L		V	630
CYLINDER	AS REQUIRED		--	626
DOOR CLOSER	4041 SPRING-CUSH		L	689
THRESHOLD	621S 5”		HA	TBS
WEATHERSTRIP	2891-S HEAD		P	TBS
WEATHERSTRIP	303-S JAMB		P	TBS
SWEEPS	18100CNB		P	TBS
DRIP CAP	346		P	TBS

HARDWARE SET # 62

DOOR NO. D149, D150, D151, D152, D153, D154, D155, D156, D159, D160, D162

HINGES	BB1279 4 ½ X 4 ½	HA	652
CLASSROOM LOCK	8808-2FL (F32)	Y	652
KICKPLATE	15” X 2” LDW	R	630
WALL DOOR STOP	WS406/407 CCV	I	630
ACOUSTICAL/RATED SEALS	S88B	P	BLK

HARDWARE SET # 64

DOOR NO. ST1-1C, ST1-1D, ST1-1E, ST1-1F, D102C

GEARED HINGES	780-224-HD SERIES	HA	TBS
EXIT DEVICE	CD98-EO (EXIT ONLY)	V	630
CYLINDERS	AS REQUIRED	Y	626
DOOR CLOSERS	4041 SPRING-CUSH	L	689

NOTE: THRESHOLDS, WEATHERSTRIPPING AND SWEEPS TO BE FURNISHED BY THE ALUMINUM DOOR AND FRAME MANUFACTURER.
DOOR CONTACT PROVIDED BY SECURITY CONTRACTOR.

HARDWARE SET # 67

PAIR OF DOOR NO. ST2-5/ROOF

HINGES	BB1279 4 ½ X 4 ½	HA	652
STOREROOM LOCK	8805FL (FO7)	Y	630
AUTO FLUSH BOLTS	1842 OR 1942	R	626
DOOR CLOSERS	4041 SPRING CUSH	L	689
COORDINATOR	1600 SERIES W/CLOSER BRACKETSR		600
KICKPLATES	15” X 1” LDW	R	630
DUST PROOF STRIKE	570	R	626
THRESHOLD	626S 5”	HA	---
WEATHERSTRIP	2891-S HEAD	P	TBS
WEATHERSTRIP	303-S JAMBS	P	TBS
SWEEP	345-P	P	TBS
DRIP CAP	346	P	TBS

NOTE: IF ASTRAGAL IS REQUIRED BY UL LISTING PROVIDE

END OF SECTION 08 71 00

SECTION 21 05 00

COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Mechanical sleeve seals.
3. Sleeves.
4. Escutcheons.
5. Grout.
6. Fire-suppression equipment and piping demolition.
7. Equipment installation requirements common to equipment sections.
8. Painting and finishing.
9. Concrete bases.
10. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
1. CPVC: Chlorinated polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:
1. Mechanical sleeve seals.
2. Escutcheons.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Fire-Suppression Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for fire-suppression items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

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

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 21 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 21 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements for Joining CPVC Plastic Piping: ASTM F 493.

2.4 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

F. PVC Pipe: ASTM D 1785, Schedule 40.

G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.6 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated and rough brass.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated and rough brass.

E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.

F. Split-Plate, Stamped-Steel Type: With[concealedhinge, set screw or spring clips, and chrome-plated finish.

G. One-Piece, Floor-Plate Type: Cast-iron floor plate.

H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 FIRE-SUPPRESSION DEMOLITION

A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove fire-suppression systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 21 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

    a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
    f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.

g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type and set screw.
h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with [rough-brass finish.
i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed or exposed-rivet hinge and set screw or spring clips.
j. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw or spring clips.
l. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Sleeves are not required for core-drilled holes.

N. Permanent sleeves are not required for holes formed by removable PE sleeves.

O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.

2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

T. Verify final equipment locations for roughing-in.

U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 21 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.

J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

3.4 PAINTING

A. Painting of fire-suppression systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.5 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use **3000-psi** , 28-day compressive-strength concrete and reinforcement.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor fire-suppression materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.7 GROUTING

A. Mix and install grout for fire-suppression equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION

SECTION 21 10 00

WATER-BASED FIRE-SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following fire-suppression piping inside the building:

1. Automatic wet-type standpipe systems.
2. Wet-pipe sprinkler systems.

B. Related Sections include the following:

1. Division 10 Sections "Fire Extinguisher Cabinets" and "Fire Extinguishers" for cabinets and fire extinguishers.
2. Division 21 Section "Electric-Drive, Centrifugal Fire Pumps" for fire pumps, pressure-maintenance pumps, and pump controllers.
3. Division 22 Section "Facility Water Distribution Piping" for piping outside the building.
4. Division 28 Section "Fire Detection and Alarm" for alarm devices not specified in this Section.

1.3 SYSTEM DESCRIPTIONS

A. Combined Standpipe and Sprinkler System: Fire-suppression system with both standpipe and sprinkler systems. Sprinkler system is supplied from standpipe system.

B. Automatic Wet-Type, Class I Standpipe System: Includes NPS 2-1/2 hose connections. Has open water-supply valve with pressure maintained and is capable of supplying water demand.

C. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.4 PERFORMANCE REQUIREMENTS

A. Standard Piping System Component Working Pressure: Listed for at least 175 psig.

B. High-Pressure Piping System Component Working Pressure: Listed for 250 psig minimum .

C. Fire-suppression standpipe system design shall be approved by authorities having jurisdiction.

1. Minimum residual pressure at each hose-connection outlet is the following:
   a. NPS 2-1/2 Hose Connections: 65 psig .

2. Unless otherwise indicated, the following is maximum residual pressure at required flow at each hose-connection outlet:
   a. NPS 2-1/2 Hose Connections: 175 psig .

D. Fire-suppression sprinkler system design shall be approved by authorities having jurisdiction.

1. Margin of Safety for Available Water Flow and Pressure: 20 > percent, including losses through water-service piping, valves, and backflow preventers.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Piping materials, including dielectric fittings and dielectric fittings, flexible connections, and sprinkler specialty fittings.
2. Pipe hangers and supports.
3. Valves, including listed fire-protection valves, unlisted general-duty valves, and specialty valves and trim.
4. Excess-pressure pumps, including electrical data.
5. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
6. Hose connections, including size, type, and finish.
7. Hose stations, including size, type, and finish of hose connections; type and length of fire hoses; finish of fire hose couplings; type, material, and finish of nozzles; and finish of rack.
8. Fire department connections, including type; number, size, and arrangement of inlets; caps and chains; size and direction of outlet; escutcheon and marking; and finish.
9. Alarm devices, including electrical data.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Fire-hydrant flow test report.

D. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations, if applicable.

E. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13 and NFPA 14 . Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping."

F. Welding certificates.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For standpipe and sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 13R, "Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height."
3. NFPA 14, "Installation of Standpipe, Private Hydrant, and Hose Systems."
4. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."
5. NFPA 230, "Fire Protection of Storage."

1.7 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell end and plain end.

1. Mechanical-Joint, Ductile-Iron Fittings: Per City of Chicago Fire Code.

B. Grooved-End, Ductile-Iron Pipe: AWWA C151, with factory- or field-formed, radius-cut-grooved ends according to AWWA C606.

1. Grooved-Joint Piping Systems:

a. Manufacturers:

1) Victaulic Co. of America.
2) Approved equal.

b. Grooved-End Fittings: ASTM A 536, ductile-iron casting with OD matching ductile-iron-pipe OD.
c. Grooved-End-Pipe Couplings: AWWA C606, gasketed fitting matching ductile-iron-pipe OD. Include ductile-iron housing with keys matching ductile-iron-pipe and fitting grooves, rubber gasket with center leg, and steel bolts and nuts.
d. Grooved-End-Pipe Transition Coupling: UL 213 and AWWA C606, gasketed fitting with end matching ductile-iron-pipe OD and end matching steel-pipe OD. Include ductile-iron housing with key matching ductile-iron-pipe groove and key matching steel-pipe groove, rubber gasket listed for use with housing, and steel bolts and nuts.
e. Grooved-End Transition Flange: UL 213, gasketed fitting with key for ductile-iron-pipe dimensions. Include flange-type, ductile-iron housing with rubber gasket listed for use with housing and steel bolts and nuts.

2.3 STEEL PIPE AND FITTINGS

A. Threaded-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795,[with factory- or field-formed threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865

B. Plain-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

a. Manufacturers:

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Ward Manufacturing.

C. Plain-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

D. Grooved-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, -grooved ends.

1. Grooved-Joint Piping Systems:

a. Manufacturers:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Ductilic, Inc.
4) JDH Pacific, Inc.
5) National Fittings, Inc.
6) Shurjoint Piping Products, Inc.
7) Southwestern Pipe, Inc.
8) Star Pipe Products; Star Fittings Div.
9) Victaulic Co. of America.
10) Ward Manufacturing.

b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

E. Threaded-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe with factory- or field-threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865.

F. Plain-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe.

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

a. Manufacturers:

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Ward Manufacturing.

G. Plain-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

H. Grooved-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe; with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Manufacturers:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Ductilic, Inc.
4) JDH Pacific, Inc.
5) National Fittings, Inc.
6) Shurjoint Piping Products, Inc.
7) Southwestern Pipe, Inc.
8) Star Pipe Products; Star Fittings Div.
9) Victaulic Co. of America.
10) Ward Manufacturing.

b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron

housing with keys matching steel-pipe and fitting grooves rubber gasket listed for use with housing, and steel bolts and nuts.

I. Threaded-End, Threadable, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10, and with factory- or field-formed threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe.
5. Steel Threaded Couplings: ASTM A 865.

J. Grooved-End, Threadable, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10, and with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Manufacturers:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Ductilic, Inc.
4) JDH Pacific, Inc.
5) National Fittings, Inc.
6) Shurjoint Piping Products, Inc.
7) Southwestern Pipe, Inc.
8) Star Pipe Products; Star Fittings Div.
9) Victaulic Co. of America.
10) Ward Manufacturing.

b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

K. Plain-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10.

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

a. Manufacturers:

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Ward Manufacturing.

L. Plain-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 and smaller; and NFPA 13 specified wall thickness in NPS 6 to NPS 10.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

M. Grooved-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10; with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Manufacturers:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Ductilic, Inc.
4) JDH Pacific, Inc.
5) National Fittings, Inc.
6) Shurjoint Piping Products, Inc.
7) Southwestern Pipe, Inc.
8) Star Pipe Products; Star Fittings Div.
9) Victaulic Co. of America.
10) Ward Manufacturing.

b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

N. Plain-End, Nonstandard OD, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 10.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

O. Grooved-End, Nonstandard OD, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 10; with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Manufacturers:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Ductilic, Inc.
4) JDH Pacific, Inc.
5) National Fittings, Inc.
6) Shurjoint Piping Products, Inc.

7) Southwestern Pipe, Inc.
8) Star Pipe Products; Star Fittings Div.
9) Victaulic Co. of America.
10) Ward Manufacturing.

b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

P. Plain-End, Hybrid Steel Pipe: ASTM A 135 or ASTM A 795, lightwall, with wall thickness less than Schedule 10 and greater than Schedule 5.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

Q. Grooved-End, Hybrid Steel Pipe: ASTM A 135 or ASTM A 795, lightwall, with wall thickness less than Schedule 10 and greater than Schedule 5; with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Manufacturers:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Ductilic, Inc.
4) JDH Pacific, Inc.
5) National Fittings, Inc.
6) Shurjoint Piping Products, Inc.
7) Southwestern Pipe, Inc.
8) Star Pipe Products; Star Fittings Div.
9) Victaulic Co. of America.
10) Ward Manufacturing.

b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, rubber gasket listed for use with housing, and steel bolts and nuts.

R. Schedule 5 Steel Pipe: ASTM A 135 or ASTM A 795, lightwall, with plain ends.

1. Steel Pressure-Seal Fittings: UL 213, FMG-approved, 175-psig working-pressure rating with steel housing, rubber O-rings, and pipe stop; for use with UL 45-listed, fitting manufacturer's, pressure-sealing tools.

a. Manufacturers:

1) Victaulic Co. of America.

2.4 LISTED FIRE-PROTECTION VALVES

A. Valves shall be UL listed or FMG approved, with 175-psig minimum pressure rating. Valves shall have 250-psig minimum pressure rating if valves are components of high-pressure piping system.

B. Gate Valves with Wall Indicator Posts:

1. Gate Valves: UL 262, cast-iron body, bronze mounted, with solid disc, nonrising stem, operating nut, and flanged ends.
2. Manufacturers:

a. Grinnell Fire Protection.
b. McWane, Inc.; Kennedy Valve Div.
c. NIBCO.
d. Stockham.

C. Ball Valves: Comply with UL 1091, except with ball instead of disc.

1. NPS 1-1/2 and Smaller: Bronze body with threaded ends.
2. NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
3. NPS 3: Ductile-iron body with grooved ends.
4. Manufacturers:

a. NIBCO.
b. Victaulic Co. of America.

D. Butterfly Valves: UL 1091.

1. NPS 2 and Smaller: Bronze body with threaded ends.

a. Manufacturers:

1) Global Safety Products, Inc.
2) Milwaukee Valve Company.

2. NPS 2-1/2 and Larger: Bronze, cast-iron, or ductile-iron body; wafer type or with flanged or grooved ends.

a. Manufacturers:

1) Central Sprinkler Corp.
2) Global Safety Products, Inc.
3) McWane, Inc.; Kennedy Valve Div.
4) Mueller Company.
5) NIBCO.

6) Pratt, Henry Company.
7) Victaulic Co. of America.

E. Check Valves NPS 2 and Larger: UL 312, swing type, cast-iron body with flanged or grooved ends.

1. Manufacturers:

a. AFAC Inc.
b. American Cast Iron Pipe Co.; Waterous Co.
c. Central Sprinkler Corp.
d. Clow Valve Co.
e. Crane Co.; Crane Valve Group; Crane Valves.
f. Crane Co.; Crane Valve Group; Jenkins Valves.
g. Firematic Sprinkler Devices, Inc.
h. Globe Fire Sprinkler Corporation.
i. Grinnell Fire Protection.
j. Hammond Valve.
k. Matco-Norca, Inc.
l. McWane, Inc.; Kennedy Valve Div.
m. Mueller Company.
n. NIBCO.
o. Potter-Roemer; Fire Protection Div.
p. Reliable Automatic Sprinkler Co., Inc.
q. Star Sprinkler Inc.
r. Stockham.
s. United Brass Works, Inc.
t. Venus Fire Protection, Ltd.
u. Victaulic Co. of America.
v. Watts Industries, Inc.; Water Products Div.

F. Gate Valves: UL 262, OS&Y type.

1. NPS 2 and Smaller: Bronze body with threaded ends.

a. Manufacturers:

1) Crane Co.; Crane Valve Group; Crane Valves.
2) Hammond Valve.
3) NIBCO.
4) United Brass Works, Inc.

2. NPS 2-1/2 and Larger: Cast-iron body with flanged ends.

a. Manufacturers:

1) Clow Valve Co.
2) Crane Co.; Crane Valve Group; Crane Valves.
3) Crane Co.; Crane Valve Group; Jenkins Valves.
4) Hammond Valve.
5) Milwaukee Valve Company.

6) Mueller Company.
7) NIBCO.
8) Red-White Valve Corp.
9) United Brass Works, Inc.

G. Indicating Valves: UL 1091, with integral indicating device and ends matching connecting piping.

1. Indicator: Electrical, 115-V ac, prewired, single-circuit, supervisory switch.
2. NPS 2 and Smaller: Ball or butterfly valve with bronze body and threaded ends.

a. Manufacturers:

1) Milwaukee Valve Company.
2) NIBCO.
3) Victaulic Co. of America.

3. NPS 2-1/2 and Larger: Butterfly valve with cast- or ductile-iron body; wafer type or with flanged or grooved ends.

a. Manufacturers:

1) Central Sprinkler Corp.
2) Grinnell Fire Protection.
3) McWane, Inc.; Kennedy Valve Div.
4) Milwaukee Valve Company.
5) NIBCO.
6) Victaulic Co. of America.

2.5 UNLISTED GENERAL-DUTY VALVES

A. Ball Valves NPS 2 and Smaller: MSS SP-110, 2-piece copper-alloy body with chrome-plated brass ball, 600-psig minimum CWP rating, blowout-proof stem, and threaded ends.

B. Check Valves NPS 2 and Smaller: MSS SP-80, Type 4, Class 125 minimum, swing type with bronze body, nonmetallic disc, and threaded ends.

C. Gate Valves NPS 2 and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, solid wedge, and threaded ends.

D. Globe Valves NPS 2 and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, nonmetallic disc, and threaded ends.

2.6 SPECIALTY VALVES

A. Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig minimum pressure rating. Control valves shall have 250-psig minimum pressure rating if valves are components of high-pressure piping system.

1. Manufacturers:

    a. AFAC Inc.
    b. Central Sprinkler Corp.
    c. Firematic Sprinkler Devices, Inc.
    d. Globe Fire Sprinkler Corporation.
    e. Grinnell Fire Protection.
    f. Reliable Automatic Sprinkler Co., Inc.
    g. Star Sprinkler Inc.
    h. Venus Fire Protection, Ltd.
    i. Victaulic Co. of America.
    j. Viking Corp.

2. Alarm Check Valves: UL 193, designed for horizontal or vertical installation, with bronze grooved seat with O-ring seals, single-hinge pin, and latch design. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gagesand fill-line attachment with strainer.

    a. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
    b. Drip Cup Assembly: Pipe drain with check valve to main drain piping.
    c.

B. Automatic Drain Valves: UL 1726, NPS 3/4, ball-check device with threaded ends.

1. Manufacturers:

    a. AFAC Inc.
    b. Grinnell Fire Protection.

2.7 MANUAL CONTROL STATIONS

A. Manual Control Stations: UL listed or FMG approved, hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

2.8 CONTROL PANELS

A. Description: Single-area, two-area, or single-area cross-zoned type control panel as indicated, including NEMA ICS 6, Type 1 enclosure, detector, alarm, and solenoid-valve circuitry for operation of deluge valves. Panels contain power supply; battery charger; standby batteries; field-wiring terminal strip; electrically supervised solenoid valves and polarized fire alarm bell; lamp test facility; single-pole, double-throw auxiliary alarm contacts; and rectifier.

1. Panels: UL listed and FMG approved when used with thermal detectors and Class A detector circuit wiring. Electrical characteristics are 120-V ac, 60 Hz, with 24-V dc rechargeable batteries.

2. Manual Control Stations: Electric operation, metal enclosure, labeled "MANUAL CONTROL STATION" with operating instructions and a cover held closed by breakable strut.
3. Manual Control Stations: Hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut.

2.9 SPRINKLERS

A. Sprinklers shall be UL listed or FMG approved, with 175-psig minimum pressure rating. Sprinklers shall have 250-psig minimum pressure rating if sprinklers are components of high-pressure piping system.

B. Manufacturers:

1. AFAC Inc.
2. Central Sprinkler Corp.
3. Firematic Sprinkler Devices, Inc.
4. Globe Fire Sprinkler Corporation.
5. Grinnell Fire Protection.
6. Reliable Automatic Sprinkler Co., Inc.
7. Star Sprinkler Inc.
8. Venus Fire Protection, Ltd.
9. Victaulic Co. of America.
10. Viking Corp.

C. Automatic Sprinklers: With heat-responsive element complying with the following:

1. UL 199, for nonresidential applications.
2. UL 1626, for residential applications.
3. UL 1767, for early-suppression, fast-response applications.

D. Sprinkler Types and Categories: Nominal 1/2-inch orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

1. Open Sprinklers: UL 199, without heat-responsive element.

a. Orifice: 1/2 inch, with discharge coefficient K between 5.3 and 5.8.
b. Orifice: 17/32 inch, with discharge coefficient K between 7.4 and 8.2.

E. Sprinkler types, features, and options as follows:

1. Concealed ceiling sprinklers, including cover plate.
2. Extended-coverage sprinklers.
3. Flow-control sprinklers, with automatic open and shutoff feature.
4. Flush ceiling sprinklers, including escutcheon.
5. High-pressure sprinklers.
6. Institution sprinklers, made with a small, breakaway projection.
7. Open sprinklers.
8. Pendent sprinklers.

9. Pendent, dry-type sprinklers.
10. Quick-response sprinklers.
11. Recessed sprinklers, including escutcheon.
12. Sidewall sprinklers.
13. Sidewall, dry-type sprinklers.
14. Upright sprinklers.

F. Sprinkler Finishes: Chrome plated, bronze, and painted.

G. Special Coatings: Wax, lead, and corrosion-resistant paint.

H. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Chrome-plated steel, one piece, flat.
2. Sidewall Mounting: Chrome-plated steel, one piece, flat.

I. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler.

2.10 HOSE CONNECTIONS

A. Manufacturers:

1. AFAC Inc.
2. Central Sprinkler Corp.
3. Elkhart Brass Mfg. Co., Inc.
4. Fire-End and Croker Corp.
5. Fire Protection Products, Inc.
6. GMR International Equipment Corporation.
7. Grinnell Fire Protection.
8. Guardian Fire Equipment Incorporated.
9. McWane, Inc.; Kennedy Valve Div.
10. Mueller Company.
11. Potter-Roemer; Fire-Protection Div.
12. United Brass Works, Inc.

B. Description: UL 668, brass or bronze, 300-psig minimum pressure rating, hose valve for connecting fire hose. Include angle or gate pattern design; female NPS inlet and male hose outlet; and lugged cap, gasket, and chain. Include NPS 1-1/2 or NPS 2-1/2 as indicated, and hose valve threads according to NFPA 1963 and matching local fire department threads.

1. Valve Operation: Nonadjustable type.
2. Finish: Rough metal or chrome-plated.

2.11 FIRE DEPARTMENT CONNECTIONS

A. Manufacturers:

1. AFAC Inc.
2. Central Sprinkler Corp.
3. Elkhart Brass Mfg. Co., Inc.
4. Fire-End and Croker Corp.
5. Fire Protection Products, Inc.
6. GMR International Equipment Corporation.
7. Guardian Fire Equipment Incorporated.
8. Potter-Roemer; Fire-Protection Div.
9. Reliable Automatic Sprinkler Co., Inc.
10. United Brass Works, Inc.

B. Wall-Type, Fire Department Connection: UL 405, 175-psig minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking similar to "AUTO SPKR & STANDPIPE."

1. Type: Flush, with two inlets and square or rectangular escutcheon plate.
2. Type: Exposed, projecting, with two inlets and round escutcheon plate.
3. Finish: Polished chrome-plated.

2.12 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Water-Motor-Operated Alarm: UL 753, mechanical-operation type with pelton-wheel operator with shaft length, bearings, and sleeve to suit wall construction and 10-inch- diameter, cast-aluminum alarm gong with red-enamel factory finish. Include NPS 3/4 inlet and NPS 1 drain connections.

1. Manufacturers:

a. AFAC Inc.
b. Central Sprinkler Corp.
c. Firematic Sprinkler Devices, Inc.
d. Globe Fire Sprinkler Corporation.
e. Grinnell Fire Protection.
f. Reliable Automatic Sprinkler Co., Inc.
g. Star Sprinkler Inc.
h. Viking Corp.
i.

C. Electrically Operated Alarm: UL 464, , vibrating-type, metal alarm bell with red-enamel factory finish and suitable for outdoor use.

1. Manufacturers:

a. Potter Electric Signal Company.
b. System Sensor.

D. Water-Flow Indicator: UL 346, electrical-supervision, paddle-operated-type, water-flow detector with 250-psig pressure rating and designed for horizontal or vertical installation. Include two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

1. Manufacturers:

a. ADT Security Services, Inc.
b. Grinnell Fire Protection.
c. ITT McDonnell & Miller.
d. Potter Electric Signal Company.
e. System Sensor.
f. Viking Corp.
g. Watts Industries, Inc.; Water Products Div.

E. Pressure Switch: UL 753, electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.

1. Manufacturers:

a. Grinnell Fire Protection.
b. Potter Electric Signal Company.
c. System Sensor.
d. Viking Corp.

F. Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

1. Manufacturers:

a. McWane, Inc.; Kennedy Valve Div.
b. Potter Electric Signal Company.
c. System Sensor.

G. Indicator-Post Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled indicator-post valve is in other than fully open position.

1. Manufacturers:

a. Potter Electric Signal Company.
b. System Sensor.

2.13 PRESSURE GAGES

A. Manufacturers:

1. AGF Manufacturing Co.

2. AMETEK, Inc.; U.S. Gauge.
3. Brecco Corporation.
4. Dresser Equipment Group; Instrument Div.
5. Marsh Bellofram.
6. WIKA Instrument Corporation.

B. Description: UL 393, 3-1/2- to 4-1/2-inch- diameter, dial pressure gage with range of 0 to 250 psig minimum.

1. Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13, NFPA 14 and NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 EARTHWORK

A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.3 EXAMINATION

A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.

B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.

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

3.4 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints where welded piping is indicated.

B. Do not use welded joints for galvanized-steel pipe.

C. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

3.5 STANDPIPE SYSTEM PIPING APPLICATIONS

A. Standard-Pressure, Wet-Type Standpipe System, 175-psig Maximum Working Pressure:

1. NPS 4 and Smaller: Threaded-end, black or galvanized, standard-weight steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
2. NPS 4 and Smaller: Plain-end, black, standard-weight steel pipe; steel welding fittings; and welded joints.
3. NPS 4 and Smaller: Grooved-end, black or galvanized, standard-weight steel pipe with grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.
4. NPS 4 and Smaller: Plain-end, black, Schedule 30 steel pipe; steel welding fittings; and welded joints.

3.6 SPRINKLER SYSTEM PIPING APPLICATIONS

A. Standard-Pressure, Wet-Pipe Sprinkler System, 175-psig Maximum Working Pressure:

3.7 Sprinkler-Piping Fitting Option: Specialty sprinkler fittings, NPS 2 and smaller.VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NFPA 13 and NFPA 14.

a. Shutoff Duty: Use ball, butterfly, or gate valves.

2. Unlisted General-Duty Valves: For applications where UL-listed and FMG-approved valves are not required by NFPA 13 and NFPA 14.

a. Shutoff Duty: Use ball, butterfly, or gate valves.
b. Throttling Duty: Use ball or globe valves.

3.8 JOINT CONSTRUCTION

A. Refer to Division 21 Section "Common Work Results for Fire Suppression" for basic piping joint construction.

B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 (DN 200) with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.

C. Twist-Locked Joints: Insert plain-end piping into locking-lug fitting and rotate retainer lug one-quarter turn.

D. Pressure-Sealed Joints: Use UL-listed tool and procedure. Include use of specific equipment, pressure-sealing tool, and accessories.

E. Mechanically Formed, Copper-Tube-Outlet Joints: Use UL-listed tool and procedure. Drill pilot hole in copper tube, form branch for collar, dimple tube to form seating stop, and braze branch tube into formed-collar outlet.

F. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.

1. Ductile-Iron Pipe: Radius-cut-groove ends of piping. Use grooved-end fittings and grooved-end-pipe couplings.
2. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.
3. Copper Tube: Roll-groove tubing. Use grooved-end fittings and grooved-end-tube couplings.
4. Dry-Pipe Systems: Use fittings and gaskets listed for dry-pipe service.

G. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials.

1. NPS 2 and Smaller: Use dielectric unions, couplings, or nipples.
2. NPS 2-1/2 to NPS 4: Use dielectric flanges.
3. NPS 5 and Larger: Use dielectric flange insulation kits.

3.9 SERVICE-ENTRANCE PIPING

A. Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building. Refer to Division 22 Section "Facility Water Distribution Piping" for exterior piping.

B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Refer to Division 22 Section "Facility Water Distribution Piping" for backflow preventers.

C. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

3.10 WATER-SUPPLY CONNECTION

A. Connect fire-suppression piping to building's interior water distribution piping. Refer to Division 22 Section "Domestic Water Piping" for interior piping.

B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water distribution piping. Refer to Division 22 Section "Domestic Water Piping Specialties" for backflow preventers.

C. Install shutoff valve, check valve, pressure gage, and drain at connection to water supply.

3.11 PIPING INSTALLATION

A. Refer to Division 21 Section "Common Work Results for Fire Suppression" for basic piping installation.

B. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

C. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions adjacent to each valve in pipes NPS 2 and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

E. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 and larger connections.

F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.

G. Install sprinkler piping with drains for complete system drainage.

H. Install sprinkler zone control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

I. Install drain valves on standpipes.

J. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

K. Install alarm devices in piping systems.

L. Hangers and Supports: Comply with NFPA 13 for hanger materials.

1. Install standpipe system piping according to NFPA 14.
2. Install sprinkler system piping according to NFPA 13.

M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

N. Fill wet-standpipe system piping with water.

O. Fill wet-pipe sprinkler system piping with water.

3.12 VALVE INSTALLATION

A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and NFPA 14 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Valves for Wall-Type Fire Hydrants: Install nonrising-stem gate valve in water-supply pipe.

D. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water supply sources.

E. Specialty Valves:

1. Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.

3.13 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels and tiles.

B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

3.14 HOSE-CONNECTION INSTALLATION

A. Install hose connections adjacent to standpipes, unless otherwise indicated.

B. Install freestanding hose connections for access and minimum passage restriction.

C. Install NPS 2-1/2 hose-connection valves with flow-restricting device, unless otherwise indicated and per Chicago Fire Code

D.

3.15 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install wall-type, fire department connections in vertical wall.

B. Install ball drip valve at each check valve for fire department connection.

3.16 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect water-supply piping to fire-suppression piping. Include backflow preventer between potable-water piping and fire-suppression piping. Refer to Division 22 Section "Domestic Water Piping Specialties" for backflow preventers.

D. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.

E. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.

F. Connect excess-pressure pumps to the following piping and wiring:

1. Sprinkler system, hydraulically.
2. Pressure gages and controls, hydraulically.
3. Electrical power system.
4. Alarm device accessories for pump.
5. Fire alarm.

G. Connect compressed-air supply to dry-pipe sprinkler piping.

H. Connect air compressor to the following piping and wiring:

1. Pressure gages and controls.
2. Electrical power system.
3. Fire alarm devices, including low-pressure alarm.

I. Electrical Connections: Power wiring is specified in Division 26.

J. Connect alarm devices to fire alarm.

K. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

L. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

M. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.17 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and NFPA 14.

3.18 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Energize circuits to electrical equipment and devices.

4. Start and run excess-pressure pumps.
5. Start and run air compressors.
6. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
7. Flush, test, and inspect standpipe systems according to NFPA 14, "System Acceptance" Chapter.
8. Coordinate with fire alarm tests. Operate as required.
9. Coordinate with fire-pump tests. Operate as required.
10. Verify that equipment hose threads are same as local fire department equipment.

B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.19 CLEANING AND PROTECTION

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

C. Protect sprinklers from damage until Substantial Completion.

3.20 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION

SECTION 21 11 00

FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following fire-suppression piping inside the building:

1. Wet-pipe sprinkler systems.

B. The work under this heading shall include the furnishing of all labor, materials, equipment and services necessary for and reasonably incidental to the satisfactory completion of the Fire Protection System, which in general shall include but not be limited to pipe sleeves, pipe and equipment hangers and supports, piping, fittings, flanges, valves, test connections, drains, etc. all as indicated on the Drawings and/or as specified.

1. Each sprinkler system shall be on a separate zone for each floor as a minimum. Each zone shall be provided with all necessary valves, valve supervisory switches, water flow indicators and drains to make it a separate sprinkler system.
2. The drawings are schematic in nature and are for information only, intended to show potential arrangement. Contractor shall field verify all information contained on the Drawings and shall be solely responsible for design and installation of the systems in accordance with the specifications. All notes, and specifications on the drawings and herein specified shall be complied with.
3. Provide shields/baffle plates necessary to protect electrical equipment from sprinkler discharge.
4. Provide temporary or permanent standpipes in accordance with requirements of authority having jurisdiction to furnish fire protection on all floors during construction. The work performed shall be complete in every respect, resulting in a system(s) installed entirely in accordance with the applicable code, standards, local code amendments, and these specifications.
5. Existing Fire Protection system(s) may not be taken out of service without prior written approval from the Owner and the Fire Department. If such systems are taken out of service, this contractor shall provide alternate protection, acceptable to the Owner and the Fire Department, until those systems are restored to service.

1.2 DEFINITIONS

A. CR: Chlorosulfonated polyethylene synthetic rubber.

B. High-Pressure Piping System: Fire-suppression piping system designed to operate at working pressure higher than standard 175 psig (1200 kPa).

C. PE: Polyethylene plastic.

D. Underground Service-Entrance Piping: Underground service piping below the building.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Piping materials, including dielectric fittings, flexible connections, sprinkler specialty fittings.
2. Pipe hangers and supports.
3. Valves, including listed fire-protection valves, unlisted general-duty valves, and specialty valves and trim.
4. Excess-pressure pumps, including electrical data.
5. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
6. Fire department connections, including type; number, size, and arrangement of inlets; caps and chains; size and direction of outlet; escutcheon and marking; and finish.
7. Alarm devices, including electrical data.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Fire-hydrant flow test report.

D. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by Chicago Bureau of Fire Prevention, including hydraulic calculations, if applicable.

1. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping." Submit written reports documenting the activities required by Part 3.0. These reports are to be submitted two weeks after the activity is completed.
2. Training Reports: Submit reports on training documenting dates and attendance.

E. Welding certificates.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified fire protection professional in accordance with the requirements of the Chicago Bureau of Fire Prevention.

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."

1.5 DELIVERY, STORAGE AND HANDLING

A. In accordance with Division 01 requirements.

1.6 WARRANTY

A. Provide manufacturer’s standard 1-year warranty for materials and labor, commencing on date of substantial completion.

1.7 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

B. Dry-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing compressed air. Opening of sprinklers releases compressed air and permits water pressure to open dry-pipe valve. Water then flows into piping and discharges from opened sprinklers.

1.8 PERFORMANCE REQUIREMENTS

A. Standard Piping System Component Working Pressure: Listed for at least 175 psig (1200 kPa).

B. Fire-suppression sprinkler system design shall be approved by Chicago Bureau of Fire Prevention.

C. Fire-suppression sprinkler system design and installation shall be in accordance with Chicago Building Code.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers. Minimum of 10 psi shall be provided.
2. Sprinkler Occupancy Hazard Classifications:

a. Building Service Areas: Ordinary Hazard, Group 1.
b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
c. General Storage Areas: Ordinary Hazard, Group 1.
d. Libraries, Except Stack Areas: Light Hazard.
e. Library Stack Areas: Ordinary Hazard, Group 2.
f. Machine Shops: Ordinary Hazard, Group 2.
g. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.

h. Office and Public Areas: Light Hazard.
i. Repair Garages: Ordinary Hazard, Group 2.
j. Restaurant and Kitchen Service Areas: Ordinary Hazard, Group 1.
k. Laboratory Areas where Chemicals are used: Ordinary Hazard, Group 1.

3. Minimum Density for Automatic-Sprinkler Piping Design:

a. Light-Hazard Occupancy: 0.12 gpm over 1500-sq. ft. area.
b. Ordinary-Hazard, Group 1 Occupancy (14 foot or lower ceiling height): 0.2 gpm over 2000-sq. ft. area.
c. Ordinary-Hazard, Group 1 Occupancy (over 14 foot ceiling height): 0.25 gpm over 2500-sq. ft. area
d. Rooms utilized for HVAC equipment: 0.15 gpm over 1500-sq. ft. area.
e. Special Occupancy Hazard: As determined by authorities having jurisdiction.

4. Maximum Protection Area per Sprinkler:

a. Office Spaces: 225 sq. ft. (20.9 sq. m).
b. Storage Areas: 130 sq. ft. (12.1 sq. m).
c. Mechanical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
d. Electrical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
e. Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13, unless otherwise indicated:

a. Light-Hazard Occupancies: 250 gpm (15.75 L/s) for 30 minutes.
b. Ordinary-Hazard Occupancies: 250 gpm (15.75 L/s) for 60 to 90 minutes.

1.9 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for minimum of six spare sprinklers for every 500 sprinklers installed, plus sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements in other part 2 articles, provide products by one of the manufacturers specified.

1. Grooved-End, Ductile-Iron Pipe

a. Grooved-Joint Piping Systems:

1) Victaulic Co. of America.
2) Nibco
3) Grinnell**.**

2. Plain-End, Standard-Weight Steel Pipe

a. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Grinnell
4) Ward Manufacturing.

3. Grooved-End, Standard-Weight Steel Pipe

a. Grooved-Joint Piping Systems:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Nibco.
4) Star Pipe Products; Star Fittings Div.
5) Victaulic Co. of America.
6) Ward Manufacturing.

4. Plain-End, Schedule 30 Steel Pipe

a. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Grinnell
4) Ward Manufacturing.

5. Grooved-End, Schedule 30 Steel Pipe

a. Grooved-Joint Piping Systems:

1) Anvil International, Inc.
2) Central Sprinkler Corp.

3) Nibco.
4) Star Pipe Products; Star Fittings Div.
5) Victaulic Co. of America.
6) Ward Manufacturing.

6. Plain-End, Threadable, Thinwall Steel Pipe

a. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Grinnell
4) Ward Manufacturing.

7. Grooved-End, Threadable, Thinwall Steel Pipe

a. Grooved-Joint Piping Systems:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Nibco
4) Star Pipe Products; Star Fittings Div.
5) Victaulic Co. of America.
6) Ward Manufacturing.

8. Plain-End, Schedule 10 Steel Pipe:

a. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Grinnell
4) Ward Manufacturing.

9. Grooved-End, Schedule 10 Steel Pipe

a. Grooved-Joint Piping Systems:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Nibco.
4) Star Pipe Products; Star Fittings Div.
5) Victaulic Co. of America.
6) Ward Manufacturing.

10. Dielectric Unions

a. Capitol Manufacturing Co.
b. Central Plastics Company.

c. Watts Industries, Inc.; Water Products Div.
d. Zurn Industries, Inc.; Wilkins Div.

11. Dielectric Flanges

a. Capitol Manufacturing Co.
b. Central Plastics Company.
c. Watts Industries, Inc.; Water Products Div.

12. Dielectric Flange Insulation Kits

a. Advance Products and Systems, Inc.
b. Calpico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.

13. Dielectric Nipples

a. Perfection Corporation.
b. Precision Plumbing Products, Inc.
c. Victaulic Co. of America.

14. Sprinkler Drain and Alarm Test Fittings

a. Central Sprinkler Corp.
b. Fire-End and Croker Corp.
c. Viking Corp.
d. Victaulic Co. of America.

15. Sprinkler Branch-Line Test Fittings

a. Elkhart Brass Mfg. Co., Inc.
b. Fire-End and Croker Corp.
c. Potter-Roemer; Fire-Protection Div.

16. Sprinkler Inspector's Test Fitting

a. AGF Manufacturing Co.
b. Central Sprinkler Corp.
c. G/J Innovations, Inc.
d. Triple R Specialty of Ajax, Inc.

17. Drop-Nipple Fittings

a. CECA, LLC.
b. Merit.

18. Ball Valves

a. NIBCO.
b. Victaulic Co. of America.
c. Milwaukee.

19. Butterfly Valves

    a. NPS 2 (DN 50) and Smaller

        1) Global Safety Products, Inc.
        2) Milwaukee Valve Company.
        3) Nibco.
        4) Watts Industries, Inc.; Water Products Div.

    b. NPS 2-1/2 (DN 65) and Larger

        1) Central Sprinkler Corp.
        2) Global Safety Products, Inc.
        3) McWane, Inc.; Kennedy Valve Div.
        4) Mueller Company.
        5) NIBCO.
        6) Victaulic Co. of America.

20. Check Valves NPS 2 (DN 50) and Larger

    a. American Cast Iron Pipe Co.; Waterous Co.
    b. Central Sprinkler Corp.
    c. Clow Valve Co.
    d. Crane Co.; Crane Valve Group; Crane Valves.
    e. Globe Fire Sprinkler Corporation.
    f. Grinnell Fire Protection.
    g. Hammond Valve.
    h. McWane, Inc.; Kennedy Valve Div.
    i. Mueller Company.
    j. NIBCO.
    k. Stockham.
    l. Watts Industries, Inc.; Water Products Div.

21. Gate Valves

    a. NPS 2 (DN 50) and Smaller

        1) Crane Co.; Crane Valve Group; Crane Valves.
        2) Hammond Valve.
        3) NIBCO.

    b. NPS 2-1/2 (DN 65) and Larger

        1) Clow Valve Co.
        2) Crane Co.; Crane Valve Group; Crane Valves.
        3) Hammond Valve.
        4) Milwaukee Valve Company.
        5) Mueller Company.
        6) NIBCO.
        7) Red-White Valve Corp.

22. Indicating Valves

    a. NPS 2 (DN 50) and Smaller

        1) Milwaukee Valve Company.
        2) NIBCO.
        3) Victaulic Co. of America.

    b. NPS 2-1/2 (DN 65) and Larger

        1) Central Sprinkler Corp.
        2) Grinnell Fire Protection.
        3) McWane, Inc.; Kennedy Valve Div.
        4) Milwaukee Valve Company.
        5) NIBCO.
        6) Victaulic Co. of America.

23. Sprinkler System Control Valves

    a. Central Sprinkler Corp.
    b. Firematic Sprinkler Devices, Inc.
    c. Globe Fire Sprinkler Corporation.
    d. Grinnell Fire Protection.
    e. Reliable Automatic Sprinkler Co., Inc.
    f. Star Sprinkler Inc.
    g. Victaulic Co. of America.
    h. Viking Corp.

24. Dry-Pipe Valves

    a. Gast Manufacturing, Inc.
    b. Grinnell Fire Protection.
    c. Reliable Automatic Sprinkler Co., Inc.
    d. Viking Corp.

25. Sprinklers

    a. Grinnell Fire Protection.
    b. Reliable Automatic Sprinkler Co., Inc.
    c. Star Sprinkler Inc.
    d. Viking Corp.

26. Fire Department Connections

    a. Elkhart Brass Mfg. Co., Inc.
    b. Fire-End and Croker Corp.
    c. Guardian Fire Equipment Incorporated.
    d. Potter-Roemer; Fire-Protection Div.
    e. Larsens, Inc.

27. Water-Motor-Operated Alarm

a. Central Sprinkler Corp.
b. Firematic Sprinkler Devices, Inc.
c. Globe Fire Sprinkler Corporation.
d. Grinnell Fire Protection.
e. Reliable Automatic Sprinkler Co., Inc.
f. Star Sprinkler Inc.
g. Viking Corp.

28. Electrically Operated Alarm

a. Potter Electric Signal Company.
b. System Sensor.
c. ITT McDonnell & Miller.

29. Water-Flow Indicator

a. Grinnell Fire Protection.
b. ITT McDonnell & Miller.
c. Potter Electric Signal Company.
d. System Sensor.
e. Viking Corp.

30. Pressure Switch

a. Grinnell Fire Protection.
b. Potter Electric Signal Company.
c. System Sensor.
d. Viking Corp.

31. Valve Supervisory Switch

a. McWane, Inc.; Kennedy Valve Div.
b. Potter Electric Signal Company.
c. System Sensor.

32. Pressure Gages

a. AGF Manufacturing Co.
b. AMETEK, Inc.; U.S. Gauge.
c. Dresser Equipment Group; Instrument Div.
d. WIKA Instrument Corporation.

2.2 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell end and plain end.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern.
2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron gland, rubber gasket, and steel bolts and nuts.

2.3 STEEL PIPE AND FITTINGS

A. Threaded-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe hot-dip galvanized where indicated. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865 hot-dip galvanized-steel pipe where indicated.

B. Plain-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795 hot-dip galvanized-steel pipe where indicated.

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

C. Plain-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795 hot-dip galvanized-steel pipe where indicated.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

D. Grooved-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed, square-cut- or roll-grooved ends.

1. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
2. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

E. Threaded-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe; hot-dip galvanized where indicated and with factory- or field-threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe hot-dip galvanized where indicated. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865 hot-dip galvanized-steel pipe where indicated.

F. Plain-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe hot-dip galvanized where indicated.

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

G. Plain-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe hot-dip galvanized where indicated.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

H. Grooved-End, Schedule 30 Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and equal to or greater than Schedule 30; or ASTM A 795 and ASME B36.10M, Schedule 30 wrought-steel pipe hot-dip galvanized where indicated; with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
b. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

I. Plain-End, Threadable, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10.

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

J. Plain-End, Threadable, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

K. Grooved-End, Threadable, Thinwall Steel Pipe: ASTM A 135 or ASTM A 795, with wall thickness less than Schedule 40 and greater than Schedule 10, and with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
b. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron

housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

L. Plain-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 (DN 125) and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10 (DN 150 to DN 250).

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

M. Plain-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 (DN 125) and smaller; and NFPA 13 specified wall thickness in NPS 6 to NPS 10 (DN 150 to DN 250).

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

N. Grooved-End, Schedule 10 Steel Pipe: ASTM A 135 or ASTM A 795, Schedule 10 in NPS 5 (DN 125) and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10 (DN 150 to DN 250); with factory- or field-formed, roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
b. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

2.4 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, annealed temper; with plain ends.

1. Copper fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Brazing Filler Metals: AWS A5.8, BCuP-3 or BCuP-4.

B. Plain-End, Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, drawn temper.

1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match tubing system.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket metal-to-metal seating surfaces, and solder-joint or threaded ends.
4. Brazing Filler Metals: AWS A5.8, BCuP-3 or BCuP-4.

2.5 DIELECTRIC FITTINGS

A. Assembly shall be copper alloy, ferrous, and insulating materials with ends matching piping system.

B. Dielectric Unions: Factory-fabricated assembly, designed for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C). Include insulating material that isolates dissimilar materials and ends with inside threads according to ASME B1.20.1.

C. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 175-psig (1200-kPa) minimum working-pressure rating as required for piping system.

D. Dielectric Flange Insulation Kits: Components for field assembly shall include CR or phenolic gasket, PE or phenolic bolt sleeves, phenolic washers, and steel backing washers.

E. Dielectric Nipples: Electroplated steel with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved ends and 300-psig (2070-kPa) working-pressure rating at 225 deg F (107 deg C).

2.6 CORROSION-PROTECTIVE ENCASEMENT FOR PIPING

A. Encasement for Underground Metal Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch (0.20-mm) minimum thickness, tube or sheet.

2.7 SPRINKLER SPECIALTY FITTINGS

A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum working-pressure rating, and made of materials compatible with piping. Sprinkler specialty fittings shall have 250-psig (1725-kPa) minimum working-pressure rating if fittings are components of high-pressure piping system.

B. Outlet Specialty Fittings:

1. Mechanical-T and -Cross Fittings: Not Allowed.
2. Snap-On and Strapless Outlet Fittings: Not Allowed.

C. Sprinkler Drain and Alarm Test Fittings: Cast- or ductile-iron body; with threaded or locking-lug inlet and outlet, test valve, and orifice and sight glass.

D. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.

E. Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.

F. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

G. Dry-Pipe-System Fittings: UL listed for dry-pipe service.

2.8 LISTED FIRE-PROTECTION VALVES

A. Valves shall be UL listed or FMG approved, with 175-psig (1200 kPa) minimum pressure rating. Valves shall have 250-psig (1725-kPa) minimum pressure rating if valves are components of high-pressure piping system.

B. Gate Valves with Wall Indicator Posts:

1. Gate Valves: UL 262, cast-iron body, bronze mounted, with solid disc, nonrising stem, operating nut, and flanged ends.
2. Indicator Posts: UL 789, horizontal-wall type, cast-iron body, with operating wrench, extension rod, locking device, and cast-iron barrel.

C. Ball Valves: Comply with UL 1091, except with ball instead of disc.

1. NPS 1-1/2 (DN 40) and Smaller: Bronze body with threaded ends.
2. NPS 2 and NPS 2-1/2 (DN 50 and DN 65): Bronze body with threaded ends or ductile-iron body with grooved ends.
3. NPS 3 (DN 80): Ductile-iron body with grooved ends.

D. Butterfly Valves: UL 1091.

1. NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.
2. NPS 2-1/2 (DN 65) and Larger: Bronze, cast-iron, or ductile-iron body; wafer type or with flanged or grooved ends.

E. Check Valves NPS 2 (DN 50) and Larger: UL 312, swing type, cast-iron body with flanged or grooved ends.

F. Gate Valves: UL 262, OS&Y type.

1. NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.
2. NPS 2-1/2 (DN 65) and Larger: Cast-iron body with flanged ends.

G. Indicating Valves: UL 1091, with integral indicating device and ends matching connecting piping.

1. Indicator: Electrical, 115-V ac, prewired, single-circuit, supervisory switch.
2. NPS 2 (DN 50) and Smaller: Ball or butterfly valve with bronze body and threaded ends.
3. NPS 2-1/2 (DN 65) and Larger: Butterfly valve with cast- or ductile-iron body; wafer type or with flanged or grooved ends.

2.9 UNLISTED GENERAL-DUTY VALVES

A. Refer to Division 23 Section "Valves" for lists of acceptable manufacturers.

B. Ball Valves NPS 2 (DN 50) and Smaller: MSS SP-110, 2-piece copper-alloy body with chrome-plated brass ball, 600-psig (4140-kPa) minimum CWP rating, blowout-proof stem, and threaded ends.

C. Check Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 4, Class 125 minimum, swing type with bronze body, nonmetallic disc, and threaded ends.

D. Gate Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, solid wedge, and threaded ends.

E. Globe Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, nonmetallic disc, and threaded ends.

2.10 SPECIALTY VALVES

A. Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig (1200-kPa) minimum pressure rating. Control valves shall have 250-psig (1725-kPa) minimum pressure rating if valves are components of high-pressure piping system.

1. Alarm Check Valves: UL 193, designed for horizontal or vertical installation, with bronze grooved seat with O-ring seals, single-hinge pin, and latch design. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber, and fill-line attachment with strainer.

a. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping. Spill to exterior where possible.

2. Dry-Pipe Valves: UL 260, differential type; with bronze seat with O-ring seals, single-hinge pin, and latch design. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

a. Air Compressor: UL 753, fractional horsepower, 120-V ac, 60 Hz, single phase.

2.11 SPRINKLERS

A. Sprinklers shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum pressure rating. Sprinklers shall have 250-psig (1725-kPa) minimum pressure rating if sprinklers are components of high-pressure piping system.

B. Automatic Sprinklers: With heat-responsive element complying with the following:

1. UL 199, for nonresidential applications.

C. Sprinkler Types and Categories: Nominal 1/2-inch (12.7-mm) orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

D. Sprinkler types, features, and options as follows:

1. Concealed ceiling sprinklers, including cover plate.
2. Extended-coverage sprinklers.
3. Flush ceiling sprinklers, including escutcheon.
4. High-pressure sprinklers.
5. Pendent sprinklers.
6. Pendent, dry-type sprinklers.
7. Quick-response sprinklers.
8. Recessed sprinklers, including escutcheon.

9. Sidewall sprinklers.
10. Sidewall, dry-type sprinklers.
11. Upright sprinklers.

E. Sprinkler Finishes: Chrome plated, or bronze.

F. Special Coatings: Wax, lead, and corrosion-resistant paint.

G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Chrome-plated steel, 2 piece, with 1-inch (25-mm) vertical adjustment.
2. Sidewall Mounting: Chrome-plated steel, one piece, flat.

H. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler.

2.12 FIRE DEPARTMENT CONNECTIONS

A. Wall-Type, Fire Department Connection: UL 405, 175-psig (1200-kPa) minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking similar to "AUTO SPKR & STANDPIPE."

1. Type: Flush, with two inlets and square or rectangular escutcheon plate, or Exposed, projecting, with two inlets and round escutcheon plate.
2. Finish: Polished chrome-plated.

B. Exposed, Freestanding-Type, Fire Department Connection: UL 405, B pressure rating; with corrosion-resistant-metal body, brass inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, and bottom outlet with pipe threads. Include brass lugged caps, gaskets, and brass chains; brass lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch- (460-mm-) high, brass sleeve; and round, floor, brass escutcheon plate with marking "AUTO SPKR & STANDPIPE."

1. Finish Including Sleeve: Polished chrome-plated.

2.13 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. See Division 28 Section "Fire Alarm" for devices not listed here.

C. Water-Motor-Operated Alarm: UL 753, mechanical-operation type with pelton-wheel operator with shaft length, bearings, and sleeve to suit wall construction and 10-inch- (250-mm-) diameter, cast-aluminum alarm gong with red-enamel factory finish. Include NPS 3/4 (DN 20) inlet and NPS 1 (DN 25) drain connections.

D. Electrically Operated Alarm: UL 464, with 10-inch- (250-mm-) diameter, vibrating-type, metal alarm bell with red-enamel factory finish and suitable for outdoor use.

E. Water-Flow Indicator: UL 346, electrical-supervision, paddle-operated-type, water-flow detector with 250-psig (1725-kPa) pressure rating and designed for horizontal or vertical installation. Include two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

F. Pressure Switch: UL 753, electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.

G. Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

2.14 PRESSURE GAGES

A. Description: UL 393, 3-1/2- to 4-1/2-inch- (90- to 115-mm-) diameter, dial pressure gage with range of 0 to 250 psig (0 to 1725 kPa) minimum.

1. Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.
2. Air System Piping: Include caption "AIR" or "AIR/WATER" on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 EARTHWORK

A. Refer to Division 31 Section "Earthwork" for excavating, trenching, and backfilling.

3.3 EXAMINATION

A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.

B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.

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

3.4 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints where welded piping is indicated.

B. Do not use welded joints for galvanized-steel pipe.

C. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

D. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

E. Underground Service-Entrance Piping: Ductile-iron, mechanical-joint pipe and fittings and restrained joints. Include corrosion-protective encasement.

3.5 SPRINKLER SYSTEM PIPING APPLICATIONS

A. Standard-Pressure, Wet-Pipe Sprinkler System, 175-psig (1200-kPa) Maximum Working Pressure:

1. NPS 2 and smaller: Threaded-end, black or galvanized, standard-weight steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
2. NPS 2-1/2 and larger: Threaded-end, black or galvanized, standard-weight steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
3. NPS 2-1/2 and larger: Grooved-end, black or galvanized, standard-weight steel pipe; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.
4. NPS 2-1/2 and larger: Grooved-end, Schedule 10 steel pipe; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

B. Standard-Pressure, Dry-Pipe Sprinkler System, 175-psig (1200-kPa) Maximum Working Pressure:

5. NPS 2 and smaller: Threaded-end, galvanized, standard-weight steel pipe; galvanized cast- or malleable-iron threaded fittings; and threaded joints.
6. NPS 2-1/2 and larger: Threaded-end, galvanized, standard-weight steel pipe; galvanized cast- or malleable-iron threaded fittings; and threaded joints.
7. NPS 2-1/2 to NPS 3-1/2: Grooved-end, galvanized, standard-weight steel pipe; galvanized grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

3.6 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

8. Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NFPA 13.

a. Shutoff Duty: Use ball, butterfly, or gate valves.

9. Unlisted General-Duty Valves: For applications where UL-listed and FMG-approved valves are not required by NFPA 13.

    a. Shutoff Duty: Use ball, butterfly, or gate valves.
    b. Throttling Duty: Use ball or globe valves.

3.7 JOINT CONSTRUCTION

A. Refer to Division 23 Section "Basic HVAC Materials and Methods" for basic piping joint construction.

B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 (DN 200) with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.

C. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.

10. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.
11. Dry-Pipe Systems: Use fittings and gaskets listed for dry-pipe service.

D. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials.

12. NPS 2 and Smaller: Use dielectric unions, couplings, or nipples.
13. NPS 2-1/2 to NPS 4: Use dielectric flanges.
14. NPS 5 and Larger: Use dielectric flange insulation kits.

3.8 SERVICE-ENTRANCE PIPING

A. Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building. Refer to Division 33 Section "Water Service" for exterior piping.

B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Refer to Division 33 Section "Water Service" for backflow preventers.

C. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

3.9 WATER-SUPPLY CONNECTION

A. Connect fire-suppression piping to building's interior water distribution piping. Refer to Division 23 Section "Domestic Water Piping" for interior piping.

B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water distribution piping. Refer to Division 23 Section " Domestic Water Piping Specialties" for backflow preventers.

C. Install shutoff valve, check valve, pressure gage, and drain at connection to water supply.

3.10 PIPING INSTALLATION

A. Refer to Division 23 Section "Basic HVAC Materials and Methods" for basic piping installation.

B. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

15. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

C. Install underground ductile-iron service-entrance piping according to NFPA 24 and with restrained joints. Encase piping in corrosion-protective encasement.

D. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

E. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

F. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger connections.

G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

I. Install sprinkler zone control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

J. Install drain valves on standpipes.

K. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

L. Install alarm devices in piping systems.

M. Hangers and Supports: Comply with NFPA 13 for hanger materials.

16. Install sprinkler system piping according to NFPA 13.

N. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 (DN 8) and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

O. Drain dry-pipe sprinkler piping.

P. Pressurize and check dry-pipe sprinkler system piping and air compressors.

Q. Fill wet-pipe sprinkler system piping with water.

3.11 VALVE INSTALLATION

A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and Chicago Bureau of Fire Prevention.

B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water supply sources.

D. Specialty Valves:

17. Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.
18. Dry-Pipe Valves: Install trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

    a. Install air compressor and compressed-air supply piping.

3.12 SPRINKLER APPLICATIONS

A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:

19. Rooms without Ceilings: Upright sprinklers.
20. Rooms with Suspended Ceilings: Recessed or concealed sprinklers.
21. Wall Mounting: Sidewall sprinklers.
22. Spaces Subject to Freezing: Upright for dry systems, pendent, dry sprinklers; or sidewall, dry sprinklers for wet systems as required.
23. Special Applications: Extended-coverage, and quick-response sprinklers where indicated or required.
24. Sprinkler Finishes:

    a. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.
    b. Concealed Sprinklers: Rough brass, with chrome or brass cover plate.
    c. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.

3.13 SPRINKLER INSTALLATION

A. Unless otherwise indicated, all sprinklers shall be arranged symmetrically within each room or space. All sprinkler heads to be installed in suspended/acoustical tile ceilings of any type shall be located as indicated on the architectural reflected ceiling plans or fire protection plans where sprinkler locations are shown. Sprinklers shall be placed in the center of ceiling tile in both directions.

B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

3.14 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install wall-type, fire department connections in vertical wall.

B. Install freestanding-type, fire department connections in level surface.

25. Install protective pipe bollards on two sides of each fire department connection. Refer to Division 05 Section "Metal Fabrications" for pipe bollards.

C. Install ball drip valve at each check valve for fire department connection.

3.15 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect water-supply piping to fire-suppression piping. Include backflow preventer between potable-water piping and fire-suppression piping. Refer to Division 23 Section " Domestic Water Piping Specialties" for backflow preventers.

D. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.

E. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.

F. Connect compressed-air supply to dry-pipe sprinkler piping.

G. Connect air compressor to the following piping and wiring:

26. Pressure gages and controls.
27. Electrical power system.
28. Fire alarm devices, including low-pressure alarm.

H. Electrical Connections: Power wiring is specified in Division 26.

I. Connect alarm devices to fire alarm.

J. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

K. Connect wiring according to Division 26 Section "Conductors and Cables for Electrical Systems."

L. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.16 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and in Division 23 Section "Identification for Plumbing."

3.17 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

29. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
30. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
31. Energize circuits to electrical equipment and devices.
32. Start and run excess-pressure pumps.
33. Start and run air compressors.
34. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
35. Flush, test, and inspect standpipe systems according to NFPA 14, "System Acceptance" Chapter.
36. Coordinate with fire alarm tests. Operate as required.
37. Coordinate with fire-pump tests. Operate as required.
38. Verify that equipment hose threads are same as local fire department equipment.

B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.18 CLEANING AND ADJUSTING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

C. Protect sprinklers from damage until Substantial Completion.

3.19 CONTRACTOR STARTUP AND REPORTING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. Refer to Division 01 Section “Demonstration and Training."

3.20 DEMONSTRATION AND COMMISSIONING - TRAINING

A. Train Owner’s maintenance personnel on procedures and schedules for starting up and shutting down, troubleshooting, servicing, and maintaining the system. The training will occur after the startup report has been provided to the owner and the trainer will provide two (2) Installation and Operations manuals for the use of the owner’s personnel during training.

B. Review data in maintenance manuals. Refer to Division 01 Section “Operation and Maintenance Data.” All required and recommended maintenance will be reviewed as well as operational troubleshooting. If the IOM does not include a written troubleshooting guide one will be provided.

C. Schedule training with Owner, through Architect, with at least seven days' advance notice.

D. Demonstrate proper operation of equipment to commissioning agent or designated owners personnel. The scope of the demonstration will include functional performance requirements under both local and building automation control as well as any commissioning requirements in Divisions 01 or 23.

END OF SECTION

SECTION 21 31 13

ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes electric-drive, split-case, end-suction and in-line centrifugal fire pumps and the following:

1. Full-service fire-pump controllers and automatic transfer switches.
2. Fire-pump accessories and specialties.
3. Pressure-maintenance pumps, controllers, accessories, and specialties.
4. Alarm panels.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, certified pump performance curves with each selection point indicated, operating characteristics, and furnished accessories and specialties for each fire pump and pressure-maintenance pump.

B. Shop Drawings: For fire pumps and drivers, fire-pump controllers, fire-pump accessories and specialties, pressure-maintenance pumps, pressure-maintenance-pump controllers, and pressure-maintenance-pump accessories and specialties. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: Power, signal, and control wiring.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Product Certificates: For each type of fire pump and fire-pump controller, signed by product manufacturer.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For fire pumps and drivers, pressure-maintenance pumps, controllers, accessories and specialties, alarm panels, and flowmeter systems to include in emergency, operation, and maintenance manuals.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain fire pumps, pressure-maintenance pumps, and controllers through one source from a single manufacturer for each type of equipment.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of fire pumps, pressure-maintenance pumps, and controllers and are based on specific systems indicated. Refer to Division 01 Section "Product Requirements."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with standards of Chicago Bureau of Fire Prevention pertaining to materials, hose threads, and installation.

E. Comply with NFPA 20, "Stationary Pumps for Fire Protection," for fire pumps, drivers, controllers, accessories, and their installation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Division 1 requirements.

1.5 WARRANTY

A. Provide manufacturer’s standard 1-year warranty for materials and labor, commencing on date of substantial completion.

1.6 PERFORMANCE REQUIREMENTS

A. Pump, Equipment, Accessory, Specialty, and Piping Pressure Rating: 175-psig (1200-kPa) minimum working-pressure rating, unless otherwise indicated.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

a. Single-Stage, Horizontally Mounted, Split-Case Fire Pumps

1) A-C Pump; ITT Industries.
2) Aurora Pump; Pentair Pump Group.
3) Patterson Pump Company.
4) Sterling Peerless Pump; Sterling Fluid Systems Group.

b. Single-Stage, Vertically Mounted, Split-Case Fire Pumps

1) A-C Pump; ITT Industries.
2) Aurora Pump; Pentair Pump Group.
3) Patterson Pump Company.

c. In-Line Fire Pumps

1) A-C Pump; ITT Industries.
2) Aurora Pump; Pentair Pump Group.
3) Patterson Pump Company.
4) Sterling Peerless Pump; Sterling Fluid Systems Group.

d. Fire-Pump Controllers, General

1) Firetrol, Inc.
2) Hubbell Industrial Controls, Inc.
3) Joslyn Clark.
4) Master Control Systems, Inc.
5) Metron, Inc.

e. Multistage, Pressure-Maintenance Pumps

1) A-C Pump; ITT Industries.
2) Grundfos Pumps Corp.
3) Jacuzzi Brothers.
4) Patterson Pump Company.
5) Sterling Peerless Pump; Sterling Fluid Systems Group.

f. Controllers, Pressure-Maintenance Pumps

1) Firetrol, Inc.
2) Hubbell Industrial Controls, Inc.
3) Joslyn Clark.
4) Master Control Systems, Inc.
5) Metron, Inc.

g. Alarm Panels

1) Firetrol, Inc.
2) Hubbell Industrial Controls, Inc.
3) Joslyn Clark.
4) Master Control Systems, Inc.
5) Metron, Inc.

h. Pressure Gages

1) AGF Manufacturing Co.
2) AMETEK, Inc.; U.S. Gauge.
3) Dresser Equipment Group; Instruments Div.
4) WIKA Instrument Corporation.

2.2 CENTRIFUGAL FIRE PUMPS

A. Description, General: UL 448, factory-assembled and -tested, electric-drive, centrifugal fire pumps capable of furnishing not less than 150 percent of rated capacity at not less than 65 percent of total rated head and with shutoff head limited to 140 percent of total rated head.

1. Finish: Manufacturer's standard red paint applied to factory-assembled and -tested unit before shipping.
2. Nameplate: Complete with capacities, characteristics, and other pertinent data.

B. Single-Stage, Horizontally Mounted, Split-Case Fire Pumps: Double-suction type with pump and driver mounted on same base and connected with coupling.

1. Manufacturers:

a. A-C Pump; ITT Industries.
b. Aurora Pump; Pentair Pump Group.
c. Patterson Pump Company.
d. Sterling Peerless Pump; Sterling Fluid Systems Group.

2. Pump: Axially split cast-iron casing with suction and discharge flanges machined to ASME B16.1, Class 125 dimensions, unless otherwise indicated.

a. Impeller: Cast bronze of construction to match fire pump, statically and dynamically balanced, and keyed to shaft.
b. Wear Rings: Replaceable, bronze.
c. Shaft and Sleeve: Steel shaft with bronze sleeve.

1) Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
2) Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.

3. Coupling: Flexible and capable of absorbing torsional vibration and shaft misalignment. Include metal coupling guard.
4. Driver: UL-listed, NEMA MG 1, open-dripproof, squirrel-cage, induction motor complying with NFPA 20 and NFPA 70. Include wiring compatible with controller used.

C. Single-Stage, Vertically Mounted, Split-Case Fire Pumps: Double-suction type with pump mounted on baseplate and connected to driver with coupling.

1. Manufacturers:

a. A-C Pump; ITT Industries.
b. Aurora Pump; Pentair Pump Group.
c. Patterson Pump Company.

2. Pump: Axially split cast-iron casing with suction and discharge flanges machined to ASME B16.1, Class 125 dimensions, unless otherwise indicated.

a. Impeller: Cast bronze of construction to match fire pump, statically and dynamically balanced, and keyed to shaft.

b. Wear Rings: Replaceable, bronze.
c. Shaft and Sleeve: Steel shaft with bronze sleeve.

1) Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
2) Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.

3. Coupling: Flexible and capable of absorbing torsional vibration and shaft misalignment. Include metal coupling guard.
4. Driver: UL-listed, NEMA MG 1, open-dripproof, squirrel-cage, induction motor complying with NFPA 20 and NFPA 70. Include wiring compatible with controller used.

D. In-Line Fire Pumps: Vertically mounted type with electric-motor driver directly mounted to pump casing.

1. Manufacturers:

a. A-C Pump; ITT Industries.
b. Aurora Pump; Pentair Pump Group.
c. Patterson Pump Company.
d. Sterling Peerless Pump; Sterling Fluid Systems Group.

2. Pump: Radially split cast-iron casing with suction and discharge flanges machined to ASME B16.1, Class 125 dimensions, unless otherwise indicated.

a. Impeller: Cast bronze of construction to match fire pump, statically and dynamically balanced, and keyed to shaft.
b. Wear Rings: Replaceable, bronze.
c. Shaft and Sleeve: Steel shaft with bronze sleeve.

1) Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
2) Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.

3. Driver: UL-listed, NEMA MG 1, open-dripproof, squirrel-cage, induction motor complying with NFPA 20 and NFPA 70. Include wiring compatible with controller used.

2.3 FIRE-PUMP CONTROLLERS

A. Fire-Pump Controllers, General: UL 218 and NFPA 20; listed for electric-drive, fire-pump service and service entrance; combined automatic and manual operation; factory assembled and wired; and factory tested for capacities and electrical characteristics.

1. Manufacturers:

a. Firetrol, Inc.
b. Hubbell Industrial Controls, Inc.
c. Joslyn Clark.
d. Master Control Systems, Inc.
e. Metron, Inc.

2. Rate controllers for scheduled fire-pump horsepower and short-circuit withstand rating at least equal to short-circuit current available at controller location. Take into account cable size and distance from substation or supply transformers.
3. Enclosure: UL 50, Type 2, dripproof, indoor, unless special-purpose enclosure is indicated. Include manufacturer's standard red paint applied to factory-assembled and -tested unit before shipping.
4. Controls, devices, alarms, functions, and operations listed in NFPA 20 as required for drivers and controller types used, and specific items listed.

    a. Isolating means and circuit breaker.
    b. "Power on" pilot lamp.
    c. Fire-alarm system connections for indicating motor running condition, loss-of-line power, and line-power phase reversal.
    d. Automatic and manual operation, and minimum run-time relay to prevent short cycling.
    e. Water-pressure-actuated switch with independent high and low calibrated adjustments responsive to water pressure in fire-suppression piping.
    f. Automatic and manual shutdown.
    g. System pressure recorder, electric ac driven with spring backup.

5. Nameplate: Complete with capacity, characteristics, approvals and listings, and other pertinent data.
6. Controller Sensing Pipes: Fabricate pipe and fittings according to NFPA 20 with nonferrous-metal sensing piping, NPS 1/2 (DN 15), with globe valves for testing controller mechanism from system to pump controller as indicated. Include bronze check valve with 3/32-inch (2.4-mm) orifice in clapper or ground-face union with noncorrosive diaphragm having 3/32-inch (2.4-mm) orifice.

B. Full-Service Fire-Pump Controllers:

1. Type Starting (for new pumps): Wye delta, closed transition.
2. Mounting: Floor-stand type for field electrical connections.
3. Automatic Transfer Switches: Where required, provide auto transfer switch connected to emergency power. UL 218 and UL 1008 and requirements for and attached to fire-pump controllers. Include enclosure complying with UL 50, Type 2, with automatic transfer switch with rating at least equal to fire-pump driver-motor horsepower. Include ampere rating not less than 115 percent of motor full-load current and suitable for switching motor-locked rotor current.

2.4 FIRE-PUMP ACCESSORIES AND SPECIALTIES

A. Match fire-pump suction and discharge ratings as required for fire-pump capacity rating. Include the following:

1. Automatic air-release valve.
2. Circulation relief valve.
3. Suction and discharge pressure gages.
4. Eccentric-tapered reducer at suction inlet.
5. Concentric-tapered reducer at discharge outlet.
6. Test-Header Manifold: Ductile-iron or brass body for hose valves. Include nozzle outlets arranged in single line; horizontal, flush-wall mounting attachment; and

rectangular, polished chrome-plated or rough brass finish escutcheon plate with lettering equivalent to "PUMP TEST CONNECTION."

7. Test-Header Manifold: Ferrous body for hose valves. Manufacturer's standard finish. Include bronze or cast-iron, exposed-type valve header with nozzle outlets; and round, brass escutcheon plate with lettering equivalent to "PUMP TEST CONNECTION."
8. Hose Valves: UL 668, straightway pattern, and bronze with cap and chain. Include NFPA 1963 hose thread that complies with local fire department standards and finish same as for test-header-manifold escutcheon plate.
9. Ball Drip Valve: UL 1726.
10. Finish: Manufacturer's standard factory-applied red paint unless brass or other finish is specified.

2.5 PRESSURE-MAINTENANCE PUMPS

A. Pressure-Maintenance Pumps, General: Factory-assembled and -tested pumps with electric-motor driver, controller, and accessories and specialties. Include cast-iron or stainless-steel casing and bronze or stainless-steel impellers, mechanical seals, and suction and discharge flanges machined to ASME B16.1, Class 125 dimensions unless Class 250 flanges are indicated and except that connections may be threaded in sizes where flanges are not available.

1. Finish: Manufacturer's standard color paint applied to factory-assembled and -tested unit before shipping.
2. Nameplate: Complete with capacity, characteristics, and other pertinent data.

B. Multistage, Pressure-Maintenance Pumps: Multiple-impeller type complying with HI 1.1-1.2 and HI 1.3 requirements for multistage centrifugal pumps. Include base.

1. Manufacturers:

   a. A-C Pump; ITT Industries.
   b. Grundfos Pumps Corp.
   c. Jacuzzi Brothers.
   d. Patterson Pump Company.
   e. Sterling Peerless Pump; Sterling Fluid Systems Group.

2. Driver: NEMA MG 1, open-dripproof, squirrel-cage, induction motor complying with NFPA 20 and NFPA 70. Include wiring compatible with controller used.

C. Controllers: UL 508; factory-assembled, -wired, and -tested, across-the-line type for combined automatic and manual operation.

1. Manufacturers:

   a. Firetrol, Inc.
   b. Hubbell Industrial Controls, Inc.
   c. Joslyn Clark.
   d. Master Control Systems, Inc.
   e. Metron, Inc.

2. Enclosure: UL 508 and NEMA 250, Type 2, wall-mounting type for field electrical wiring.

a. Finish: Manufacturer's standard color paint applied to factory-assembled and -tested unit before shipping.

3. Rate controller for scheduled horsepower and include the following:

a. Fusible disconnect switch.
b. Pressure switch.
c. Hand-off-auto selector switch.
d. Pilot light.
e. Running period timer.

D. Accessories and Specialties: Match pressure-maintenance-pump suction and discharge ratings as required for pump capacity rating. Include the following:

1. Circulation relief valve.
2. Suction and discharge pressure gages.

2.6 ALARM PANELS

A. Refer to Division 28 Section "Fire Detection and Alarm" for requirements. Where this Section is not provided, refer to information below.

B. Description: Factory-assembled and -wired remote panel complying with UL 508 and requirements in NFPA 20. Include audible and visible alarms matching controller type.

1. Manufacturers:

a. Firetrol, Inc.
b. Hubbell Industrial Controls, Inc.
c. Joslyn Clark.
d. Master Control Systems, Inc.
e. Metron, Inc.

2. Enclosure: NEMA 250, Type 2, remote wall-mounting type.

a. Finish: Manufacturer's standard red paint applied to factory-assembled and -tested unit before shipping.

3. Features: Include manufacturer's standard features and the following:

a. Motor-operating condition.
b. Loss-of-line power.
c. Phase reversal.

2.7 PRESSURE GAGES

A. Description: UL 393, 3-1/2- to 4-1/2-inch- (90- to 115-mm-) diameter dial with range of 0- to 250-psig (0- to 1725-kPa) minimum. Include caption "WATER" on dial face.

1. Manufacturers:

a. AGF Manufacturing Co.

b. AMETEK, Inc.; U.S. Gauge.
c. Dresser Equipment Group; Instruments Div.
d. WIKA Instrument Corporation.

2.8 GROUT

A. Description: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

2.9 SOURCE QUALITY CONTROL

A. Test and inspect fire pumps with their controllers according to NFPA 20 for certified shop tests.

B. Verification of Performance: Rate fire pumps according to requirements indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, concrete bases, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of fire pumps.

B. Examine roughing-in for fire-suppression piping to verify actual locations of piping connections before fire-pump installation.

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

3.2 CONCRETE BASES

A. Install concrete bases of dimensions indicated for fire pumps, pressure-maintenance pumps, and controllers. Refer to Division 23 Section "Basic HVAC Materials and Methods."

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.3 INSTALLATION

A. Install and align fire pump, pressure-maintenance pump, and controller according to NFPA 20.

B. Install pumps and controllers to provide access for periodic maintenance including removal of motors, impellers, couplings, and accessories.

C. Set base-mounting-type pumps on concrete bases. Disconnect coupling halves before setting. Do not reconnect couplings until alignment operations have been completed.

1. Support pump baseplate on rectangular metal blocks and shims or on metal wedges having small taper, at points near anchor bolts, to provide 3/4- to 1-1/2-inch (19- to 38-mm) gap between pump base and concrete base for grouting.
2. Adjust metal supports or wedges until pump and driver shafts are level. Verify that coupling faces and pump suction and discharge flanges are level and plumb.

D. Install suction and discharge piping equal to or greater than diameter of fire-pump nozzles.

E. Install valves that are same size as piping connecting fire pumps, bypasses, test headers, and other piping systems.

F. Install pressure gages on fire-pump suction and discharge at pressure-gage tappings.

G. Support pumps and piping separately so weight of piping does not rest on pumps.

H. Install piping accessories, hangers and supports, anchors, valves, meters and gages, and equipment supports.

I. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.

3.4 ALIGNMENT

A. Align split-case and end-suction fire-pump and driver shafts after complete unit has been leveled on concrete base, grout has set, and anchor bolts have been tightened.

B. After alignment is correct, tighten anchor bolts evenly. Fill baseplate completely with grout, with metal blocks and shims or wedges in place. Tighten anchor bolts after grout has hardened. Check alignment and make required corrections.

C. Align piping connections.

D. Align pump and driver shafts for angular and parallel alignment according to HI 1.4 and to tolerances specified by manufacturer.

E. Align vertically mounted, split-case pump and driver shafts after complete unit has been made plumb on concrete base, grout has set, and anchor bolts have been tightened.

3.5 CONNECTIONS

A. Piping installation requirements are specified in Division 21 Section "Facility Fire-Suppression Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to pumps and equipment to allow service and maintenance.

C. Connect water supply and discharge piping to fire pumps. Connect water supply and discharge piping to pressure-maintenance pumps.

D. Connect relief-valve discharge to point of disposal.

E. Connect controllers to pumps.

F. Connect fire-pump controllers to building fire-alarm system. Refer to Division 28 Section "Fire Detection and Alarm."

G. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

H. Connect wiring according to Division 26 Section "Conductors and Cables for Electrical Systems."

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform field tests for each fire pump when installation is complete. Comply with operating instructions and procedures in NFPA 20 to demonstrate compliance with requirements. Where possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment that cannot be satisfactorily corrected or that does not perform as indicated, then retest to demonstrate compliance. Verify that each fire pump performs as indicated.

C. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Final Checks before Startup: Perform the following preventive-maintenance operations and checks:

    a. Lubricate oil-lubrication-type bearings.
    b. Remove grease-lubrication-type bearing covers, flush bearings with kerosene, and clean thoroughly. Fill with new lubricant according to manufacturer's written instructions.
    c. Disconnect coupling and check electric motor for proper rotation. Rotation shall match direction of rotation marked on pump casing.
    d. Verify that pump is free to rotate by hand. If pump is bound or if it drags even slightly, do not operate until cause of trouble is determined and corrected.

3. Starting procedure for pumps is as follows:

    a. Prime pump by opening suction valve and closing drains, and prepare pump for operation.
    b. Open sealing-liquid supply valves if pump is so fitted.
    c. Start motor.
    d. Open discharge valve slowly.
    e. Observe leakage from stuffing boxes and adjust sealing-liquid valve for proper flow to ensure lubrication of packing. Do not tighten gland immediately, but let packing run in before reducing leakage through stuffing boxes.

f. Check general mechanical operation of pump and motor.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Furnish fire hoses in number, size, and length required to reach storm drain or other acceptable location to dispose of fire-pump test water. Fire hoses are for field-acceptance tests only and are not property of Owner.

3.7 CONTRACTOR STARTUP AND REPORTING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire pumps, drivers, controllers, and pressure-maintenance pumps. Refer to Division 01 Section “Demonstration and Training."

B. Startup Services: Provide services of factory-authorized service representative to provide startup service and to demonstrate and train Owner's maintenance personnel as specified below.

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
3. Review data in the "Operating and Maintenance Manual." Refer to Division 01 Section "Project Closeout."
4. Schedule training with at least 7 days' advance notice.
5. Provide fire hoses in number, size, and of length required to reach a storm drain or other acceptable location to dispose of fire pump test water. These fire hoses are for field acceptance tests only and are not intended to become property of the Owner.

C. Final Checks Before Startup: Perform the following preventive-maintenance operations and checks before startup:

1. Lubricate oil-lubricated bearings.
2. Remove grease-lubricated bearing covers and flush bearings with kerosene and thoroughly clean. Fill with new lubricant according to manufacturer's recommendations.
3. Disconnect coupling and check electric motor for proper rotation. Rotation shall match direction of rotation marked on pump casing.
4. Check that the pump is free to rotate by hand. Do not operate the pump if it is bound or if it drags even slightly until cause of trouble is determined and corrected.

D. Starting procedure for pumps:

1. Prime pump by opening suction valve and closing drains, and prepare pump for operation.
2. Open sealing liquid supply valve if pump is so fitted.
3. Start motor.
4. Open discharge valve slowly.
5. Observe leakage from stuffing boxes and adjust sealing liquid valve for proper flow to ensure lubrication of packing. Do not tighten gland immediately, but let packing run in before reducing leakage through stuffing boxes.
6. Check general mechanical operation of pump and motor.

E. Fire Pump Test:

1. Pump manufacturer shall perform a fire pump test in accordance with City of Chicago Code and NFPA standards coordinate test with authority having jurisdiction.

END OF SECTION

SECTION 26 05 43

UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Contractor shall provide separate hand holes for both power and low voltage systems.

C. Where a single hand hole is indicated on the drawings which serve both power and low voltage utilities, the hand hole shall be provided with a UL listed divider in order to provide physical separation of such utilities.

1.2 SUMMARY

A. This Section includes the following:

1. Conduit, ducts, and duct accessories for direct-buried and concrete-encased duct banks, and in single duct runs.
2. Handholes and boxes.

1.3 DEFINITION

A. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Duct-bank materials, including separators and miscellaneous components.
2. Ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Accessories for handholes, boxes, and other underground utility structures.
4. Warning tape.
5. Warning planks.

B. Shop Drawings for Precast or Factory-Fabricated Underground hand holes: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:

1. Duct entry provisions, including locations and duct sizes.

2. Reinforcement details.
3. Frame and cover design and manhole frame support rings.
4. Grounding details.
5. Dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
6. Joint details.

C. Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.

1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
2. Drawings shall be signed and sealed by a qualified professional engineer.

D. Product Certificates: For concrete and steel used in precast concrete manholes and hand holes, as required by ASTM C 858.

E. Qualification Data: For professional engineer and testing agency.

F. Source quality-control test reports.

G. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Comply with ANSI C2.

C. Comply with NFPA 70.

D. Comply with Chicago Building Code.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver ducts to Project site with ends capped. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.

B. Store precast concrete and other factory-fabricated underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

C. Lift and support precast concrete units only at designated lifting or supporting points.

1.7 COORDINATION

A. Coordinate layout and installation of ducts, hand holes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.

B. Coordinate elevations of ducts and duct-bank entrances into hand holes, and boxes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to hand holes, and as approved by Architect.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Furnish cable-support stanchions, arms, insulators, and associated fasteners in quantities equal to 5 percent of quantity of each item installed.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.

B. RNC: NEMA TC 2, Type EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.2 NONMETALLIC DUCTS AND DUCT ACCESSORIES

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

1. ARNCO Corp.
2. Beck Manufacturing.
3. Cantex, Inc.
4. CertainTeed Corp.; Pipe & Plastics Group.
5. Condux International, Inc.
6. ElecSys, Inc.
7. Electri-Flex Company.
8. IPEX Inc.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT; a division of Cable Design Technologies.
11. Spiraduct/AFC Cable Systems, Inc.

B. Underground Plastic Utilities Duct: NEMA TC 6 & 8, Type EB-20-PVC, ASTM F 512, UL 651A, with matching fittings by the same manufacturer as the duct, complying with NEMA TC 9.

C. Duct Accessories:

1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and sizes of ducts with which used, and selected to provide minimum duct spacings indicated while supporting ducts during concreting or backfilling (Underground Devices Incorperated (847) 205-9000, www.udevices.com).
    a. Duct bank shall be encased in concrete with at least three inches of concrete at the top and bottom and two inches on each side.
    b. A horizontal and vertical separation between the ducts of two inches shall be maintained by installing Underground Devices High Impact Polystyrene Wunpeece Spacers.
    c. Spacers shall be interlocked horizontally only. Along the length of the duct run spacers shall be staggered at least 6 inches vertically and shall be placed at an interval of five spacers per 20 feet or per manufacturer's recommendations.
2. Warning Tape: Underground-line warning tape specified in Division 26 Section "Identification for Electrical Systems."
3. Concrete Warning Planks: Nominal 12 by 24 by 3 inches in size, manufactured from 6000-psi concrete.

    a. Color: Red dye added to concrete during batching.
    b. Mark each plank with "ELECTRIC" in 2-inch- high, 3/8-inch- deep letters.

2.3 PRECAST CONCRETE HANDHOLES AND BOXES

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

1. Carder Concrete Products.
2. Christy Concrete Products.
3. Elmhurst-Chicago Stone Co.
4. Oldcastle Precast Group.
5. Riverton Concrete Products; a division of Cretex Companies, Inc.
6. Utility Concrete Products, LLC.
7. Utility Vault Co.
8. Wausau Tile, Inc.

B. Comply with ASTM C 858 for design and manufacturing processes.

C. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of hand hole or box.

1. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
2. Frame and Cover: Weatherproof steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
3. Frame and Cover: Weatherproof steel frame, with hinged steel access door assembly with tamper-resistant, captive, cover-securing bolts.

    a. Cover Hinges: Concealed, with hold-open ratchet assembly.
    b. Cover Handle: Recessed.

4. Frame and Cover: Weatherproof aluminum frame with hinged aluminum access door assembly with tamper-resistant, captive, cover-securing bolts.

    a. Cover Hinges: Concealed, with hold-open ratchet assembly.
    b. Cover Handle: Recessed.

5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
6. Cover Legend: Molded lettering, "ELECTRIC.", "TELEPHONE." Or As indicated on the drawings for each service.
7. Configuration: Units shall be designed for flush burial and have closed bottom, unless otherwise indicated.
8. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.

    a. Extension shall provide increased depth of 12 inches.
    b. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.

9. Windows: Precast openings in walls, arranged to match dimensions and elevations of approaching ducts and duct banks plus an additional 12 inches vertically and horizontally to accommodate alignment variations.

    a. Windows shall be located no less than 6 inches from interior surfaces of walls, floors, or frames and covers of hand holes, but close enough to corners to facilitate racking of cables on walls.
    b. Window opening shall have cast-in-place, welded wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct banks.
    c. Window openings shall be framed with at least two additional No. 4 steel reinforcing bars in concrete around each opening.

10. Duct Entrances in hand hole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.

    a. Type and size shall match fittings to duct or conduit to be terminated.
    b. Fittings shall align with elevations of approaching ducts and be located near interior corners of hand holes to facilitate racking of cable.

11. Hand holes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

12. Where power and communication service conduits are routed in parallel to a common piece of equipment or device, the hand hole shall be provided with an FHR divider panel and separate access covers in order to maintain code required physical separation of conduits and associated cabling.

2.4 HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Description: Comply with SCTE 77.

1. Color: Custom factory color as selected by architect.

2. Configuration: Units shall be designed for flush burial and have closed bottom, unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC", "TELEPHONE" or as indicated on the drawings for each service.
6. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
7. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
8. Hand holes 12 inches wide by 24 inches long and larger shall have factory-installed inserts for cable racks and pulling-in irons.

B. Polymer Concrete Hand holes and Boxes with Polymer Concrete Cover: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

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

    a. Armorcast Products Company.
    b. Carson Industries LLC.
    c. CDR Systems Corporation.
    d. NewBasis.

C. Fiberglass Handholes and Boxes with Polymer Concrete Frame and Cover: Sheet-molded, fiberglass-reinforced, polyester resin enclosure joined to polymer concrete top ring or frame.

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

    a. Armorcast Products Company.
    b. Carson Industries LLC.
    c. Christy Concrete Products.
    d. Synertech Moulded Products, Inc.; a division of Oldcastle Precast.

D. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with covers of polymer concrete.

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

    a. Carson Industries LLC.
    b. Christy Concrete Products.
    c. Nordic Fiberglass, Inc.

E. High-Density Plastic Boxes: Injection molded of high-density polyethylene or copolymer-polypropylene. Cover shall be polymer concrete.

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

a. Carson Industries LLC.
b. Nordic Fiberglass, Inc.
c. Pen-Cell Plastics.

2.5 SOURCE QUALITY CONTROL

A. Test and inspect precast concrete utility structures according to ASTM C 1037.

PART 3 - EXECUTION

3.1 UNDERGROUND DUCT APPLICATION

A. Ducts for Electrical Cables Over 600 V: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank, unless otherwise indicated.

B. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank, unless otherwise indicated.

C. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank, unless otherwise indicated.

D. Ducts for Electrical Branch Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank, unless otherwise indicated.

E. Underground Ducts for Telephone, Communications, or Data Utility Service Cables: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank, unless otherwise indicated.

F. Underground Ducts for Telephone, Communications, or Data Utility Service Cables: RNC, NEMA Type EPC-40-PVC, installed in direct-buried duct bank, unless otherwise indicated.

G. Underground Ducts for Telephone, Communications, or Data Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank, unless otherwise indicated.

H. Underground Ducts for Telephone, Communications, or Data Circuits: RNC, NEMA Type EB-20-PVC, in concrete-encased duct bank, unless otherwise indicated.

I. Underground Ducts Crossing Paved Paths, Walks and Driveways/Roadways: RNC, NEMA Type EPC-40-PVC, encased in reinforced concrete.

3.2 UNDERGROUND ENCLOSURE APPLICATION

A. Hand holes and Boxes for 600 V and Less, Including Telephone, Communications, and Data Wiring:

1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-10 structural load rating.
2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Non-deliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20 structural load rating.
3. Units in Sidewalk and Similar Applications with a Safety Factor for Non-deliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10 structural load rating.
4. Units Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf vertical loading.

3.3 EARTHWORK

A. Excavation and Backfill: Comply with Division 31 Section "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary top-soiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Division 32 Sections "Turf and Grasses" and "Plants."

D. Cut and patch existing pavement in the path of underground ducts and utility structures according to Division 01 Section "Cutting and Patching."

3.4 DUCT INSTALLATION

A. Slope: Pitch ducts a minimum slope of 1:300 down toward hand holes and away from buildings and equipment. Slope ducts from a high point in runs between two manholes to drain in both directions.

B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations, unless otherwise indicated.

C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.

D. Duct Entrances to Polymer Concrete Hand holes: Use end bells, spaced approximately 10 inches o.c. for 5-inch ducts, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell without reducing duct line slope and without forming a trap in the line.

2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to hand hole.
3. Grout end bells into structure walls from both sides to provide watertight entrances.

E. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 feet outside the building wall without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in Division 26 Section "Common Work Results for Electrical."

F. Sealing and Waterproofing: Provide temporary mechanical waterproof closure/plug at all terminations of ducts that have cables pulled. Provide mechanical waterproof plug on all spare empty ducts at each duct/conduit end. Sealing and waterproofing mechanical plugs shall withstand at least 15-psig hydrostatic pressure. Sealing and waterproofing system shall be capable of adding and removing cables. Provide the following products for sealing and waterproofing conduits and ducts:
1. Tyco Electronics Corporation – Jackmoon Series Duct Plugs.

G. Pulling Cord: Install 100-lbf- test nylon cord in ducts, including spares.

H. Cleaning: Underground conduit duct shall completely dry and free from water and debris prior to installation of cables and nylon pull ropes. Clean entire length of all underground electrical conduit ducts with compressed air. Temporarily cover all ends of conduit ducts in order to prevent water and debris infiltration during the entire length of construction.

I. Concrete-Encased Ducts: Support ducts on duct separators.

1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with not less than 5 spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
2. Concreting Sequence: Pour each run of envelope between manholes or other terminations in one continuous operation.

    a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations, or use other specific measures to prevent expansion-contraction damage.
    b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch reinforcing rod dowels extending 18 inches into concrete on both sides of joint near corners of envelope.

3. Pouring Concrete: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Use a plank to direct concrete down sides of bank assembly to trench bottom. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.

4. Reinforcement: Reinforce concrete-encased duct banks where they cross disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
5. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
6. Minimum Space between Ducts: 3 inches between ducts and exterior envelope wall, 2 inches between ducts for like services, and 4 inches between power and signal ducts.
7. Depth: Install top of duct bank at least 24 inches below finished grade in areas not subject to deliberate traffic, and at least 30 inches below finished grade in deliberate traffic paths for vehicles, unless otherwise indicated.
8. Stub-Ups: Use manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Extend concrete encasement throughout the length of the elbow.
9. Stub-Ups: Use manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. Stub-Ups to Equipment: For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.

10. Warning Tape: Bury warning tape approximately 12 inches above all concrete-encased ducts and duct banks. Align tape parallel to and within 3 inches of the centerline of duct bank. Provide an additional warning tape for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

J. Direct-Buried Duct Banks:

1. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.
2. Space separators close enough to prevent sagging and deforming of ducts, with not less than 5 spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6 inches between tiers.
3. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Division 31 Section "Earth Moving" for pipes less than 6 inches in nominal diameter.
4. Install backfill as specified in Division 31 Section "Earth Moving."
5. After installing first tier of ducts, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand-place backfill to 4 inches over ducts and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
6. Install ducts with a minimum of 3 inches between ducts for like services and 6 inches between power and signal ducts.

7. Depth: Install top of duct bank at least 36 inches below finished grade, unless otherwise indicated.
8. Set elevation of bottom of duct bank below the frost line.
9. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
10. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

3.5 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Install hand holes and boxes level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by the manufacturer.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and traffic ways, set so cover surface will be flush with finished grade. Set covers of other hand holes 1 inch above finished grade.

D. Install hand holes and boxes with bottom below the frost line, 36 inches below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for ducts and conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

G. For enclosures installed in asphalt paving and subject to occasional, non-deliberate, heavy-vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screeded to top of box cover frame. Bottom of ring shall rest on compacted earth.

    1. Concrete: 3000 psi, 28-day strength, complying with Division 03 Section "Cast-in-Place Concrete," with a troweled finish.
    2. Dimensions: 10 inches wide by 12 inches deep.

3.6 GROUNDING

A. Ground underground ducts and utility structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
3. Test hand hole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.8 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

B. Clean internal surfaces of manholes, including sump. Remove foreign material.

END OF SECTION

SECTION 32 93 11

PLANTINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes landscaping work as shown and specified.

1.2 SUBMITTALS

A. Submit list of sources for plant material to be provided.

B. Submit photographs of proposed plant material taken in the nursery where they are grown prior to requesting inspection and tagging.

C. Submit product certificates signed by manufacturers certifying that their products comply with specified requirements

1. Manufacturer’s certified analysis for standard products.
2. Label data substantiating that plants, trees, shrubs, insecticides, and planting materials comply with specified requirements.

D. Submit two copies of written maintenance instructions for care of installed plants.

E. Samples:

1. Submit samples and certified analyses by recognized laboratory for humus, fertilizer. Manufacturer's analysis for standard products will be acceptable.
2. For environmental analysis, submit representative soil samples (no composite samples) to a laboratory certified by the Illinois Environmental Protection Agency and provide analysis results to the Boards Authorized Representative for approval in accordance with Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil."
3. Review shall not be construed as final acceptance. Architect may take samples of materials delivered to site and analyze them for compliance with specifications.

F. Soil Test Analysis:

1. Submit copies of test analysis indicating pH, percentages of gravel, sand, silt, clay, organic matter, and major micronutrient groups in the analysis for imported topsoil and topsoil from site (if any).
2. Provide environmental analysis of representative soil samples (no composite samples) in accordance with Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil" and submit analytical results to the Boards Authorized Representative for approval 10 working days prior to start of project. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 1,000 tons of material must be analyzed for 35 ILL. ADM CODE 740

APPENDIX A Target Compound List (TCL) parameters. The date of the topsoil analysis shall be within 60 days of importing such material to the site.

3. Include in the analysis recommended amounts of fertilizer and other soil amendments needed to bring the topsoil into compliance with the requirements of this Section.
4. Furnish Architect with 5 copies of test analysis report.

G. Percolation Test results:

1. Perform percolation tests in tree pits as required by the Chicago Landscape Ordinance. Submit 5 copies of test results to Architect.

H. Comply with State of Illinois and federal laws with respect to inspection of all plants for plant diseases and insect infestation. Submit an inspection certificate, required by law to this effect, with each shipment.

I. Preinstallation Conference: Conduct preinstallation conference at the Site in compliance with requirements of Division 01 Section "Project Management and Coordination":

1. Review maintenance procedures for surrounding streets, walks, paving and site amenities.
2. Review procedures for work on public property.
3. Review plant locations and procedures for adjustment.

1.3 QUALITY ASSURANCE

A. Ability to Deliver:

1. Investigate sources of supply and confirm they can supply plants specified on plant list in sizes, variety, and quality noted and specified before submitting bid. Failure to take this precaution will not relieve responsibility for furnishing and installing plant material in accordance with Contract requirements.
2. Substitutions may be permitted only upon submission of written proof that specified plant is not obtainable locally. Such substitution may be made upon written authorization by Architect.
3. Furnish and install plants shown on drawings in quantity and size designated.

B. Inspection:

1. Submit photos of plant material as grown in the nursery for preliminary review by Architect. Select and tag plant material before requesting inspection by Architect.
2. In addition to review of plant material photographs, Architect may inspect plant material at nursery. Such inspection shall be in addition to inspection at job site.

    a. If plants and materials required to be inspected are located outside radius of 25 miles from Project site, Architect's direct and indirect cost including normal profit shall be borne and paid by Contractor.

3. Upon delivery and before planting request inspection of plants by Architect.
4. Inspection and approval is for quality, size, and variety only, and in no way impairs right of rejection for failure to meet other requirements during progress of Work.
5. Contractor shall be present during required inspection or as may be required by Architect.

C. Qualifications of installer: Work under this Section is to be performed by a Landscape Contracting firm which has a minimum of 5 years experience successfully completing projects of a similar size and value.

D. Perform planting by personnel familiar with accepted landscape planting procedures. A qualified foreman, with a minimum of 5 years experience installing plant material is to be on-site during planting procedures.

E. Reference Standards

1. Provide analyses and tests of topsoil, fertilizer and humus in accordance with requirements of Association of Official Agricultural Chemists.
2. All imported backfill materials shall also comply with Section 31 23 23 “Acceptance of Backfill, Topsoil & CU Structural Soil”.
3. Plant names used in plant list are in accordance with "Standardized Plant Names," published by American Joint Committee on Horticulture Nomenclature (current edition).
4. Size grading standards of plant materials shall be in accordance with American Association of Nurseryman, Inc., (AAN) Code of Standards ANSI Z60.1.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Preparation for Delivery:

1. Balled and Burlapped (B&B) Plants:

a. Dig and prepare for shipment in manner that will not damage roots, branches, shape, and future development of plant.
b. Originate from soil which will hold good ball when wrapped with burlap or similar material, bound with twine or cord so as to hold balls firm and intact.
c. Ball Sizes: Not less than standard established by AAN.
d. Drumlace plants 2 inches in caliper and over.

2. Potted or Container Plants

a. Provide container to hold ball shape protecting root mass during delivery and handling.

B. Delivery:

1. Plant Material: Take precautions in accordance with best trade practices to ensure arrival of plant material at job site in good condition and without injury. Cover plants to prevent drying, transit disease or injury.
2. Fertilizer: Deliver fertilizer to site in original, unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state law.
3. Maintenance materials: Deliver insecticide spray in the manufacturer’s containers; mix and spray according to manufacturer’s directions. Deliver fungicide in manufacturer’s containers; mix and apply according to manufacturer’s directions only with the acceptance of the Architect. Deliver herbicide in the manufacturer’s containers; apply per manufacturer’s directions, only with the acceptance of the Architect.
4. Notify Architect, a minimum of 24 hours before delivery of plant material.

a. Failure to notify Architect in advance, in order to arrange proper scheduling may result in loss of time or removal of plant or plants not installed as specified or directed.

5. Each shipment shall be accompanied by invoice showing sizes and varieties of plants included in each shipment.

a. Provide copy of invoice to Architect upon delivery of plant material.

C. Storage:

1. Plant Material:

a. Set plants which are not to be planted within 4 hours, on ground and heal in with peat, soil, mulch or other media.
b. Protect roots of plant material from drying or other possible injury.
c. Water plants as necessary until planted.
d. Plants shall not remain unplanted for longer than 3 days.

2. Store fertilizer, humus, and spray materials in weatherproof storage areas and in such manner that their effectiveness will not be impaired.

1.5 JOB CONDITIONS

A. Planting Seasons:

1. Spring Planting: From time soil becomes workable to June 15. Fall Planting: September 1 to November 15. Plant evergreen shrub plantings no later than November 1, and evergreen tree plantings no later than October 15.
2. Summer Season: June 2 through August 31. Planting shall be considered unseasonable and shall require approval by Architect. Approval to plant under such conditions shall in no way relieve Contractor from guarantee provisions of these specifications.
3. Container Plants: Planting season designated above may be extended for container grown plants when approved by Architect.

B. Plant only when weather and soil conditions are suitable in accordance with best practices of industry.

C. Protection:

1. Protect seeded and planted areas against damage by other work.
2. Replace, repair, restake or replant sod or plantings which are damaged.
3. Protect lawn areas, and repair damage resulting from planting operations.

D. Wherever landscape work is executed in conjunction with other work, arrange schedule that will permit execution of landscape work as specified.

PART 2 - PRODUCTS

2.1 PLANT

A. General:

1. Provide nursery grown plant material. Provide plants grown within same hardiness zone as project site or have been acclimated to conditions of same hardiness zone for minimum of two growing seasons. Hardiness zones shall conform to "Zones of Plant Hardiness" as provided by U.S. Department of Agriculture.
2. Unless specifically noted otherwise, provide plants of selected specimen quality, have normal habit of growth and be sound, healthy, vigorous plants with well developed root systems, free of disease, insect pests, their eggs or larvae, and injuries.
3. Do not prune before delivery. Prune only at time of planting.
4. Trees that have damaged or crooked leader, or multiple leaders, are not acceptable unless specifically specified. Trees with abrasion of bark, sun scalds, disfiguring knots, or fresh cuts of limbs over 1-1/4 inches, which have not completely calloused, are not acceptable.
5. Plants shall be freshly dug or container-grown. No heeled-in plants or plants for cold storage will be accepted, except as otherwise specified, unless Contractor makes such request in writing and plants are inspected and approved.

B. Plant Name and Size:

1. Measure plants when branches are in their normal position. Height and spread refer to plant's main body and not from branch tip to branch tip.
2. Take caliper measurement at point on trunk 6 inches above natural ground line for trees up to 4 inches in caliper and at point 12 inches above natural ground line for trees 4 inches and over in caliper.
3. If range of size is given, no plant shall be less than minimum size and not less than 50% of plants shall be as large as upper half of range specified.
4. Measurements specified are minimum size acceptable and are measurements after pruning, where pruning is required. Plants meeting measurements specified, but not producing normal balance between height and spread, are not acceptable.
5. Shrubs shall be matched specimens from single block source.
6. Plants shall be true to species and variety and shall conform to measurement specified in Plant List except that plants larger than specified may be used if approved by Architect. Use of such plants shall not result in increase in Contract price. If larger plants are approved, increase ball of earth in proportion to size of plant.
7. Where plants larger than specified have been submitted in writing for approval and approved in writing by Architect, Contractor shall assume responsibility of guarantee for plant in size as planted.

C. Balled and Burlapped Plants (Designated B&B):

1. Dig plants with firm natural balls of earth of diameter indicated below and of sufficient depth to encompass fibrous and feeding root system necessary for full recovery of plant.
2. Plants having balls broken or cracked during delivery or at time of planting will be rejected.
3. For Evergreen trees, trunk diameter shall be used to determine minimum required ball dimensions. Minimum ball dimensions shall be those as specified for single stem trees.

4. Diameter at top of each ball shall be diameter specified above and diameter at bottom of each ball shall not be less than 70% of specified top diameter. Top and bottom sources shall be parallel.
5. Ball shall be of specified depth at points perpendicular to bottom of ball.
6. Balls greater than 30 inches diameter shall be drum-laced.
7. Architect may reject any plant specified as balled and burlapped which fails to conform, in the Architect's opinion, to balling requirements set forth herein.

D. Container or Pot Grown Plants:

1. Container grown plants shall have heavy fibrous root system, or well developed taproot, that has been developed by proper horticultural practice including transplanting and root pruning.
2. Root system shall have developed sufficiently long for new fibrous roots to develop so root mass will retain its shape and hold together when removed from container.
3. In no case should container strangle or girdle natural growth of plant.
4. Groundcovers in containers pots shall have the minimum number of runners and length of runners in accordance with American Association of Nurserymen, Inc., ANSI Z60.1.
5. Diameter of spread shall determine inside diameter of pot in which they shall be grown for at least 3 months prior to delivery.
6. Plant container sizes shall conform to American Association of Nurseryman, Inc., ANSI Z60.1.

E. Deciduous (Shade and Ornamental Trees):

1. Street tree plantings shall be free of branches equivalent to 1/2 of tree height or so that crown of tree is in proportion to trunk as tree grows.

    a. Trees with ascending branches may be branched 1 foot or more below branch heights as listed.

2. Provide trees of specimen quality.

F. Evergreen Trees/Shrubs:

1. Provide evergreen trees of specimen quality.
2. Provide evergreen shrubs of specimen quality.
3. Columnar plants:

    a. Provide columnar plants of specimen quality.

G. Deciduous Shrubs:

1. Provide deciduous shrubs of specimen quality.

H. Perennial, Biennials, Prairie Forbes, and Grasses:

1. Perennial, biennials, prairie forbes, and grasses specified as "container" or "pot" shall be provided as container grown plants, or shall be provided with firm natural balls of earth with diameter and depth in accordance with American Standard for Nursery Stock for size specified on Plant List.

2. Ship balled plants in open-air boxes or crates that will minimize handling of each plant prior to installation. Do not plant balled plants if ball is cracked or broken either before or during process of planting.

2.2 PLANTING MATERIALS

A. Water:

1. Existing water supply from hose bibs at the project building may be used for all planting operations. Provide hose and equipment necessary for proper watering of plant material. Provide water at no extra cost if it is not available at the project site.

B. Topsoil:

1. Topsoil shall be loamy soil from the A horizon of soil profiles of local soils. It shall be relatively free from large roots, sticks, weeds, brush, or stones larger than 25 mm (1 inch) in diameter, or other litter and waste products. At least 90 percent must pass the 2.00 mm (No. 10) sieve and the pH must be between 5.0 and 8.0.
2. Composition: 45-77 percent silt, 0-25 percent clay, 25-33 percent sand.
3. Acidity: pH 6.0 to 7.0; amend soil as indicated by tests to achieve this pH range.
4. Organic content: Three to five percent.
5. Environmental analysis requirements shall be in accordance with Section 31 23 23 "Acceptance of Backfill, Topsoil and CU Structural Soil".
6. Import topsoil conforming to above requirements from off-site sources as required to complete the work. Do not obtain from bogs or marshes.
7. Perform test analysis on each source of topsoil to demonstrate compliance with the above and submit reports as specified.

C. Mulch:

1. Shredded Hardwood Bark:

a. From mixed hardwood species and free of sticks leaves, and wood chips, 60% shall range between 1 inch and 3 inches in length; remaining 40% shall not exceed 1-1/2 inches.
b. Maximum of 5% content by weight of shredded wood particles.

D. Fertilizer:

1. Commercial type, uniform in composition, free flowing, conforming to state and federal laws, and suitable for application with equipment designed for that purpose.
2. Fertilizer to contain minimum basis percentage by weight of following:

a. Nitrogen: 6%, 1/4 of nitrogen shall be in form of nitrates, 1/4 in form of ammonia salts, and 1/2 in form of organic nitrogen.
b. Phosphorus: 24%, available phosphoric acid shall be derived from super phosphate having minimum analysis of 20% available phosphate.
c. Potash: 24%, potash shall be in form of sulphate of potash.
d. Balance of fertilizer shall be materials usually present in such products, free from dust, sticks, sand, stone, and other debris.

3. Coordination N-P-K requirements with those recommended by soils consultant, if applicable.

E. Drainage material:

1. Free draining aggregate meeting the requirements of IDOT CA7 and having a pH of 5.5 - 7. Comply with the requirements of Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil."

F. Aeration/drainage pipe:

1. Perforated or slotted agricultural drainage pipe capable of withstanding required backfill compaction.
2. Rigid riser pipe for vertical installation where indicated. Install slotted use compatible pipe and fittings such as tees and caps for horizontal and vertical installations.
3. Cover aeration/drainage pipe with a geotextile sock.

G. Plant Maintenance Materials:

1. Insecticides, Herbicides, and Fungicides: Materials used for the control of pests shall be appropriate to the pest or pests which pose a problem to the materials, and shall be used by licensed personnel in strict accordance with manufacturer's recommendations. No phytotoxic materials shall be used.

H. Filter fabric:

1. Nonbiodegradable, needle-punched, non-woven, water permeable, 100% continuous polypropylene or polyester fabric, 3 oz. per sq. yd. minimum, designed for drainage applications without clogging or piping.
2. Capable of withstanding backfilling and compacting operations without tearing or deforming.

PART 3 - EXECUTION

3.1 INSPECTION

A. Do not install plantings where depth of soil over underground construction, obstructions or rock is insufficient to accommodate roots or where pockets in rock or impervious soil will require drainage. Where such conditions encountered in excavation planting areas and where stone, boulders or other obstruction cannot be broke or removed by hand methods and where trees to be planted found under overhead wires, bring to the attention of the Architect. Alternate locations for planting may be designated by Architect.

B. Remove rock or other underground construction and drain planting areas only when approved by Architect. Payment of extra shall be based on in-place volume required to provide normal requirements for plantings.

C. Verify location of underground utilities with appropriate sources prior to construction. Contact D.I.G.G.E.R. at least 48 hours before commencing with construction operations. Repair damaged utilities.

D. Conflicts with utilities shall be called to the Architect's attention before proceeding with work. Alternate locations may be designated by Architect.

3.2 INSTALLATION

A. Topsoil/Finish Grading:

1. Do not place or work topsoil in frozen or muddy condition.
2. Establish final grade as shown on drawings. Grades not otherwise indicated are uniform levels or slopes between points where elevations are given or between such points and existing finished grades.
3. Where drawings show existing grades of landscaped areas not to be changed remove enough material to allow placement of 18in. of new topsoil and 6 inches of drainage material beneath shrub plantings and 24 inches of topsoil minimum beneath tree plantings, unless existing topsoil to required depth is undisturbed and of equal or better quality than specified herein. In latter case, existing topsoil may be left in place and use only enough new topsoil to bring these areas up to grade.

B. Preparation:

1. Planting Season: Conform to planting seasons defined herein.
2. Preparation of Planting Areas: Cover surrounding turf (if existing) in manner to protect turfed areas that are to be trucked or hauled over and upon which soil is to be temporarily stocked.
3. Maintain at least one stockpile of topsoil for backfilling plants during planting operations.
4. Stake or paint locations of plants and bed lines. Architect must approve locations before excavation is started. Provide 48 hours notice for approval. Contractor to be present during approval. Make adjustments in locations and outlines as required. In event that pits or areas for planting are prepared and backfilled with topsoil to grade prior to commencement of lawn operations, mark so they can be readily located when work of planting proceeds.
5. Remove weed growth prior to planting installation.

C. Excavation for Planting:

1. Comply with the requirements of Section 31 23 18.13 "Contaminated Soil, General Construction & Demolition Debris Disposal".
2. Excavate circular pits with vertical side for plants. Except for ground cover or other bedding type plant material.

    a. Diameter of pits for trees shall be at least 2 feet greater than diameter of ball, or container.

3. Depth of pits for trees shall be as indicated, or as required by Ordinance, which ever is more beneficial to the growth of plants. Excavate to greater depth as suitable to accommodate ball, container or bare roots when plant is set to finish grade allowing for 6 in. of compacted, prepared soil in bottom of pit.
4. All planting areas must have adequate drainage. Install under drainage pipes in all planting areas and connect to storm sewer. Where percolation tests indicate adequate percolation of 1 inch per hour minimum, sump drainage may be used. Auger an 8-inch diameter by 6-foot deep drainage passage beneath individual tree pits. Fill passage with

drainage material and cover with filter fabric. Utilize continuous trench for rows of trees. Excavate a drainage sump of indicated dimensions adjacent to each tree. Fill sump with drainage material and cover with filter fabric.

5. Utilize continuous trench for shrub masses and hedges instead of separate round pits. Auger an 8-inch diameter by 6-foot deep drainage sump every 8 ft along length of plant pit. Fill passage with drainage material and cover with filter fabric.
6. Install aeration/drainage pipe system in tree planting trenches as indicated.

D. Testing of Plant Pits and Trenches:

1. Perform percolation tests for all plant pits.
2. Where obstructions below or above ground are encountered, alternate locations may be selected as approved by Architect.
3. Where locations cannot be changed as determined by Architect, submit cost required to remove obstructions to depth of not less than 6 in. below required pit depth. Proceed with work after approval of Architect.
4. Dispose of excavated material not suitable for backfilling offsite in legal manner.

E. Preparation of Planting Pits:

1. Loosen soil at bottom of pit to minimum depth of 4 inches by spading or other effective methods.
2. Scarify walls of plant pits.
3. Backfill pit with 6-inch layer of compacted, topsoil.
4. Notify Landscape Architect if drainage problems are encountered.

F. Setting and Backfilling Plants:

1. Balled and Burlapped (B&B) Plants:

   a. Place plants being planted in pits or trenches in center of pit or trench on compacted, topsoil. Adjust compacted soil so that top of root ball bears same relationship to finish grade as it bore to its previous finish grade in nursery.
   b. Remove twine tied around tree trunk. Remove or roll down burlap or plastic wrap around ball. Remove wire and other nondecomposible materials. Untreated burlap need not be removed, but shall be loosened around tree trunk.
   c. Backfill planting pits with topsoil in 12-inch layers and tamp each layer to fill voids until planting mixture is at final grade.
   d. Remove nursery plant identification tags.

2. Container Grown Plants:

   a. Open and remove potted plants from containers.
   b. If growing medium is comprised of 75% or more of peat, perlite, sand or like material other than soil, pull visible roots away from container medium so as to leave roots partially exposed.
   c. Place plants in plant pit or trench and carefully backfill with topsoil among exposed roots. Continue backfilling and tamping in 6-inch layers until topsoil is at final grade.
   d. Remove nursery plant identification tags.

G. Saucer Formation:

1. Form shallow saucer around each isolated plant pit with topsoil.
2. Water plants immediately after planting. Incorporate required fertilizer into prepared planting mixture at rate specified.

H. Bed Edging:

1. Spade edge all planting beds and tree rings 2 inches deep.
2. Ragged edges and edging will not be accepted.

3.3 PRUNING

A. Prune trees and shrubs at time of or after planting. Prune and repair existing trees designated to remain.

B. Prune in accordance with standard horticultural practices to retain natural habit and shape of plant.

1. Shearing of plants will not be accepted, unless instructed by Architect.
2. Preserve leader(s) promoting symmetrical growth on multiple leader plants.

C. Prune and trim dead wood, suckers, and injured twigs and branches.

D. Use only clean, sharp tools.

E. Make cuts flush and clean avoiding injury to branch bark ridge or branch collar leaving no stubs.

F. For cuts greater than 3/4 in. in diameter and bruises or scars on bark, trace injured cambium back to living tissue and remove. Smooth and shape wounds so as not to retain water.

G. Prune flowering trees only to remove dead or damaged branches. Do not remove leader.

3.4 PROTECTION AND MAINTENANCE

A. Fertilizer:

1. First Application (Ratio 1-4-4): Prior to installation of mulch to plant beds and saucers, apply commercial fertilizer to plant bed or saucer area at rate of 1/2 lb. of active ingredient per 100 sq. ft.
2. Second Application (Ratio 5-3-2): Applied in 60 days after planting at rate of 1/2 lb. of active ingredient per 100 sq. ft.

B. Mulching:

1. Mulch shade trees, ornamental trees, singularly planted shrubs, hedge plantings, and massed plantings. Cover entire planting pit or trench with minimum 3-inch depth of shredded hardwood bark.
2. Mulch within five days after installation.

C. Watering:

1. Thoroughly water immediately after installation.
2. Water during period of temporary maintenance.

3.5 CLEAN UP

A. Remove soil or similar material brought onto paved areas, keeping these areas clean.

B. Upon completion of planting, remove excess soil, stones, and debris and dispose of off-site in legal manner.

3.6 ACCEPTANCE

A. Planting Acceptance: At completion of the work installed under this contract, the Architect in conjunction with the Landscape Architect will inspect and accept the landscape work in accordance with the following requirements:

1. Acceptance requires:

a. Plant material shall conform to drawings with respect to quantity, quality, size, species, and location, except those items accepted or revised in field by Architect.
b. Plant material shall be in healthy condition as defined under guarantee requirements below.
c. Items shall appear to be in general conformance with specifications.

3.7 MAINTENANCE

A. Maintenance Period: Perform landscape maintenance, as specified hereunder, for the following period:

1. Initial Maintenance: The Contractor is responsible for maintenance of all landscape areas until it has been accepted by the Architect of Record in conjunction with the Landscape Architect, in accordance with 3.6 requirements. Begin maintenance immediately upon delivery to the site and as each plant and each portion is planted.
2. Maintenance Period: 12 months following Final Acceptance.

B. Work Subject to Maintenance: The work installed under this contract for the entire site, including parkways.

C. Maintenance of Plant Materials: Maintain all plantings in a healthy and flourishing condition. Maintenance of new planting consists of pruning, watering (rainfall shall be supplemented with Contractor watering operations for a total rate of one inch per week during the growing seasons), cultivating, replanting, weeding, mulching, tightening and repairing of guys (if used), resotre or replace damaged tree trunk wrap (if used), cleaning, edging, furnishing and applying sprays as are necessary to keep the plants free of insects and disease, resetting of plants to proper grades or upright position, restoration of damaged planting saucers, and any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous, and healthy growth of work.

D. Documentation: Record all landscape maintenance events completed during course of Maintenance Period. Include name of person, date and activity, and leave on file with Building Engineer.

3.8 GUARANTEE

A. The Contractor shall warranty and maintain plant material for a period of one (1) year from the date of the Final Acceptance of the plant material. If any plant material installed by the Contractor is not in a healthy and thriving condition due to, but not limited to: improper handling or planting, improper after care including trimming, watering, weeding, cultivating, etc., or from shock of transplanting, the Contractor shall upon due notice, remove said plant(s), dispose of it/them off the project property, and furnish and plant a new plant of the same type, size and quality, at no cost to the Owner. Both the final acceptance of the plant material and the inspection one (1) year later to satisfy the warranty, shall be done when the plant material is in full leaf. The Contractor assumes the responsibility for supplying and replacing all plants not in a healthy and thriving condition at the end of the warranty period.

B. Warrant all plant material to be true to botanical name and of the specified size.

C. After receiving a Notice of Final Acceptance, all plant materials shall be warranted against defects including death, disease or infestation, unsatisfactory growth and improper maintenance for the one year Warranty Maintenance Period following project acceptance.

D. The installation contractor shall not be liable for replacement cost of plants damaged by deicing compounds, fertilizers, pesticides or other materials not specified in Contract Documents or not applied by the landscape, by relocating or removal by others, by acts of God, or by vandalism, and losses due to curtailment of water by local authorities.

3.9 REPLACEMENTS

A. Plants which die or require replacement for other reasons during one-year guarantee period shall be replaced as soon as possible during following acceptable planting seasons:

1. Spring Replacement Season: All plants - when ground becomes workable to June 15.
2. Fall Replacement Season:

    a. Deciduous plants - September 1 to November 15.
    b. Evergreen plants - September 1 to November 1.

B. Topsoil that does not conform to the environmental standards as detailed in specification Section 31 23 23 "Acceptance of Backfill, Topsoil and CU Structural Soil" shall be excavated and replaced with topsoil that does at Contractor’s expense.

C. Procedure:

1. Dispose of plants off-site in legal manner.
2. Replacements shall be of same size and species as original plant unless otherwise approved by Landscape Architect.
3. Replacements shall be supplied and installed in accordance with specifications.

    a. Additional one-year guarantee for replacement plants shall begin on date of final acceptance of plant material by Architect as documented in field report.

4. Replacement and Damages:

a. Decisions of Architect for required replacements shall be conclusive and binding upon Contractor.
b. Contractor shall be responsible for repairing damage to property also caused by defective workmanship and materials.

END OF SECTION

32'-0" 0'-0" 16'-0" 32'-0" 64'-0"
1/32" = 1'-0"

16'-0" 0'-0" 8'-0" 16'-0" 32'-0"
1/16" = 1'-0"

8'-0" 0'-0" 4'-0" 8'-0" 16'-0"
1/8" = 1'-0"

4'-0" 0'-0" 2'-0" 4'-0" 8'-0"
1/4" = 1'-0"

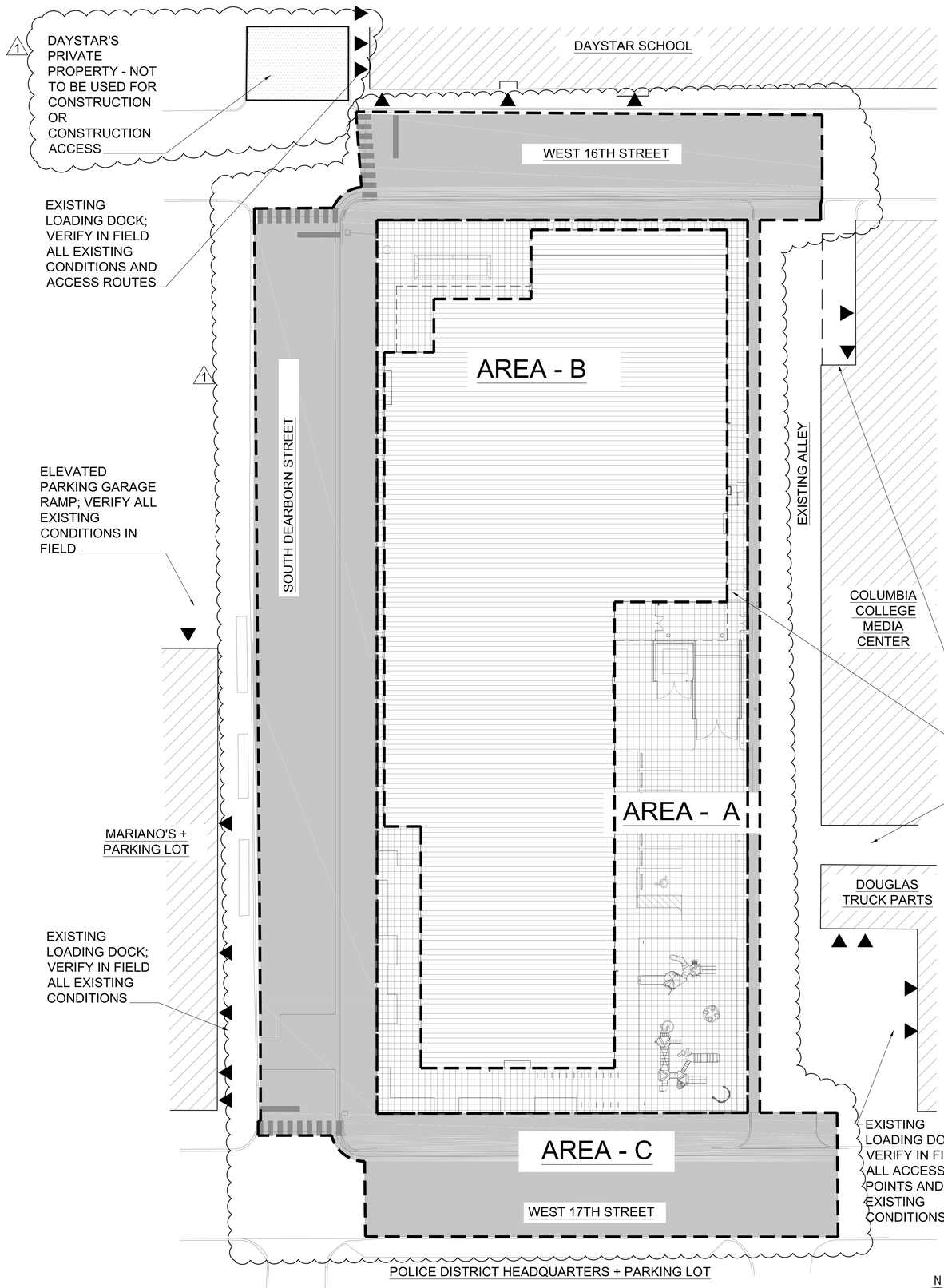
2'-0" 0'-0" 1'-0" 2'-0" 4'-0"
1/2" = 1'-0"

1'-0" 0'-0" 0'-6" 1'-0" 2'-0"
1" = 1'-0"

0'-0" 0'-6" 1'-0" 2'-0"
1-1/2" = 1'-0"

0'-0" 0'-3" 0'-6" 0'-9" 1'-0"
3" = 1'-0"

0'-0" 0'-1-1/2" 0'-3" 0'-4-1/2" 0'-6"
6" = 1'-0"



1 G5.1 PHASING PLAN
SCALE: N.T.S.

LEGEND:

AREA - A: SITE IMPROVEMENTS

AREA - B: BUILDING INTERIOR AND BUILDING ENCLOSURE

AREA - C: PUBLIC RIGHT OF WAY

EXISTING NEIGHBORING FACILITIES

EXISTING ENTRY/ EGRESS. VERIFY ALL LOCATIONS IN FIELD

SCHEDULE MILESTONES

SCHEDULE MILESTONE #1: (NTP THROUGH AUGUST 31, 2017) ALL WORK ASSOCIATED WITH EARTHWORK INCLUDING EXCAVATION AND PROPER HANDLING AND DISPOSAL OF SUB-GRADE OBSTRUCTIONS AND SOIL, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

1 SCHEDULE MILESTONE #2 (AREA 'A'): (NTP THROUGH OCTOBER 1, 2018) ALL WORK ASSOCIATED WITH SITE IMPROVEMENTS WITHIN THE PROPERTY LINE EXCLUDING PLANTINGS, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

1 SUBSTANTIAL COMPLETION (AREAS 'B' AND 'C'): (NTP THROUGH NOVEMBER 30, 2018) ALL WORK ASSOCIATED WITH THE NEW BUILDING AND PUBLIC RIGHT OF WAY (PROW) IMPROVEMENTS EXCLUDING PLANTINGS, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

SCHEDULE MILESTONE #3: (APRIL 1, 2019 THROUGH JUNE 15, 2019) LANDSCAPE PLANTING WORK, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS..

SITE LOGISTICS

1. GENERAL CONTRACTOR SHALL REVIEW ALL NEIGHBORING FACILITIES, INCLUDING BUT NOT LIMITED TO THE DAYSTAR SCHOOL (1550 S. STATE ST); COLUMBIA COLLEGE MEDIA CENTER (1600 S. STATE ST); 1ST DISTRICT POLICE STATION (1718 S. STATE ST); MARIANOS (1615 S. CLARK ST); AND DOUGLAS TRUCK PARTS (1640 S. STATE ST), AND COORDINATE ALL CONSTRUCTION SITE ACTIVITIES SO AS TO NOT IMPACT THE OPERATIONS OF THESE NEIGHBORS. CONTRACTOR SHALL SUBMIT A SITE UTILIZATION PLAN THAT INCORPORATES AND ACCOMMODATES ALL ENTRY, EXIT, AND LOADING LOCATIONS, PRIMARY TRAFFIC ROUTINGS, AND HOURS OF OPERATION FOR EACH OF THESE FACILITIES.
1 2. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN UNRESTRICTED ACCESS TO THE DAYSTAR SCHOOL FACILITY DURING HOURS OF OPERATION AND STUDENT DROP-OFF AND PICK-UP BETWEEN THE HOURS OF 7:30 AM TO 9:00 AM AND 2:30 PM TO 4:00 PM. NO CONSTRUCTION TRAFFIC NOR DELIVERIES SHALL TAKE PLACE DURING DROP OFF AND PICK UP HOURS ALONG 16TH STREET.
3. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN UNRESTRICTED ACCESS TO MARIANOS DURING HOURS OF OPERATION AND DOCK DELIVERIES BETWEEN THE HOURS OF 5:00 AM TO 1:00 PM.
4. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN UNRESTRICTED ACCESS TO THE COLUMBIA COLLEGE MEDIA CENTER DURING HOURS OF OPERATION, DOCK DELIVERIES AND WASTE PICK UP.
5. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN UNRESTRICTED ACCESS TO DOUGLAS TRUCK PARTS DURING HOURS OF OPERATION, DOCK DELIVERIES AND WASTE PICK UP.
6. CONTRACTOR MUST OBTAIN ALL REQUIRED PUBLIC RIGHT OF WAY PERMITS AS NECESSARY TO PERFORM THE WORK.
8. CONTRACTOR MUST PROTECT ALL PUBLIC RIGHT OF WAY INFRASTRUCTURE AND COORDINATE CONSTRUCTION ACTIVITIES ACCORDINGLY.
1 9. CONTRACTOR SHALL INCLUDE A TOTAL OF THREE (3) PILE-DRIVING OPERATION BLACK-OUT DAYS IN THE CONSTRUCTION SCHEDULE; EXACT DAYS TO BE DETERMINED AND SCHEDULED BY THE AUTHORIZED COMMISSION REPRESENTATIVE. CONTRACTOR WILL BE GIVEN THREE (3) BUSINESS DAYS ADVANCE NOTICE WHEN A PILE-DRIVING OPERATIONS BLACK-OUT DAY IS SCHEDULED TO OCCUR. CONTRACTOR SHALL ACCOUNT FOR ANY AND ALL IMPACTS RELATED TO THE BLACK-OUT DATES AT NO ADDITIONAL COST TO THE OWNER OR COMMISSION.

PUBLIC BUILDING COMMISSION OF CHICAGO
Chicago Public Schools

SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ARCHITECT OF RECORD:
SMNG A LTD.

ADDRESS: 936 W. HURON STREET
CHICAGO, ILLINOIS 60642
PHONE: 312.829.3355
FAX: 312.829.8187
WEB: www.smng-arch.com

ASSOCIATE ARCHITECT:
URBAN WORKS

STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

FOODSERVICE CONSULTANT:
EDGE ASSOCIATES

ACOUSTICAL CONSULTANT:
SHINER + ASSOCIATES

THEATER CONSULTANT:
BILL CONNER ASSOCIATES LLC

ISSUANCE

MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

PROJECT NAME: SOUTH LOOP ELEMENTARY SCHOOL
PBC CONTRACT NO: 05035
SMNG-A PROJECT NO: 1620

TITLE
PHASING PLAN

SHEET
G5.1

AS-BUILD DRAWING

OF

Part of Section 21, Township 39 North, Range 14 East
of the Third Principal Meridian, in Cook County, Illinois.

N

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)
1 inch = 20 ft.

LEGEND
Grey lines indicates items removed (TYP).
Red lines indicate items remaining on site (TYP).

Boundary information, Utilities, Improvements, Related CAD line work and Benchmarks hereon shown by ALTA/ACSM Survey by TERRA ENGINEERING dated 10/16/16.

CITY OF CHICAGO BENCHMARK NUMBER 4426
Mark cut on Granite Base near the Northwest coorner of a 6 story building, 2.5' above the walk. About 1 foot east of the east line of S. Michigan Blvd. and on the south line of E. 16th St.

Elevation = 15.627

Site Benchmark #1
Chain Bolt on fire hydrant at the Southeast corner of Dearborn and 16th.

Elevation = 13.622

Site Benchmark #2
Chain Bolt on fire hydrant at the Northeast corner of Dearborn and 17th.

Elevation = 13.417

STATE OF ILLINOIS))
))
COUNTY OF COOK))

I, MICHAEL P. KARCZ, AN ILLINOIS PROFESSIONAL LAND SURVEYOR,DO HEREBY STATE THAT THE INFORMATION HEREON SHOWN ON THIS DRAWING WAS PREPARED BY ME, OR UNDER MY DIRECT SUPERVISION AND THAT THIS THE AS-BUILDS HEREON SHOWN IS AN ACCURATE DEPICTION OF SAID CONDITIONS.

DATED THIS 21ST DAY OF JUNE, 2017
FIELDWORK COMPLETED JUNE 8, 2017

PROFESSIONAL LAND SURVEYOR
MICHAEL P. KARCZ
35-3608
CHICAGO
STATE OF ILLINOIS

ILLINOIS PROFESSIONAL LAND SURVEYOR 035-003608
MY LICENSE EXPIRES NOVEMBER 30, 2018

DRAWN: MPK				
CHECKED:				
APPROVED:				
DATE: JUNE 12, 2017	1	MPK	6.21.2017	
SCALE: AS NOTED	NO.	BY	DATE	DESCRIPTION
PROJECT NO. Job #1417	REVISIONS			

FH PASCHEN SN NIELSEN LLC
5515 N. East River Rd.
Chicago, IL 60606
T 773-444-3474

CPS SOUTH LOOP
1601 S. Dearborn St., Chicago, IL

DRAWING NO.
DSV-1
SHEET NO.
1

AS-BUILD DRAWING

OF

Part of Section 21, Township 39 North, Range 14 East
of the Third Principal Meridian, in Cook County, Illinois.

N

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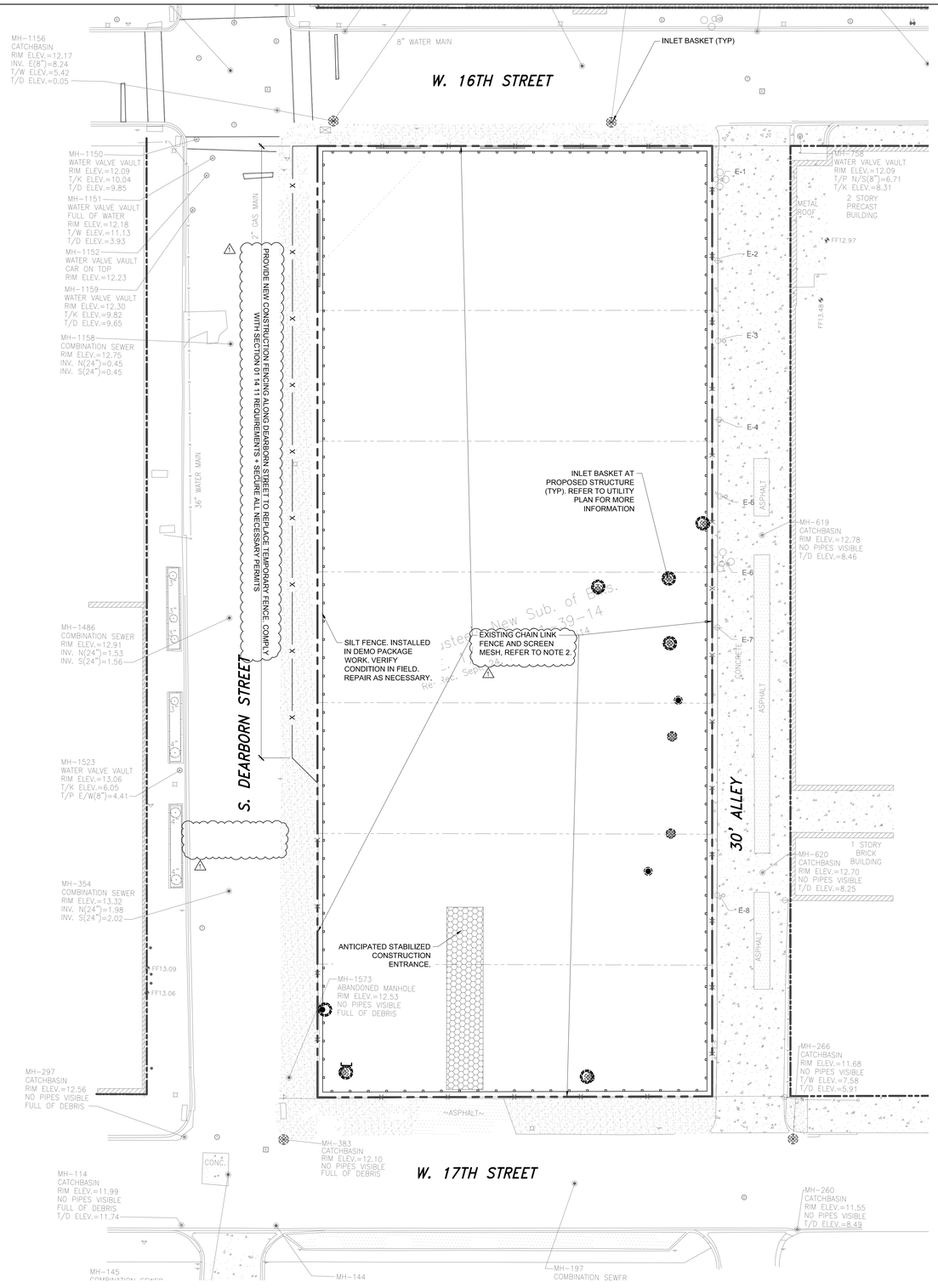
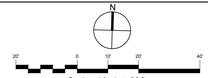
PROJECT NO. Job #1417	REVISIONS			

FH PASCHEN SN NIELSEN LLC
5515 N. East River Rd.
Chicago, IL 60606
T 773-444-3474

CPS SOUTH LOOP
1601 S. Dearborn St., Chicago, IL

DRAWING NO.
DSV-2
SHEET NO.
2





PROPERTY LINE

EXISTING BUILDING

1 C0.1 — SILT FENCE (REPAIR OR REPLACE AS NECESSARY)

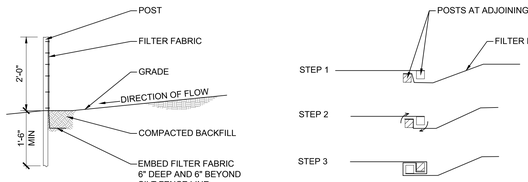
CONSTRUCTION FENCE

2 C0.1 — FURNISH AND INSTALL INLET/CATCH BASIN FILTER (REPAIR OR REPLACE AS NECESSARY)

3 C0.1 — STABILIZED CONSTRUCTION ENTRANCE (REPAIR OR REPLACE AS NECESSARY)

SHEET NOTES

1. VERIFY CONDITION OF EXISTING SILT FENCE. REPAIR FENCE AS NECESSARY. ITEMS INSTALLED FOR DEMOLITION PACKAGE.
2. VERIFY CONDITION OF EXISTING CHAIN LINK FENCE. REPAIR IN FULL AND MAINTAIN THROUGHOUT DURATION OF WORK AS NECESSARY TO MEET SECTION 01 14 11 REQUIREMENTS. REMOVE AND DISPOSE OF ALL COMPONENTS, INCLUDING EXISTING FOUNDATIONS, GATES, AND ACCESSORIES, AT THE CONCLUSION OF WORK.
3. UPON STABILIZATION OF SITE, REMOVE EROSION CONTROL MEASURES.
4. MAINTAIN ALL DRAINAGE STRUCTURES FREE OF SOIL EROSION AND DELETERIOUS DEBRIS.
5. MAINTAIN ALL STORMWATER MANAGEMENT FACILITIES, i.e. SUBSURFACE DRAINAGE STONE AND SUBSURFACE DETENTION VAULT, FREE FROM SOIL EROSION AND DELETERIOUS DEBRIS.
6. MAINTAIN ALL EROSION CONTROL MEASURES/DEVICES AS REQUIRED FOR PROPER FUNCTION/OPERATION THROUGHOUT CONSTRUCTION.
7. MAINTAIN STABILIZED CONSTRUCTION ENTRANCE AS REQUIRED FOR PROPER FUNCTION/OPERATION THROUGHOUT CONSTRUCTION.
8. PROVIDE INLET FILTERS FOR ALL CATCH BASINS. MAINTAIN INLET FILTERS FOR PROPER FUNCTION THROUGHOUT CONSTRUCTION.



FABRIC ANCHOR DETAIL

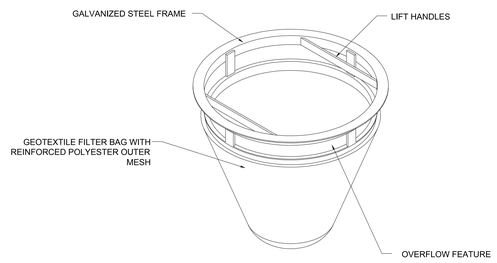
INSTALLATION AT FABRIC JOINTS

NOTES:

1. ANY REQUIRED TEMPORARY SEDIMENT FENCE THAT REQUIRES REPAIR OR REPLACEMENT SHALL BE INSTALLED PRIOR TO ANY GRADING OPERATIONS IN THE AREA THAT IS TO BE PROTECTED. THE FENCE SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. FENCE POSTS SHALL BE EITHER STANDARD STEEL POST OR WOOD POST WITH A MINIMUM CROSS-SECTIONAL AREA OF 3.0 SQ. IN.
3. AT FABRIC JOINTS PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE, ROTATE BOTH POST LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CRETE A TIGHT SEAL WITH THE FABRIC MATERIAL.
4. DRIVE BOTH POSTS A MINIMUM OF 18 INCHES INTO THE GROUND AND BURY THE FLAP.
5. PLACE POST 6' O.C. MIN.
6. FASTEN NO. 10 GAGE WIRE (MIN) 4 TIME PER POST

1 SILT FENCE

SCALE: NTS



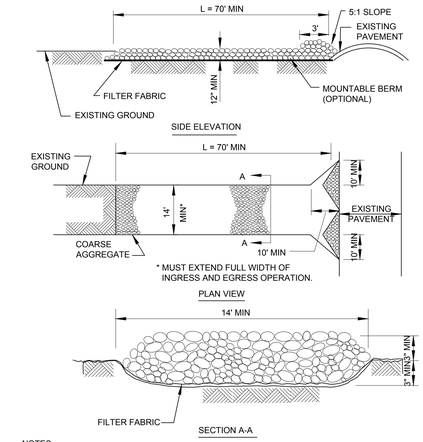
NOTE:

1). TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL CATCH BASINS AND STORM INLETS WITHIN THE PROXIMITY OF WORK LIMITS.

2). ROUTINELY REMOVE DEBRIS FROM FILTER BASKET.

2 INLET PROTECTION

SCALE: NTS



NOTES:

1. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF MATERIAL SPECIFICATION 592 GEOTEXTILE, TABLE I OR 2, CLASS I, II OR IV AND SHALL BE PLACED OVER THE CLEARED AREA PRIOR TO THE PLACING OF ROCK.
2. ROCK SHALL MEET ONE OF THE FOLLOWING IDOT COARSE AGGREGATE GRADATION, CA-1 OR CA-4.
3. ANY WASH RACKS SHALL BE CONSTRUCTED OF REINFORCED P.C.C. SUBMIT PRODUCT DATA TO ENGINEER FOR REVIEW AND APPROVAL.
4. WATER SOURCE MUST BE PROVIDED NEAR WASH RACK FOR CLEANING, AND POSITIVE DRAINAGE AWAY FROM ENTRANCE TO SEDIMENT TRAPPING DEVICE MUST BE PROVIDED.
5. CONTRACTOR TO REMOVE ALL STABILIZED CONSTRUCTION ENTRANCE FROM SITE UPON ALL IMPROVEMENTS AND STABILIZATION OF SITE.
6. ALL IMPORTED BACKFILL SHALL BE IN ACCORDANCE WITH SPECIFICATIONS SECTION 31 23 23 "ACCEPTANCE OF BACKFILL, TOPSOIL, & CU STRUCTURAL SOIL."

3 STABILIZED CONSTRUCTION ENTRANCE

SCALE: NTS

SOUTH LOOP ELEMENTARY SCHOOL

1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

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SMNG A LTD.

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FAX: 312.829.8187
WEB: www.smng-arch.com

STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

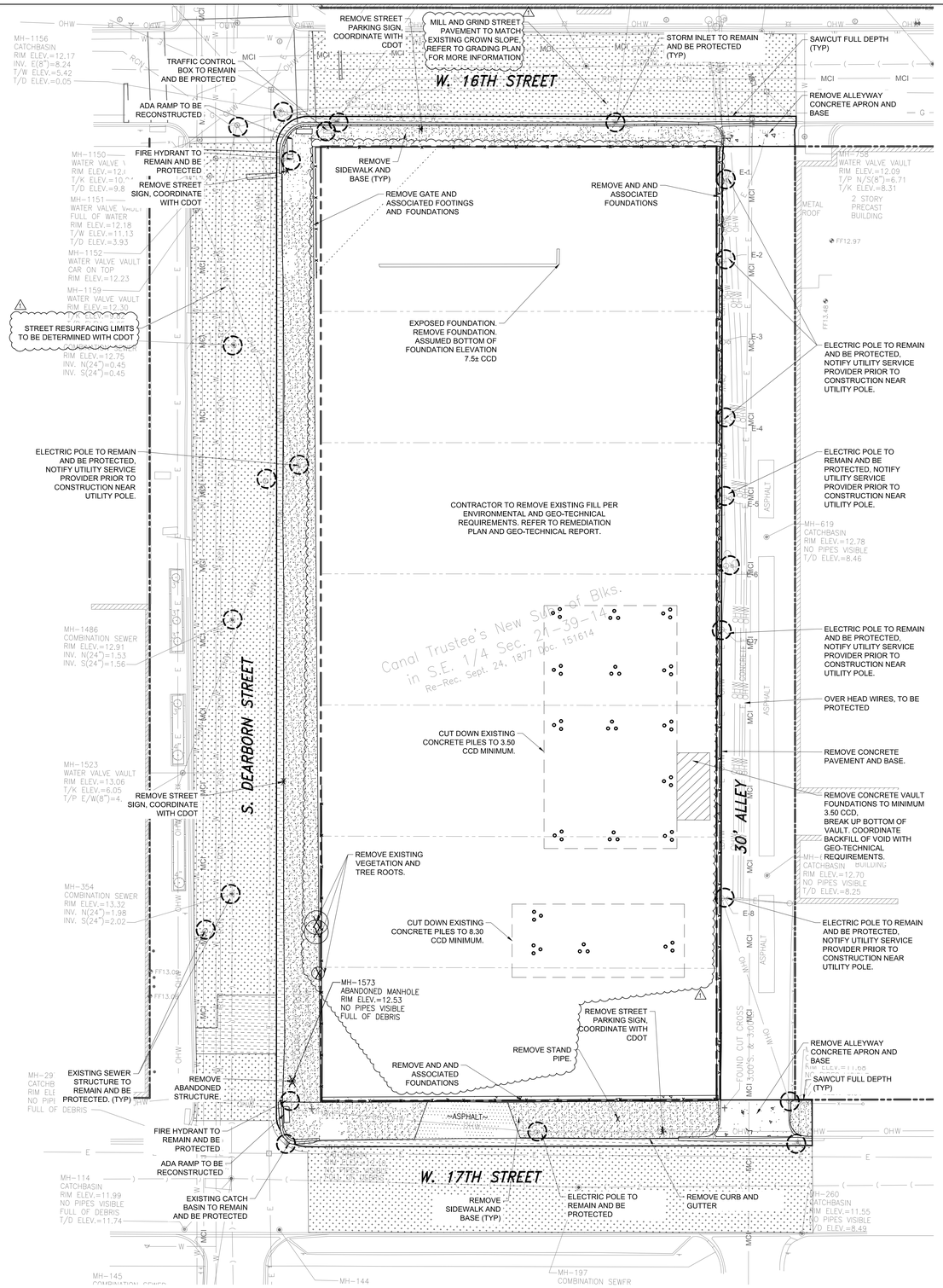
PROJECT NAME: SOUTH LOOP ES OUC

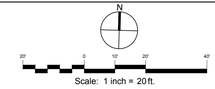
CONTRACT NO: 2017-22961-NSC

SMNG-A PROJECT NO:

TITLE
SITE EROSION AND SEDIMENTATION CONTROL PLAN

SHEET
C0.1





LEGEND:

- PROPERTY LINE
- EXISTING BUILDING
- REMOVE CONCRETE PAVEMENT AND BASE
- REMOVE CONCRETE WALK AND BASE
- REMOVE ASPHALT PAVEMENT AND BASE
- REMOVE STREET PAVEMENT AND BASE
- MILL AND GRIND EXISTING PAVEMENT
- SAWCUT (FULL DEPTH)
- ITEM TO REMAIN AND BE PROTECTED
- ITEM TO BE REMOVED

SHEETS NOTES

1. PRIOR TO ALL UTILITY REMOVALS COORDINATE WITH OWNER.
2. STREET REMOVAL FOR CURB AND GUTTER AND UTILITY CONNECTIONS TO BE CONDUCTED PER CDOT REQUIREMENTS.
3. COORDINATE ALL UTILITY DISCONNECTS WITH SERVICE PROVIDER PRIOR TO REMOVAL.
4. SOILFILL REMOVED FROM THESE AREAS SHALL BE HANDHELD PER SPECIFICATION SECTION 31 23 18.13 "CONTAMINATED SOIL, GENERAL CONSTRUCTION AND DEMOLITION DEBRIS DISPOSAL" AS PARK OF CONTACT WORK.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATION, COST, AND ENGINEERING ASSOCIATED WITH PROTECTION OF EXISTING POWER LINES.

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MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

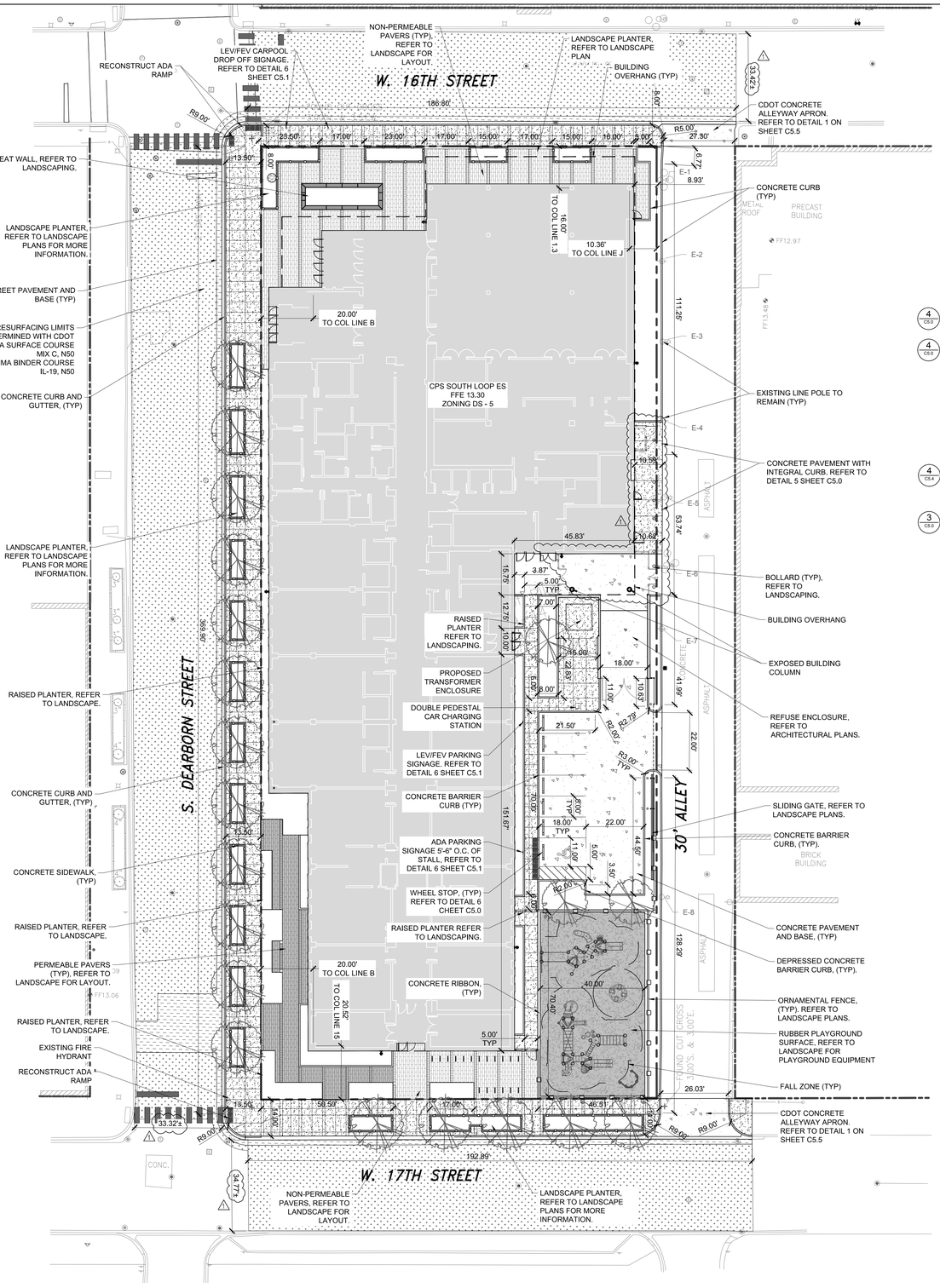
MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

PROJECT NAME: SOUTH LOOP ES OUC
CONTRACT NO: 2017-22961-NSC
SMNG-A PROJECT NO:
TITLE

SITE DEMOLITION PLAN

SHEET

C1.0



LEGEND:

- PROPERTY LINE
- EXISTING BUILDING
- BUILDING
- BUILDING OVERHANG
- C / CS.0 — CONCRETE PAVEMENT AND BASE
- 1 / CS.0 — CONCRETE WALK AND BASE
- 4 / CS.0 + 1 / CS.4 — STREET PAVEMENT AND BASE
- 4 / CS.0 + 1 / CS.4 — MILL AND GRIND / ASPHALT SURFACE COURSE
- 5 / CS.1 — PAVERS
- 3/4 / CS.1 — PERMEABLE PAVERS
- 1/2 / CS.1 — POURED IN PLACE PLAYGROUND SURFACE
- 4 / CS.4 + 5 / CS.5 — CONCRETE CURB AND GUTTER
- 3 / CS.0 — CONCRETE BARRIER CURB
- 3 / CS.0 + 5 / CS.5 — DEPRESSED CURB
- ORNAMENTAL FENCE
- PLANTER CURB RAILING
- SEAT WALL

SHEET NOTES

1. PARKING SPACES INCLUDE (6) 8' X 18' STALLS AND (1) ADA VAN ACCESSIBLE STALL.
2. ZONING REQUIRED : (8) TOTAL SPACES PER 17-10-0228, PROJECT SEEKING DEDUCTION OF REQUIREMENT.
3. LOADING ZONE AREA 10' X 12', ZONING REQUIRED : 10' X 50', PROJECT IS SEEKING REDUCTION OF REQUIREMENT.
4. COORDINATE STREET SIGNAGE WITH CHICAGO DEPARTMENT OF TRANSPORTATION.

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dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

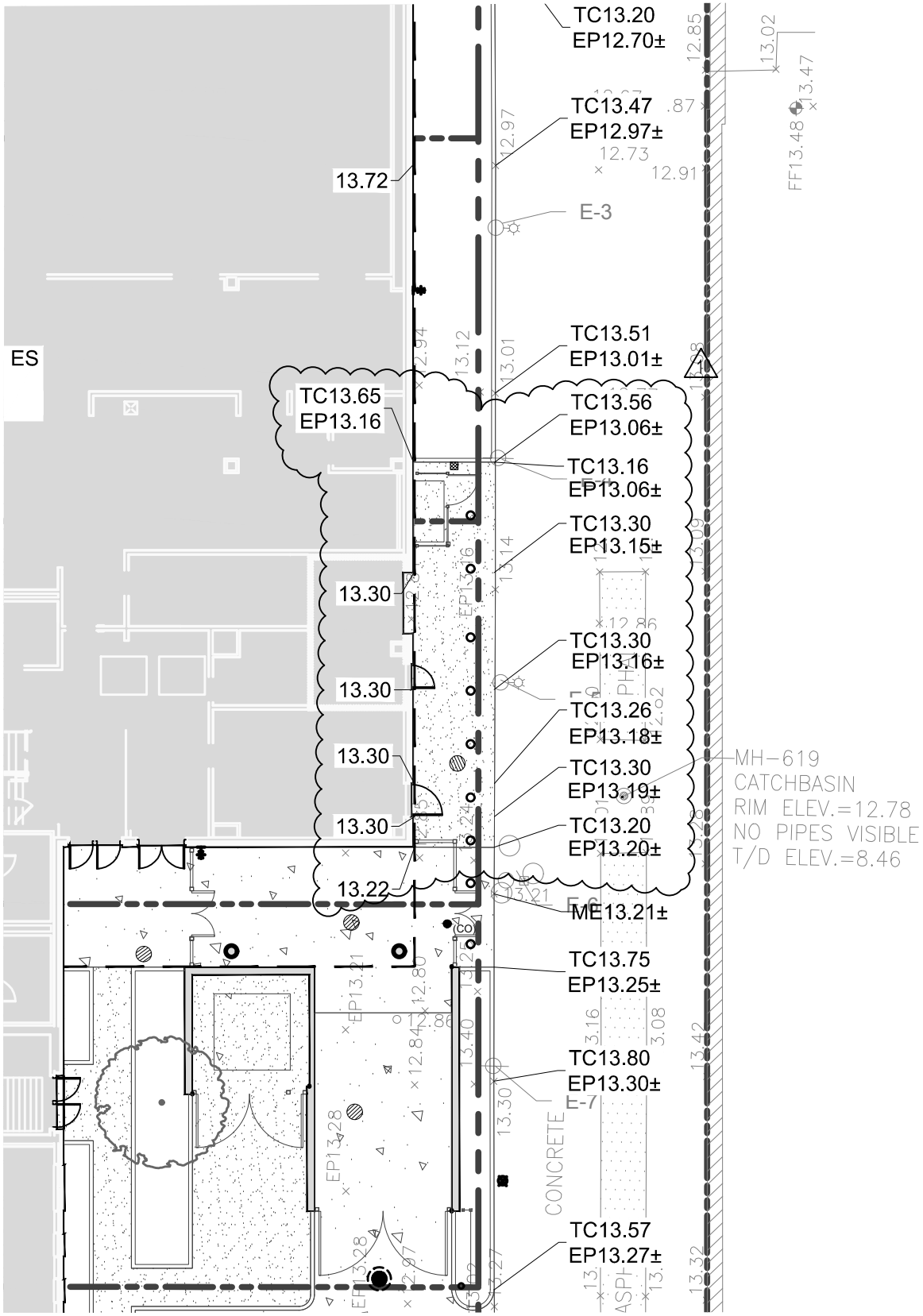
MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

PROJECT NAME: SOUTH LOOP ES OUC
CONTRACT NO: 2017-22961-NSC
SMNG-A PROJECT NO:
TITLE

SITE DIMENSION PLAN

SHEET

C2.0



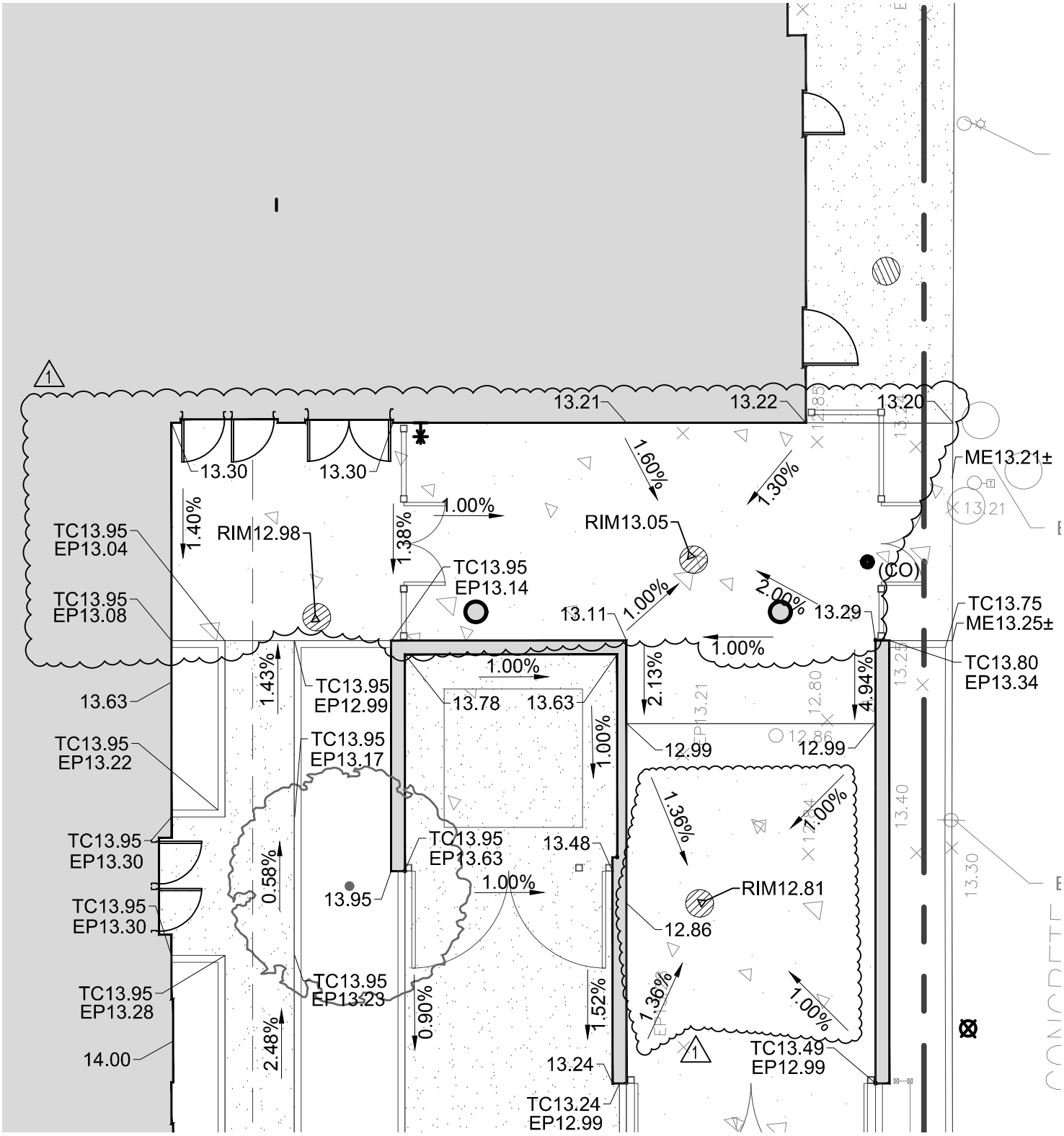
SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

Chicago Public Schools
PUBLIC BUILDING COMMISSION

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.21.2017
ISSUANCE: ADDENDUM 1
NOTES: CSK SHOWN HEREIN IS IN REFERENCE TO SHEET C3.0

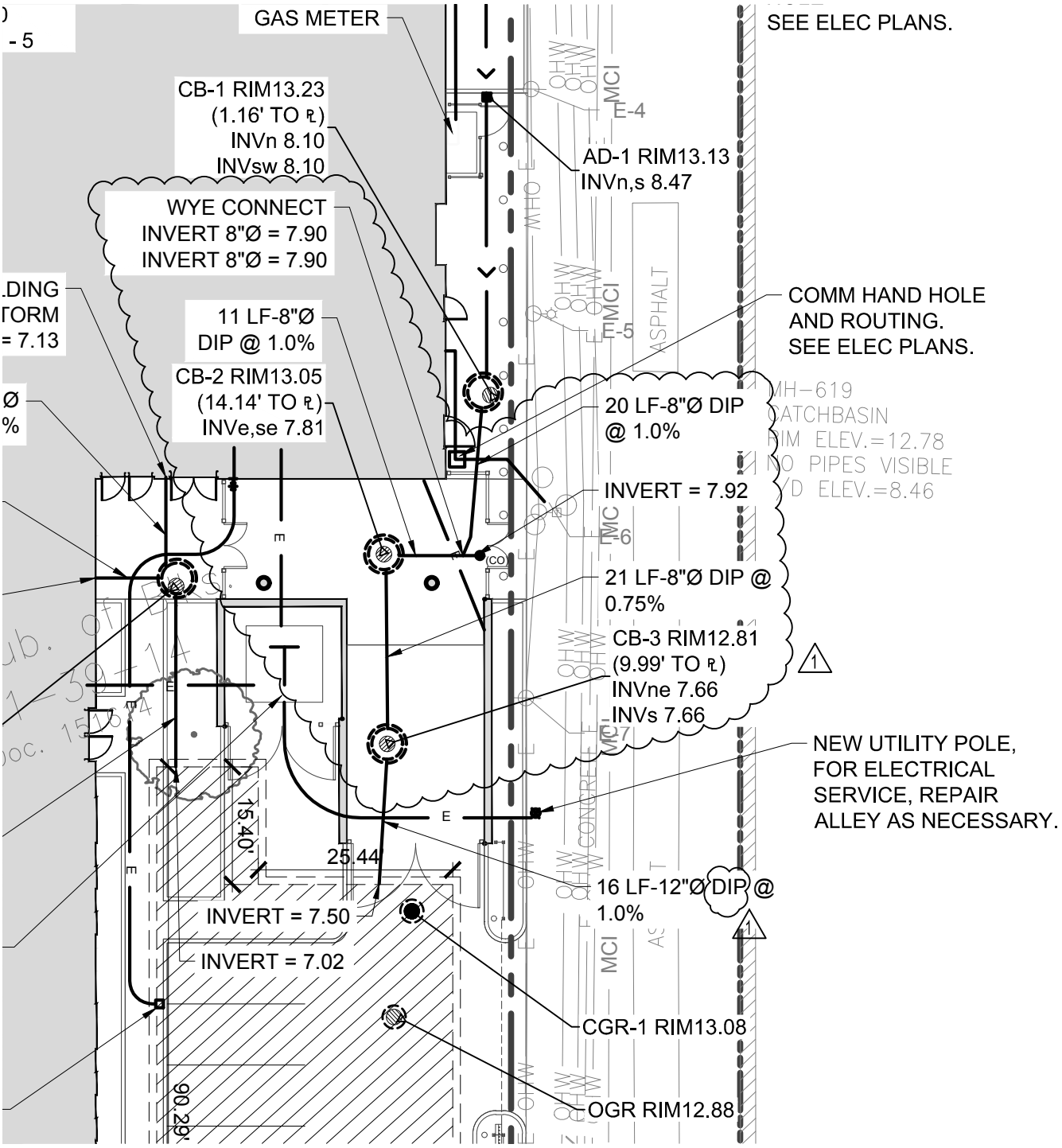
TITLE:

CSK-1



SMNGA 943 W. SUPERIOR STREET CHICAGO, ILLINOIS 60642 312.829.3355	PROJECT: SOUTH LOOP ELEMENTARY SCHOOL 1601 SOUTH DEARBORN STREET CHICAGO, IL 60616 DATE: 06.21.2017 ISSUANCE: ADDENDUM 1 NOTES: CSK SHOWN HEREIN IS IN REFERENCE TO SHEET C3.1	TITLE: **CSK-2**

Date of Issue: June 23, 2017



SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

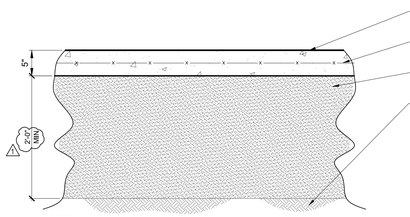
Chicago Public Schools
PUBLIC BUILDING COMMISSION

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.21.2017
ISSUANCE: ADDENDUM 1
NOTES: CSK SHOWN HEREIN IS IN REFERENCE TO SHEET C4.0

TITLE:

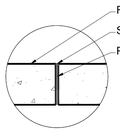
CSK-3

Date of Issue: June 23, 2017

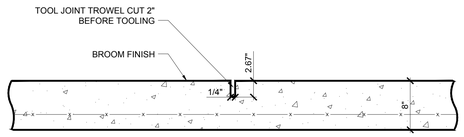


GENERAL NOTES:
1. SET WELDED WIRE FABRIC [WWF] 2-1/2" BELOW FINISHED SURFACE. FOR R.O.W SIDEWALK EXCLUDE WELDED WIRE FABRIC.
2. REFER TO DRAWINGS FOR PAVEMENT LOCATIONS AND ELEVATIONS.
3. CONCRETE SHALL BE 3,500 PSI, A/E. LIGHT BROOM FINISH.
4. PROVIDE ½" PREFORMED EXPANSION JOINT WHERE PAVEMENT ABUTS RIGID STRUCTURES.
5. MAINTAIN 1% MINIMUM SLOPE ON FINISH SURFACE FOR POSITIVE DRAINAGE AWAY FROM BUILDINGS TO DRAINAGE STRUCTURES/SYSTEMS.
6. SET ½" PREFORMED EXPANSION JOINTS 30' O.C. RECESS PREFORMED JOINT FILLER ½" TO ALLOW FOR APPLICATION OF SEALANT.
7. SEALANT SHALL BE WATER RESISTANT AND APPLICABLE TO TEMPERATURES BETWEEN -30 DEGREES TO 110 DEGREES FAHRENHEIT.. COLOR TO BE SELECTED BY ARCHITECT/ENGINEER. SUBMIT PRODUCT DATA TO ARCHITECT/ENGINEER WITH STANDARD COLOR CHART FOR REVIEW AND APPROVAL.
8. PROVIDE CONTROL JOINTS 5' O.C. WHERE CURB ABUTS CONCRETE PAVEMENT, ALIGN JOINTS WITH ADJACENT CONCRETE PAVEMENT JOINTS.
9. UPON INSTALLATION OF POURED CONCRETE, VERIFY PLANARITY AND ENSURE NO DEPRESSIONS OR BIRD BATHS WILL RESULT.
10. COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEO-TECHNICAL REQUIREMENTS, REFER TO GEO-TECHNICAL REPORT DATED 6/22/17.
11. REFER TO ENVIORNMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

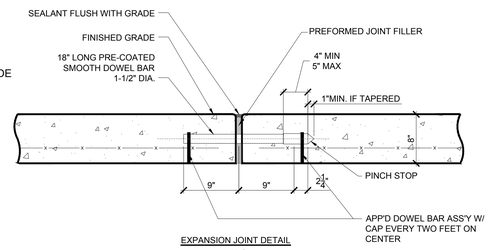
1 CONCRETE SIDEWALK AND BASE
SCALE: NTS



EXPANSION JOINT DETAIL
N.T.S.

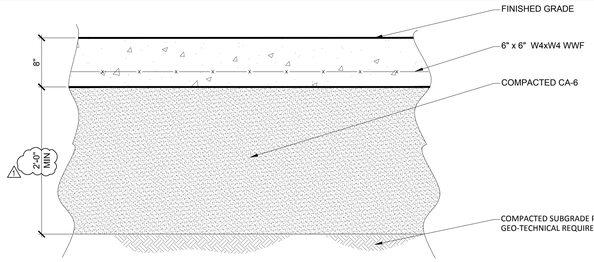


TOOLED CONTRACTION JOINT
N.T.S.

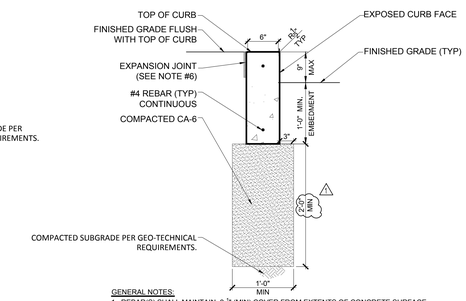


EXPANSION JOINT DETAIL
N.T.S.

2 CONCRETE PAVEMENT AND BASE
SCALE: NTS

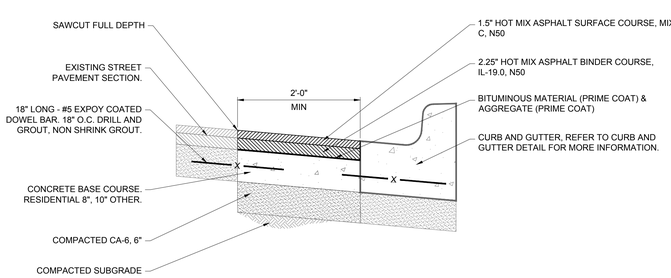


GENERAL NOTES:
1. SET WELDED WIRE FABRIC [WWF] 2-1/2" ABOVE COMPACTED CA-6 BASE COURSE.
2. CONCRETE SHALL BE 3,500 PSI, A/E. LIGHT BROOM FINISH.
3. PROVIDE ½" PREFORMED EXPANSION JOINT WHERE PAVEMENT ABUTS RIGID STRUCTURES.
4. MAINTAIN 1% MINIMUM SLOPE ON FINISH SURFACE FOR POSITIVE DRAINAGE AWAY FROM BUILDINGS TO DRAINAGE STRUCTURES/SYSTEMS.
5. SET ½" PREFORMED EXPANSION JOINTS 30' O.C. OR AS NOTED ON PLANS. RECESS PREFORMED JOINT FILLER ½" TO ALLOW FOR APPLICATION OF SEALANT.
6. SEALANT SHALL BE WATER RESISTANT AND APPLICABLE TO TEMPERATURES BETWEEN -30 DEGREES TO 110 DEGREES FAHRENHEIT.. COLOR TO BE SELECTED BY ARCHITECT/ENGINEER. SUBMIT PRODUCT DATA TO ARCHITECT/ENGINEER WITH STANDARD COLOR CHART FOR REVIEW AND APPROVAL.
7. PROVIDE CONTROL JOINTS 5' O.C. OR AS NOTED ON PLANS. WHERE CURB ABUTS CONCRETE PAVEMENT, ALIGN JOINTS WITH ADJACENT CONCRETE PAVEMENT JOINTS.
8. UPON INSTALLATION OF POURED CONCRETE, VERIFY PLANARITY AND ENSURE NO DEPRESSIONS OR BIRD BATHS WILL RESULT.
9. ALL WWF SHALL BE EPOXY COATED.
10. COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEO-TECHNICAL REQUIREMENTS, REFER TO GEO-TECHNICAL REPORT DATED 6/22/17.
11. REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.



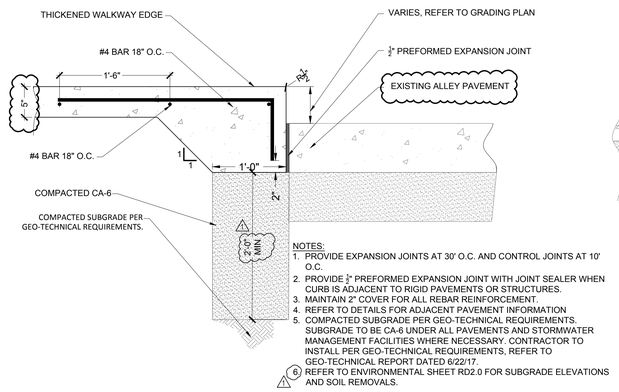
GENERAL NOTES:
1. REBAR(S) SHALL MAINTAIN 2-½" (MIN) COVER FROM EXTENTS OF CONCRETE SURFACE.
2. REFER TO GRADING PLAN FOR TOP OF CURB ELEVATIONS AND BOTTOM CURB ELEVATIONS.
3. CONCRETE SHALL BE 3,500 PSI, A/E. LIGHT BROOM FINISH TOP OF CONCRETE CURB; RUB FINISH ON EXPOSED CURB FACE.
4. PROVIDE ½" PREFORMED EXPANSION JOINT WHERE CURB ABUTS RIGID PAVEMENT AND STRUCTURES.
5. REFER TO PLANS AND DETAILS FOR ADJACENT SURFACE INFORMATION.
6. SET ½" PREFORMED EXPANSION JOINTS 30' O.C. AND CONTROL JOINTS 10' O.C. WHERE CURB ABUTS CONCRETE PAVEMENT, ALIGN JOINTS WITH ADJACENT CONCRETE PAVEMENT JOINTS.
7. COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEO-TECHNICAL REPORT DATED 6/22/17.
6. REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

3 CONCRETE BARRIER CURB
SCALE: NTS



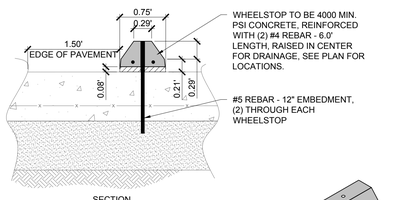
GENERAL NOTES:
1. REFER TO DIMENSION PLAN FOR LOCATIONS.
2. SLOPE OF RESTORATION SHALL CONFORM TO CROWN OF PAVEMENT.
3. SET ½" PREFORMED EXPANSION JOINTS 30' O.C. OR AT POINTS OF CURVATURE. RECESS PREFORMED JOINT FILLER ½" TO ALLOW FOR APPLICATION OF SEALANT.
4. SEALANT SHALL BE WATER RESISTANT AND APPLICABLE TO TEMPERATURES BETWEEN -30 DEGREES TO 110 DEGREES FAHRENHEIT.
5. PROVIDE CONTROL JOINTS 5' O.C, ¼ THICKNESS OF CONCRETE BASE. WHERE RESTORATION ABUTS CONCRETE GUTTER, ALIGN JOINTS WITH ADJACENT JOINTS. REFER TO CDOT RULES AND REGULATIONS (2016) FOR MORE CONTROL JOINT INFORMATION.
4. ALL TIE BARS SHALL BE CORRUGATED AND ALL DOWEL BARS SHALL BE SMOOTH.
5. ALL TIE BARS AND DOWEL BARS SHALL BE EPOXY COATED.
6. "X" DIMENSION IS SET TO BE ¼ OF "H" DIMENSION.
7. STREET RESTORATION TO COMPLY WITH CDOT RULES AND REGULATIONS (2016)

4 STREET RESTORATION FOR NEW CONSTRUCTION
SCALE: NTS

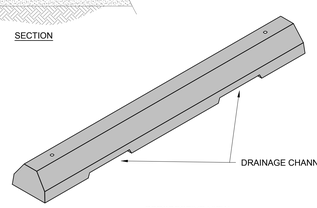


NOTES:
1. PROVIDE EXPANSION JOINTS AT 30' O.C. AND CONTROL JOINTS AT 10' O.C.
2. PROVIDE ½" PREFORMED EXPANSION JOINT WITH JOINT SEALER WHEN CURB IS ADJACENT TO RIGID PAVEMENTS OR STRUCTURES.
3. MAINTAIN 2" COVER FOR ALL REBAR REINFORCEMENT.
4. REFER TO DETAILS FOR ADJACENT PAVEMENT INFORMATION
5. COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEO-TECHNICAL REPORT DATED 6/22/17.
6. REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

5 INTEGRAL CURB AND SIDEWALK
SCALE: NTS

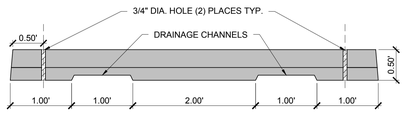


SECTION



PERSPECTIVE VIEW

6 CONCRETE WHEEL STOP
SCALE: NTS



ELEVATION

GENERAL NOTES:
1. REFER TO PLAN FOR LOCATIONS.
2. REFER TO DETAILS FOR ADJACENT PAVEMENT SECTIONS DETAILS.

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LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

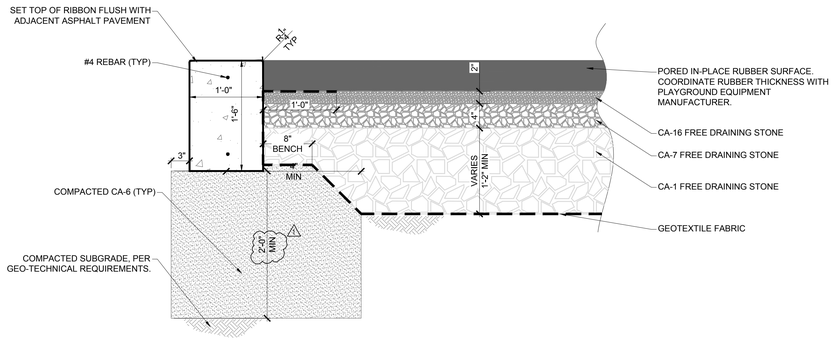
MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.22.17

PROJECT NAME: SOUTH LOOP ES OUC
CONTRACT NO: 2017-22961-NSC
SMNG-A PROJECT NO:
TITLE

SITE DETAILS

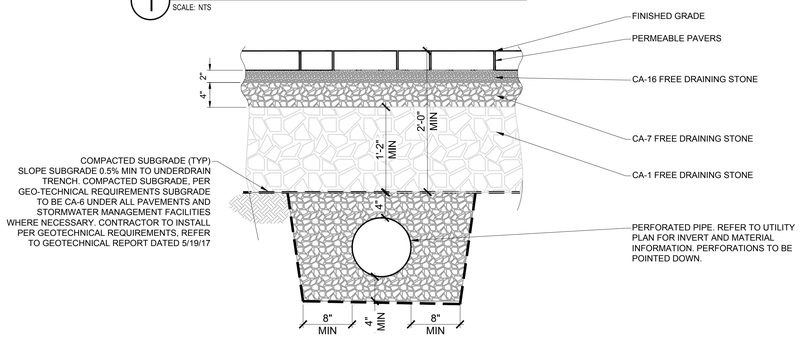
SHEET

C5.0



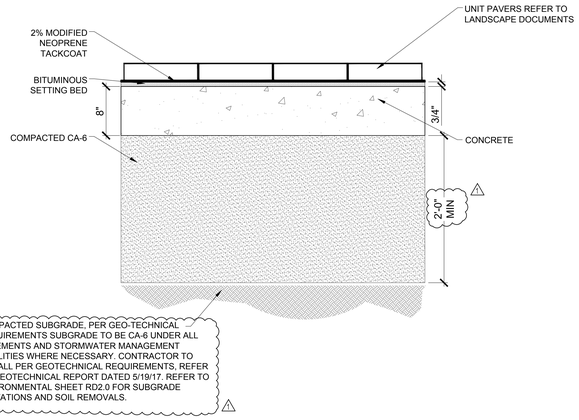
GENERAL NOTES:
1. REBAR(S) SHALL MAINTAIN 2-½" COVER FROM TOP AND BOTTOM EXTENTS OF CONCRETE RIBBON. PLACE REBAR IN MIDDLE OF RIBBON.
2. REFER TO GRADING FOR FINISHED GRADE ELEVATIONS.
3. CONCRETE SHALL BE 3,500 PSI, A/E. LIGHT BROOM FINISH TOP OF RIBBON.
4. REFER TO PLANS AND DETAILS FOR ADJACENT SURFACE INFORMATION, IF CONCRETE, INSTALL ½" EXPANSION JOINT AND JOINT FILLER.
5. EXTEND GEOFABRIC 12 INCHES BENEATH LEVELING COURSE.
6. SLOPE SUBGRADE OF DRAINAGE 0.5% MINIMUM TO PERFORATED PIPE/SWMF FACILITY.
7. DETENTION TANK HWL = 11.52
8. COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEO-TECHNICAL REQUIREMENTS, REFER TO GEO-TECHNICAL REPORT DATED 5/19/17.
9. (1) REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

1 CONCRETE RIBBON AT RUBBER SURFACE
SCALE: NTS



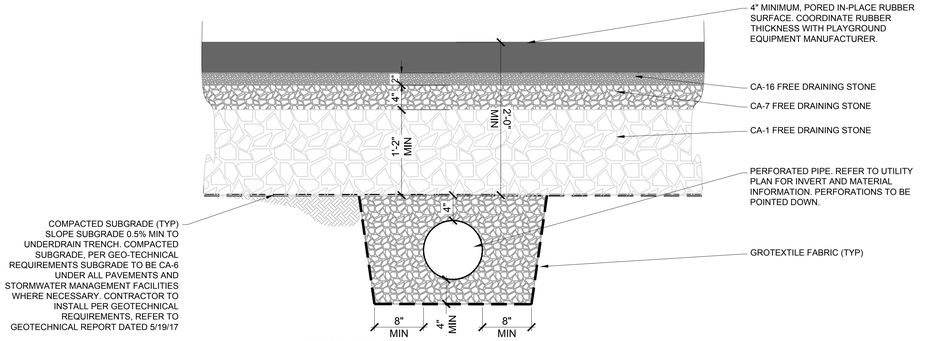
GENERAL NOTES:
1. REFER TO GRADING PLAN FOR FINISHED GRADE ELEVATIONS.
2. REFER TO PLANS AND DETAILS FOR ADJACENT SURFACE INFORMATION.
3. EXTEND GEOTEXTILE FABRIC 12 INCHES BENEATH LEVELING COURSE.
4. SLOPE SUBGRADE OF DRAINAGE 0.5% MINIMUM TO PERFORATED PIPE/SWMF FACILITY.
5. REFER TO UTILITY PLAN FOR PIPE INFORMATION (LOCATIONS, INVERTS, SLOPES, DIAMETER, MATERIAL, ETC.)
6. DETENTION TANK HWL = 11.52
7. (1) REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

3 PERMEABLE PAVER UNDERDRAIN
SCALE: NTS



5 NON-PERMEABLE PAVER
SCALE: NTS

NOTES:
1. SUBGRADE UNDER PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES TO BE CA-6, INSTALLED PER GEO-TECHNICAL REQUIREMENTS.

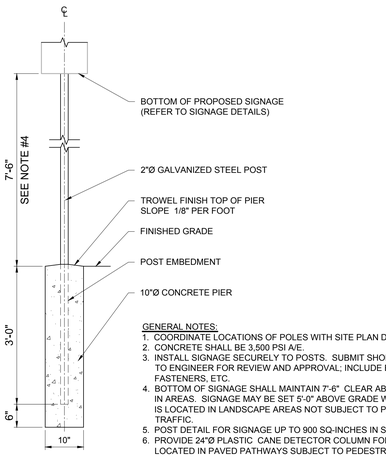


GENERAL NOTES:
1. REFER TO GRADING PLAN FOR FINISHED GRADE ELEVATIONS.
2. REFER TO PLANS AND DETAILS FOR ADJACENT SURFACE INFORMATION.
3. EXTEND GEOTEXTILE FABRIC 12 INCHES BENEATH LEVELING COURSE.
4. SLOPE SUBGRADE OF DRAINAGE 0.5% MINIMUM TO PERFORATED PIPE/SWMF FACILITY.
5. REFER TO UTILITY PLAN FOR PIPE INFORMATION (LOCATIONS, INVERTS, SLOPES, DIAMETER, MATERIAL, ETC.)
6. DETENTION TANK HWL = 11.52
7. (1) REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

2 RUBBER SURFACE UNDERDRAIN
SCALE: NTS

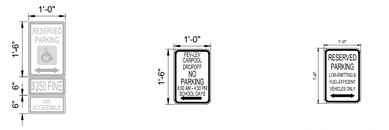
GENERAL NOTES:
1. REFER TO GRADING FOR FINISHED GRADE ELEVATIONS.
2. EXTEND GEOFABRIC 12 INCHES BENEATH LEVELING COURSE.
3. SLOPE SUBGRADE OF DRAINAGE 0.5% MINIMUM TO PERFORATED PIPE/SWMF FACILITY.
4. DETENTION TANK HWL = 11.52.
5. (7) REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

4 PERMEABLE PAVER AT BUILDING
SCALE: NTS



GENERAL NOTES:
1. COORDINATE LOCATIONS OF POLES WITH SITE PLAN DOCUMENTS.
2. CONCRETE SHALL BE 3,500 PSI A/E.
3. INSTALL SIGNAGE SECURELY TO POSTS. SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW AND APPROVAL; INCLUDE BRACKETS, FASTENERS, ETC.
4. BOTTOM OF SIGNAGE SHALL MAINTAIN 7'-6" CLEAR ABOVE GRADE IN AREAS. SIGNAGE MAY BE SET 5'-0" ABOVE GRADE WHERE SIGN IS LOCATED IN LANDSCAPE AREAS NOT SUBJECT TO PEDESTRIAN TRAFFIC.
5. POST DETAIL FOR SIGNAGE UP TO 900 SQ-INCHES IN SIZE.
6. PROVIDE 24"Ø PLASTIC CANE DETECTOR COLUMN FOR SIGNAGE LOCATED IN PAVED PATHWAYS SUBJECT TO PEDESTRIAN TRAFFIC.

6 SITE SIGNAGE
SCALE: NTS



GENERAL NOTES:
1. SIGNS SHALL CONFORM TO MUTCD (CURRENT EDITION).
2. INSTALL SIGNAGE SECURELY TO POSTS. SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW AND APPROVAL; INCLUDE SIGNAGE MATERIAL, REFLECTIVITY INFORMATION, FASTENERS, ETC.

SOUTH LOOP ELEMENTARY SCHOOL

1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ARCHITECT OF RECORD:
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PHONE: 312.829.3355
FAX: 312.829.8187
WEB: www.smng-arch.com

STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

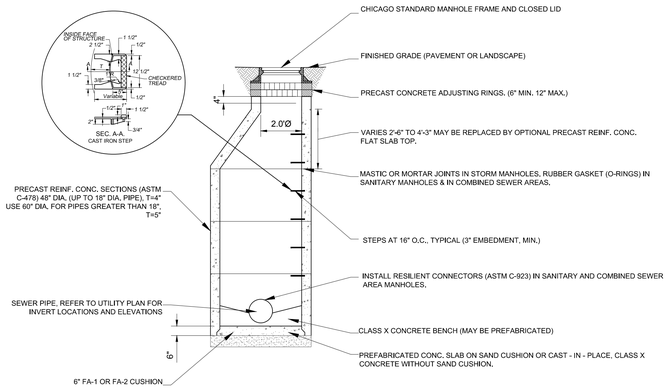
MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

PROJECT NAME: SOUTH LOOP ES OUC
CONTRACT NO: 2017-22961-NSC
SMNG-A PROJECT NO:
TITLE

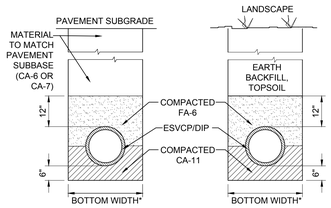
SITE DETAILS

SHEET

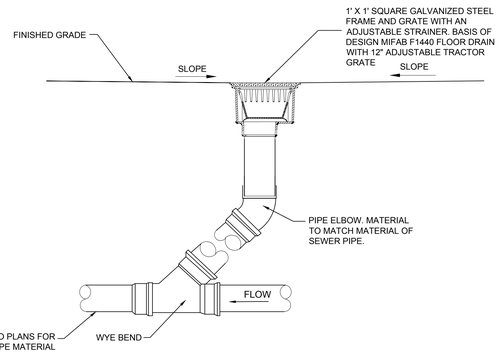
C5.1



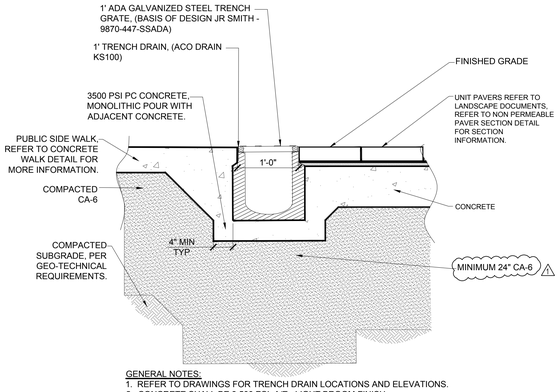
1 MANHOLE
SCALE: NTS



2 SEWER PIPE TRENCH AND BEDDING
SCALE: NTS

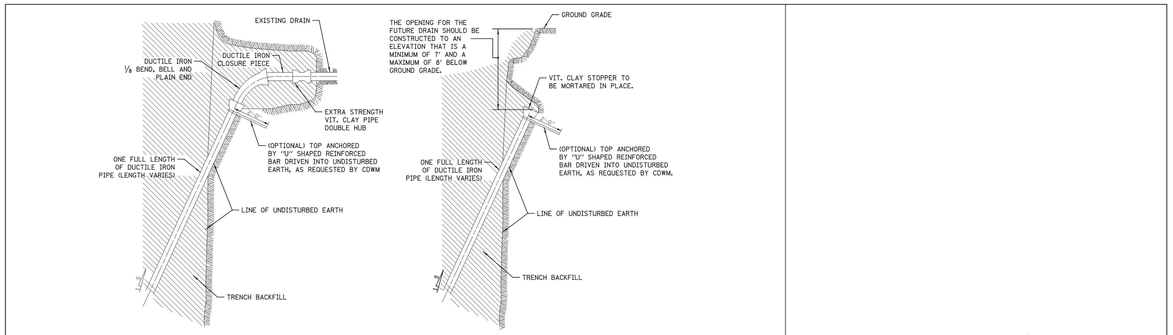


4 AREA DRAIN
SCALE: NTS



GENERAL NOTES:
1. REFER TO DRAWINGS FOR TRENCH DRAIN LOCATIONS AND ELEVATIONS.
2. CONCRETE SHALL BE 3,500 PSI, A/E. LIGHT BROOM FINISH.
3. MAINTAIN 1% MINIMUM SLOPE ON FINISH SURFACE FOR POSITIVE DRAINAGE AWAY FROM BUILDINGS.
4. TRENCH DRAIN CONCRETE ENCASEMENT TO BE A MONOLITHIC POUR WITH THE ADJACENT SIDEWALK AND PAVER CONCRETE BASE.
5. REFER TO SIDEWALK DETAILS FOR PAVEMENT SECTION INFORMATION.
6. REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

6 TRENCH DRAIN
SCALE: NTS



DUCTILE IRON PIPE DRAIN CONNECTIONS

BRICK SEWER DRAIN CONNECTIONS

NOTES:
1. DUCTILE IRON PIPE MUST BE BELL END WITH PUSH-ON JOINTS CONFORMING TO ANSI SPECIFICATIONS A21.51 WITH CLASS 52 THICKNESS.
2. CONNECTIONS AND STACKS SHOWN MUST BE USED FOR 6", 8", & 10" DRAINS ONLY.
3. FOR VITRIFIED CLAY PIPE DRAIN CONNECTION AND DRAIN STACK CONSTRUCTION, SEE SHEET NO. A.1.
4. FOR TRENCH BACKFILL, USE FA-6 SAND, CRUSHED CONCRETE SAND, OR STONE SAND.
5. FOR GRANULAR EMBEDMENT, USE CA-11, CRUSHED GRAVEL, CRUSHED STONE, OR CRUSHED CONCRETE.

STANDARD REVISIONS	
DATE	DESCRIPTION
1/5/15	APPROVED PLAN

PERCENT COMPLETE	DATE
30	
60	
75	
90	
100	
BULLETIN	

CITY OF CHICAGO
DEPARTMENT OF WATER MANAGEMENT
BUREAU OF ENGINEERING SERVICES

DUCTILE IRON PIPE DRAIN CONNECTIONS

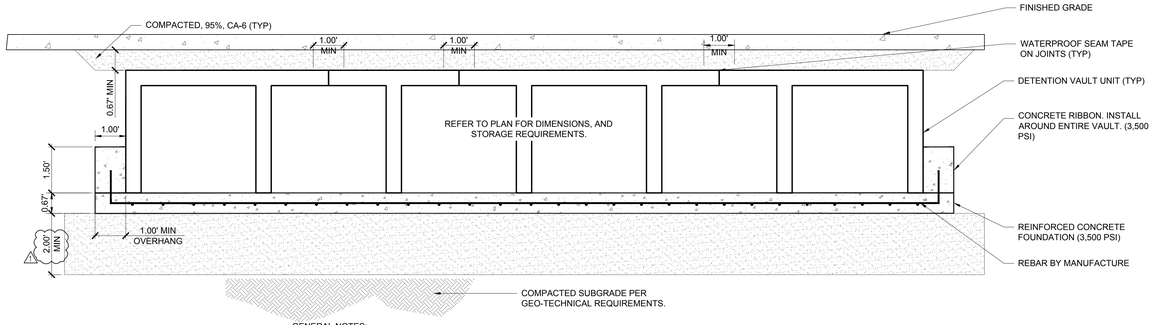
DRAWN: SEE RESIDENCE
CHECKED:
REVIEWED:

A.2

___ OF ___

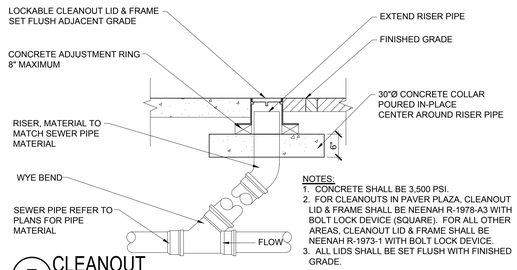
PN ___

3 CITY OF CHICAGO SEWER CONNECTION
SCALE: NTS



GENERAL NOTES:
1. PRECAST CONCRETE VAULT SHALL BE DESIGNED FOR AASHTO HS-20 LOADING
2. INSTALL PRECAST CONCRETE VAULT PER MANUFACTURE'S REQUIREMENTS.
3. REFER TO GRADING PLAN FOR SURFACE ELEVATIONS.
4. REFER TO PLANS AND DETAILS FOR ADJACENT SURFACE INFORMATION.
6. INSTALL REINFORCEMENT FOR CONCRETE FOUNDATION PER MANUFACTURE'S REQUIREMENT.
7. FOUNDATION CONTROL JOINTS TO BE LOCATED AT CENTER OF UNIT.
8. FOUNDATION TO HAVE A MINIMUM 1'-0" OVERHANG BEYOND EXTERNAL FACE OF VAULT.
9. REFER TO UTILITY PLAN FOR ACCESS RISER LOCATIONS. ACCESS RISERS TO BE 2'-0" IN DIAMETER.
10. INSTALL ACCESS RISERS PER DETENTION VAULT PER MANUFACTURE'S REQUIREMENTS.
11. SYSTEM TO BE WATER TIGHT. PROVIDE WATER STOP ALONG PERIMETER OF VAULT
12. HWL = 11.52.
13. COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEO-TECHNICAL REQUIREMENTS, REFER TO GEO-TECHNICAL REPORT DATED 5/19/17.
14. REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

5 SUBSURFACE PRECAST DETENTION VAULT
SCALE: NTS



NOTES:
1. CONCRETE SHALL BE 3,500 PSI.
2. FOR CLEANOUTS IN PAVER PLAZA, CLEANOUT LID & FRAME SHALL BE NEENAH R-1978-A3 WITH BOLT LOCK DEVICE (SQUARE). FOR ALL OTHER AREAS, CLEANOUT LID & FRAME SHALL BE NEENAH R-1973-1 WITH BOLT LOCK DEVICE.
3. ALL LIDS SHALL BE SET FLUSH WITH FINISHED GRADE.

7 CLEANOUT
SCALE: NTS

Chicago Public Schools

SOUTH LOOP ELEMENTARY SCHOOL

1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
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dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.22.17

PROJECT NAME: SOUTH LOOP ES OUC
CONTRACT NO: 2017-22961-NSC
SMNG-A PROJECT NO:
TITLE

UTILITY DETAILS

SHEET

C5.3

NORTH

15' 0' 7.5' 15' 30'

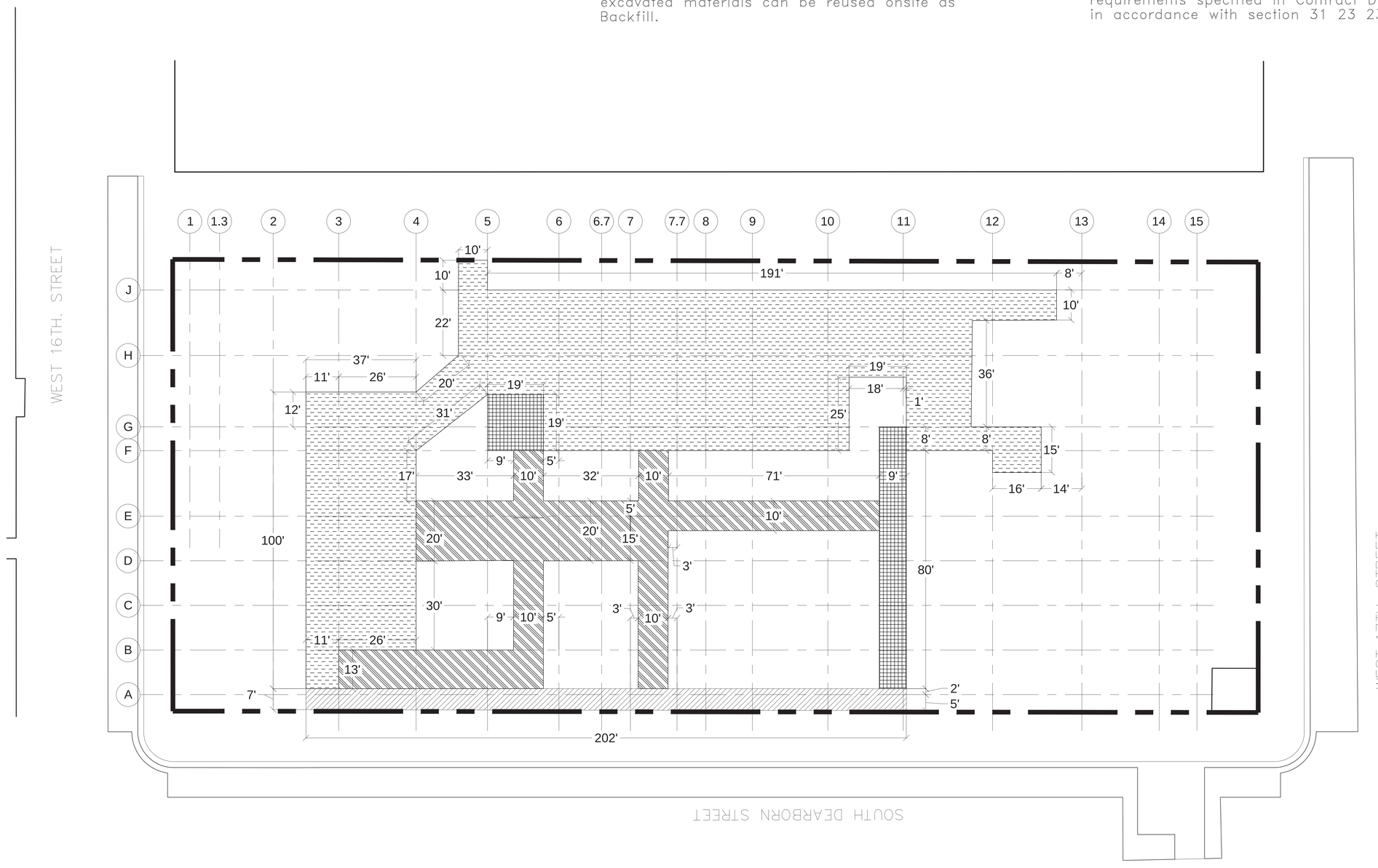
1" = 15'

LEGEND – EXCAVATION ELEVATIONS

- 6.2 CCD
- 7.4 CCD
- 8.5 CCD
- 9.0 CCD
- Property Line

NOTES:

1. This Sheet was generated based on the As–Built Survey dated 06/12/2017 documenting soils that were disturbed during Demolition work but were not disposed offsite.
2. Contractor shall excavate soils/fill to extents and elevations shown on this Sheet. ALL material excavated in accordance with this Sheet shall be removed and disposed of at a Subtitle D landfill per Section 312318.13. Excavation shall be kept to the extent required to perform the Work. No excavated materials can be reused onsite as Backfill.
3. Structural gridlines shown on this Sheet are provided for reference. Refer to applicable surveys and engineering drawings for gridline dimensions and distance from property line.
4. Refer to General Notes on Sheet RD1.0 for additional requirements and environmental information.
5. Backfill used in the resulting excavations shall be compliant with engineering and architectural requirements specified in Contract Documents and in accordance with section 31 23 23.



PUBLIC BUILDING COMMISSION

Chicago Public Schools

SOUTH LOOP ELEMENTARY SCHOOL

1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

MANAGING ENVIRONMENTAL CONSULTANT:
CARNOW, CONIBEAR & ASSOC., LTD.

CARNOW CONIBEAR

ADDRESS: 600 W. VAN BUREN STREET
SUITE 500
CHICAGO, ILLINOIS 60607
PHONE: 312.762.2900
WEB: www.ccaltd.com

ISSUANCE

MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
	ADDENDUM 1	06.19.17

PROJECT NAME: SOUTH LOOP ELEMENTARY SCHOOL

PBC CONTRACT NO: 05035

SMNG-A PROJECT NO: 1620

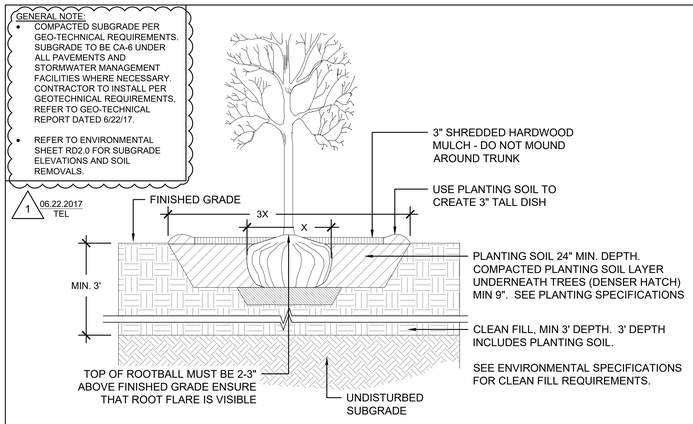
TITLE

REMEDIATION EXCAVATION PLAN

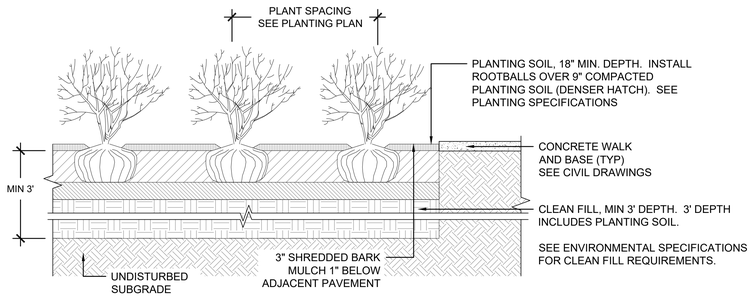
SHEET

RD2.0

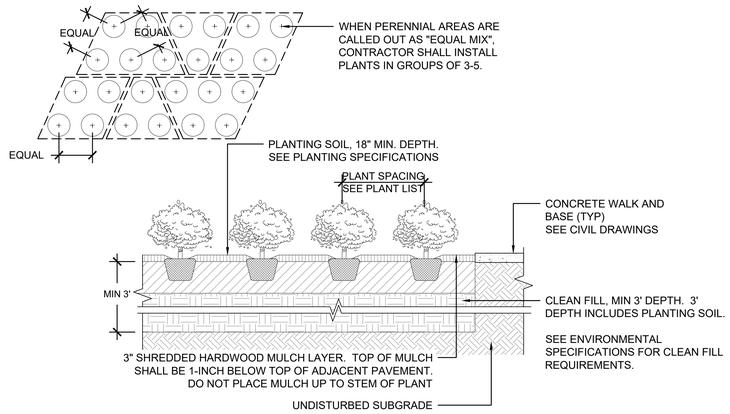
GENERAL NOTE:
- COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEOTECHNICAL REQUIREMENTS, REFER TO GEO-TECHNICAL REPORT DATED 6/22/17.
- REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.



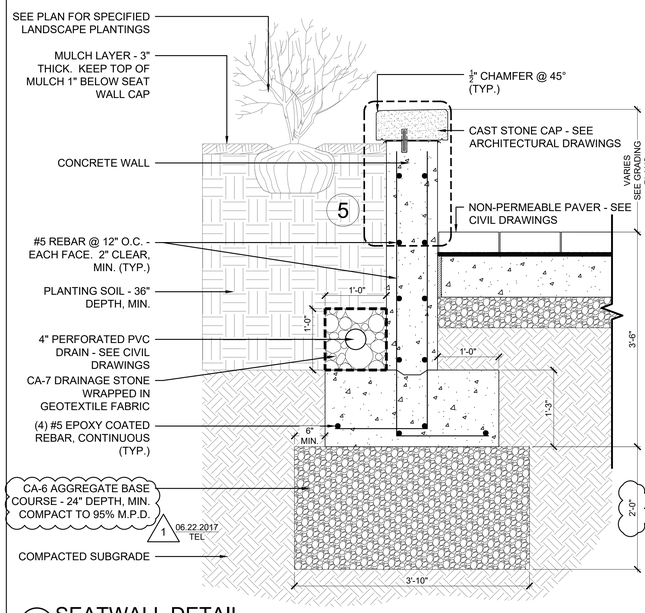
1 SHADE TREE PLANTING DETAIL
SCALE: NTS



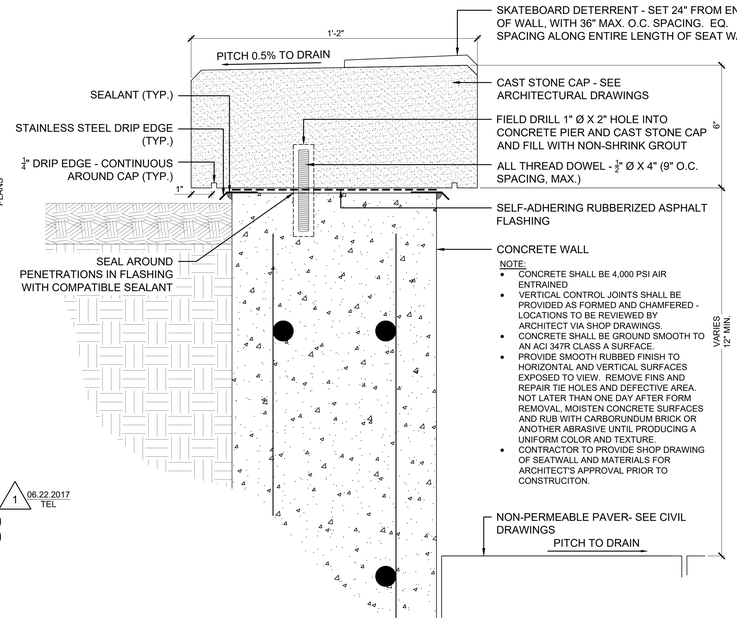
2 SHRUB PLANTING DETAIL
SCALE: NTS



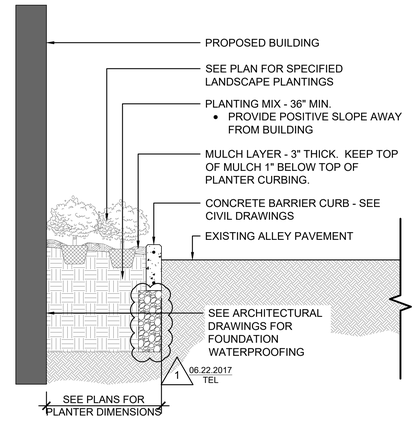
3 GROUNDCOVER / PERENNIAL PLANTING DETAIL
SCALE: NTS



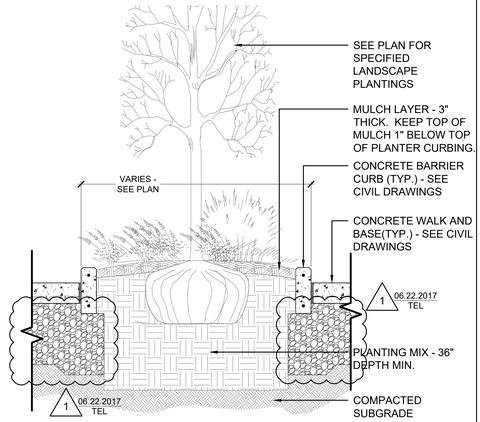
4 SEATWALL DETAIL
SCALE: 1" = 1'-0"



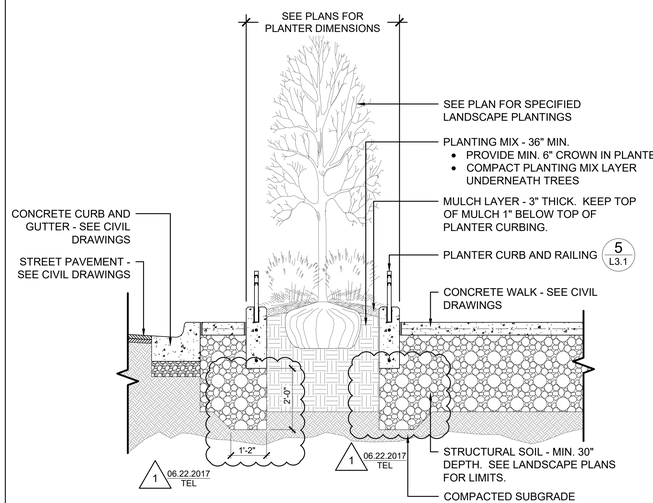
5 SEATWALL ENLARGEMENT
SCALE: 1/4" = 1'-0"



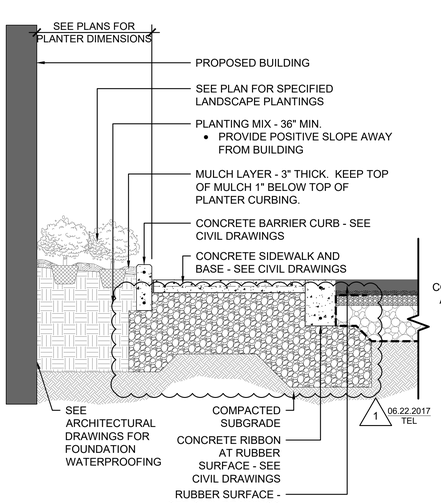
6 EAST FND. PLANTER - TYP. SECTION
SCALE: 1/2" = 1'-0"



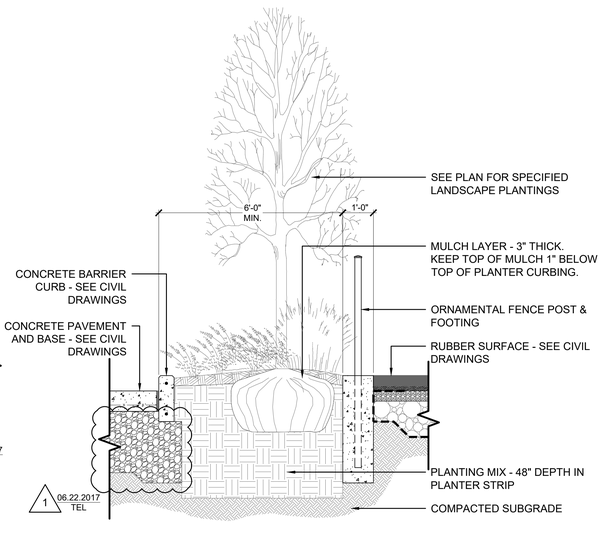
7 COURTYARD PLANTER - SECTION
SCALE: 1/2" = 1'-0"



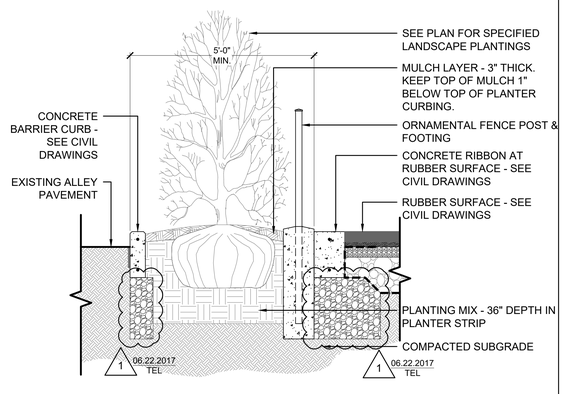
8 PARKWAY PLANTER - TYPICAL SECTION
SCALE: 1/2" = 1'-0"



9 FOUNDATION PLANTER - TYPICAL SECTION
SCALE: 1/2" = 1'-0"



10 PLAYGROUND NORTH PLANTER - SECTION
SCALE: 1/2" = 1'-0"



11 PLAYGROUND PLANTER EAST - SECTION
SCALE: 1/2" = 1'-0"

SOUTH LOOP ELEMENTARY SCHOOL

1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

BROOKE A. DAVIS
157-001571
LICENSED LANDSCAPE ARCHITECT
STATE OF ILLINOIS

Chicago Public Schools

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LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
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ISSUANCE

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1	ADDENDUM 1	06.22.17

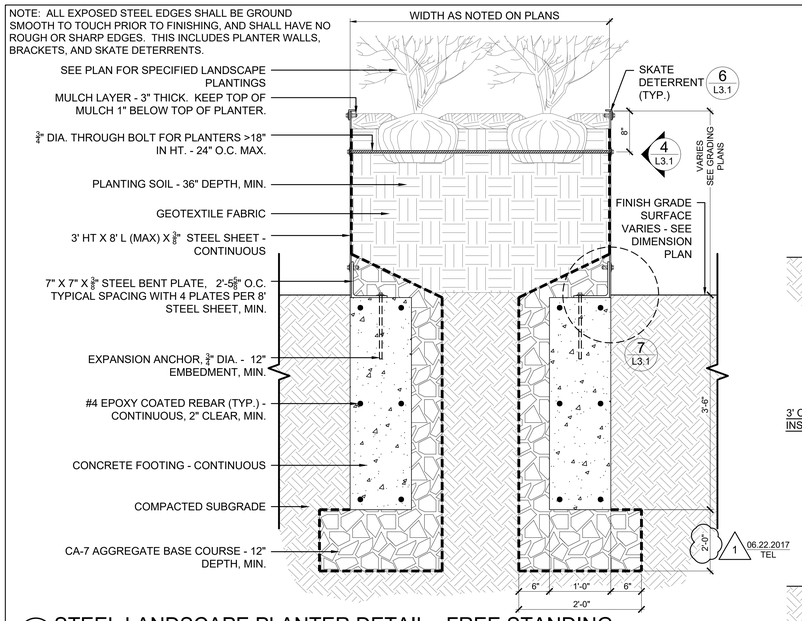
PROJECT NAME: SOUTH LOOP ES OUC
CONTRACT NO: 2017-22961-NSC
SMNG-A PROJECT NO:
TITLE

LANDSCAPE DETAILS

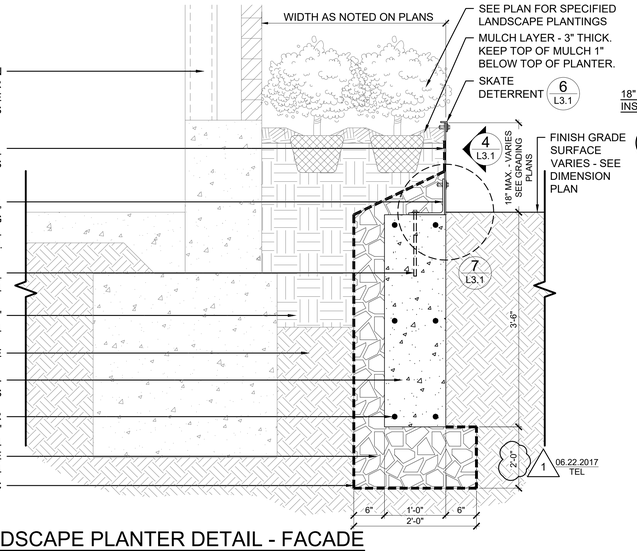
SHEET

L3.0

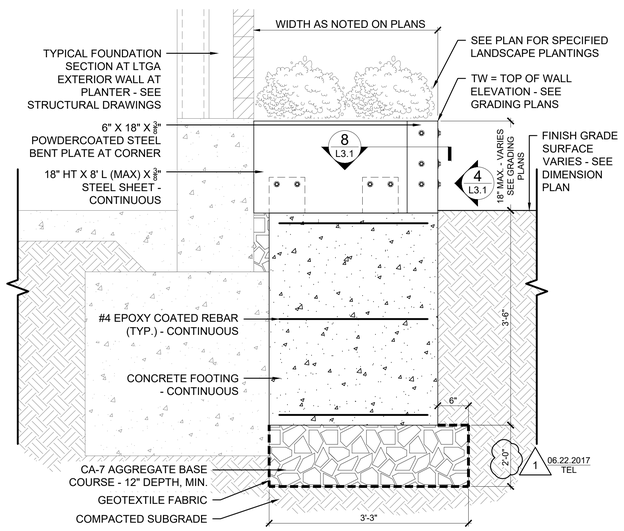
NOTE: ALL EXPOSED STEEL EDGES SHALL BE GROUND SMOOTH TO TOUCH PRIOR TO FINISHING, AND SHALL HAVE NO ROUGH OR SHARP EDGES. THIS INCLUDES PLANTER WALLS, BRACKETS, AND SKATE DETERRENTS.



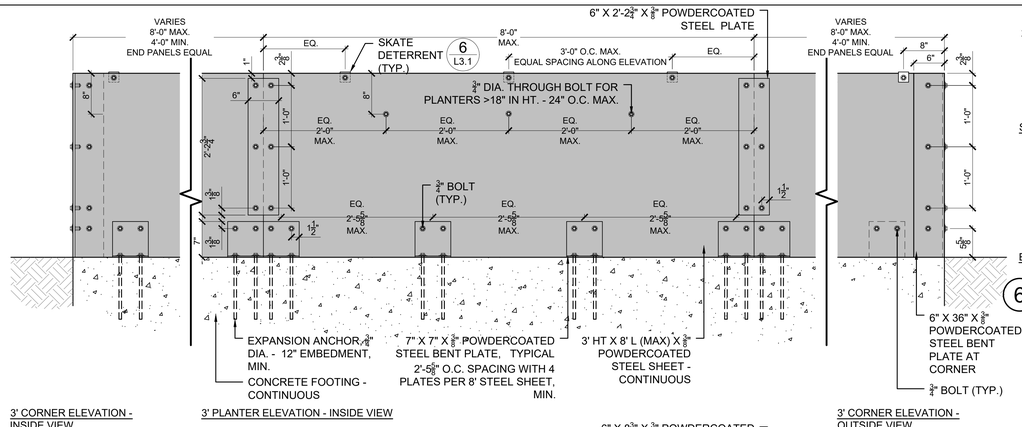
1 STEEL LANDSCAPE PLANTER DETAIL - FREE STANDING
SCALE: 1" = 1'-0"



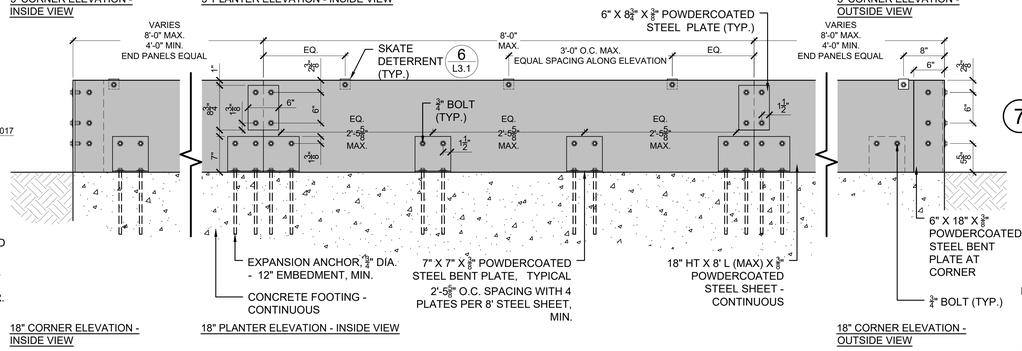
2 STEEL LANDSCAPE PLANTER DETAIL - FACADE
SCALE: 1" = 1'-0"



3 STEEL LANDSCAPE PLANTER DETAIL - FACADE PLANTER RETURN
SCALE: 1" = 1'-0"

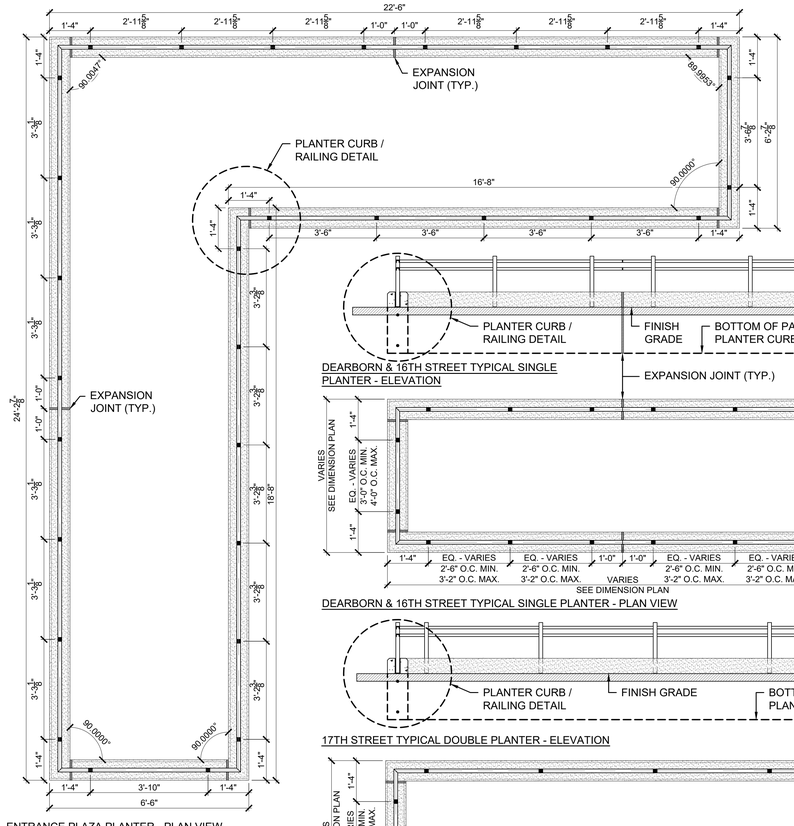


3' CORNER ELEVATION - INSIDE VIEW | 3' PLANTER ELEVATION - INSIDE VIEW | 3' CORNER ELEVATION - OUTSIDE VIEW



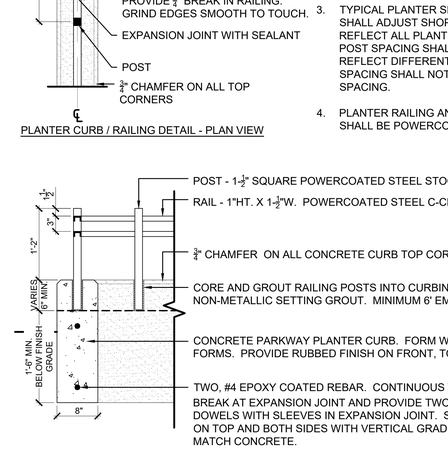
18" CORNER ELEVATION - INSIDE VIEW | 18" PLANTER ELEVATION - INSIDE VIEW | 18" CORNER ELEVATION - OUTSIDE VIEW

4 STEEL LANDSCAPE PLANTER ELEVATIONS
SCALE: 1" = 1'-0"

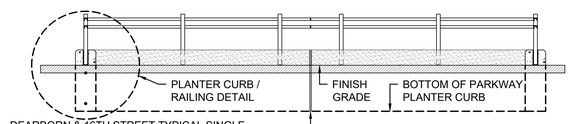


ENTRANCE PLAZA PLANTER - PLAN VIEW

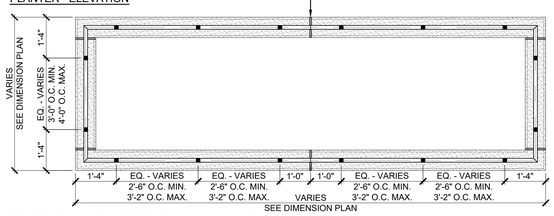
5 PLANTER CURB AND RAILING DETAIL
SCALE: 1" = 1'-0"



PLANTER CURB / RAILING DETAIL - PLAN VIEW

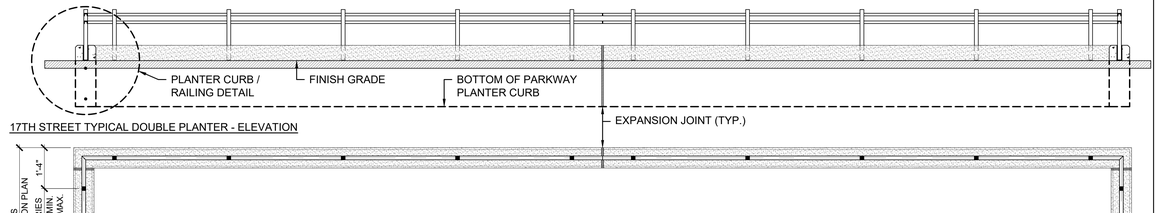


DEARBORN & 16TH STREET TYPICAL SINGLE PLANTER - ELEVATION

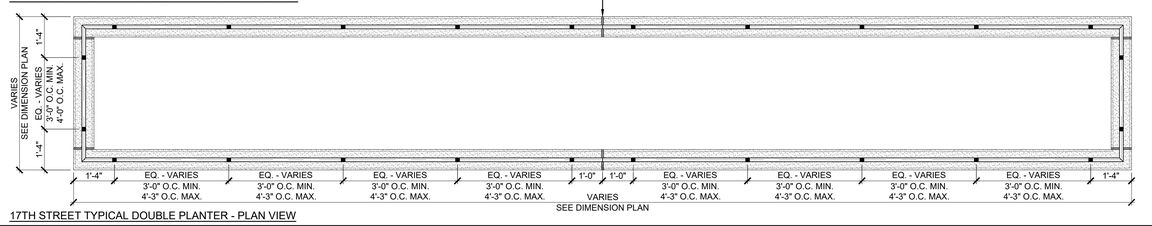


DEARBORN & 16TH STREET TYPICAL SINGLE PLANTER - PLAN VIEW

PLANTER CURB / RAILING DETAIL - SECTION

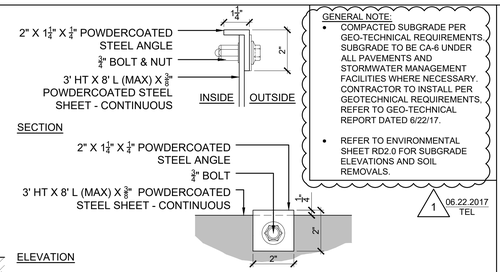


17TH STREET TYPICAL DOUBLE PLANTER - ELEVATION



17TH STREET TYPICAL DOUBLE PLANTER - PLAN VIEW

6 SKATE DETERRENT
SCALE: 1/4" = 1'-0"



GENERAL NOTE:
- COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEOTECHNICAL REQUIREMENTS, REFER TO GEO-TECHNICAL REPORT DATED 6/22/17.
- REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

1 06.22.2017 TEL

7 PLANTER CONNECTION DETAIL
SCALE: 1/2" = 1'-0"

PLAN VIEW

8 PLANTER CORNER DETAIL
SCALE: 1/2" = 1'-0"

NOTES:
1. PRIOR TO FABRICATION, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR PLANTER CURB AND PLANTER RAILING FOR REVIEW BY ARCHITECT.
2. PLANTER LENGTH AND WIDTH MAY VARY. CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD AND INCLUDE DIMENSIONS ON SHOP DRAWING SUBMITTALS.
3. TYPICAL PLANTER SHOWN. CONTRACTOR SHALL ADJUST SHOP DRAWINGS TO REFLECT ALL PLANTER SIZES. RAILINGS AND POST SPACING SHALL BE ADJUSTED TO REFLECT DIFFERENT PLANTER SIZES. POST SPACING SHALL NOT EXCEED 48" MAXIMUM SPACING.
4. PLANTER RAILING AND RAILING POST FINISH SHALL BE POWERCOATED STEEL.

BROOKE A. DAVIS 157-001571 LICENSED LANDSCAPE ARCHITECT STATE OF ILLINOIS

Chicago Public Schools

SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

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PHONE: 312.829.3355
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STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

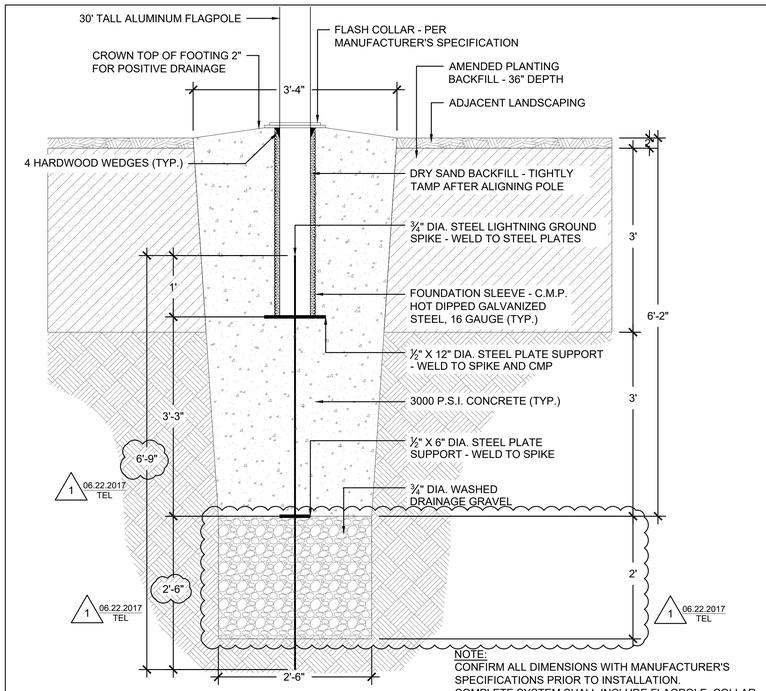
MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.22.17

PROJECT NAME: SOUTH LOOP ES OUC
CONTRACT NO: 2017-22961-NSC
SMNG-A PROJECT NO:
TITLE

PLANTER DETAILS

SHEET

L3.1

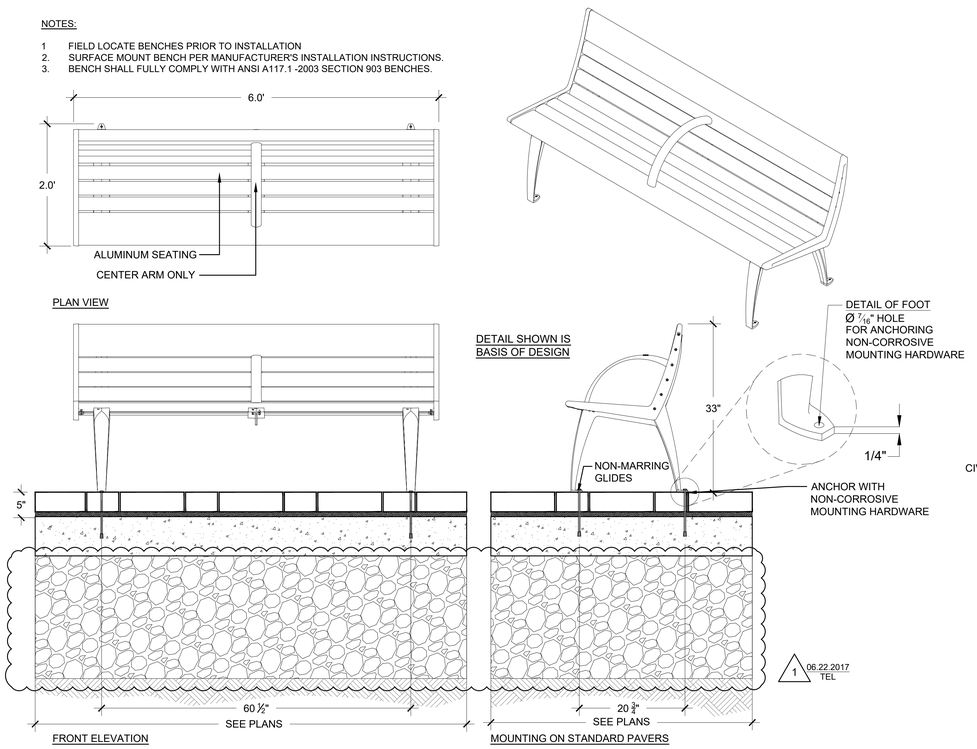


NOTE:
CONFIRM ALL DIMENSIONS WITH MANUFACTURER'S SPECIFICATIONS PRIOR TO INSTALLATION.
COMPLETE SYSTEM SHALL INCLUDE FLAGPOLE, COLLAR AND RELATED ACCESSORIES AS SUPPLIED WITH POLE.

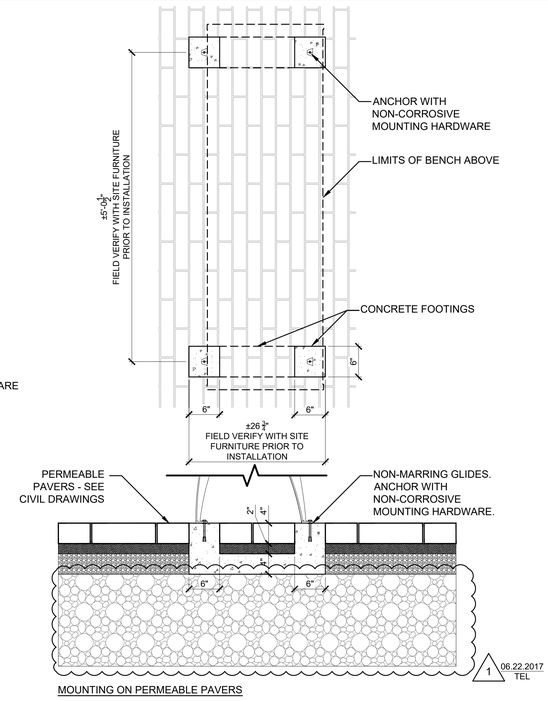
1 FLAGPOLE FOUNDATION DETAIL
SCALE: NTS

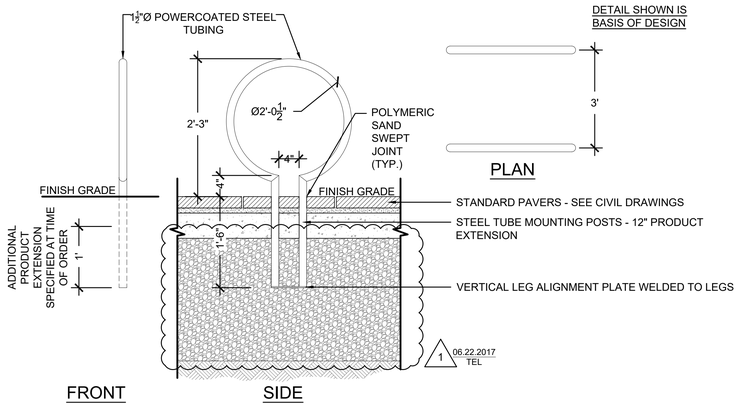
NOTES:

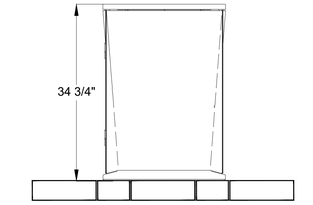
1. FIELD LOCATE BENCHES PRIOR TO INSTALLATION
2. SURFACE MOUNT BENCH PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. BENCH SHALL FULLY COMPLY WITH ANSI A117.1 -2003 SECTION 903 BENCHES.



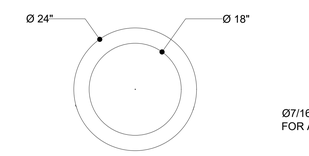
2 BENCH
SCALE: NTS

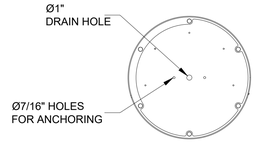


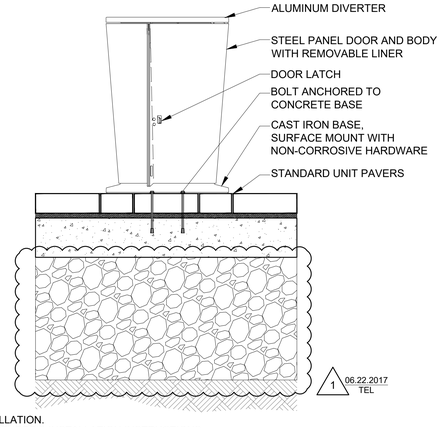




3 BIKE RACK
SCALE: 1" = 1'-0"

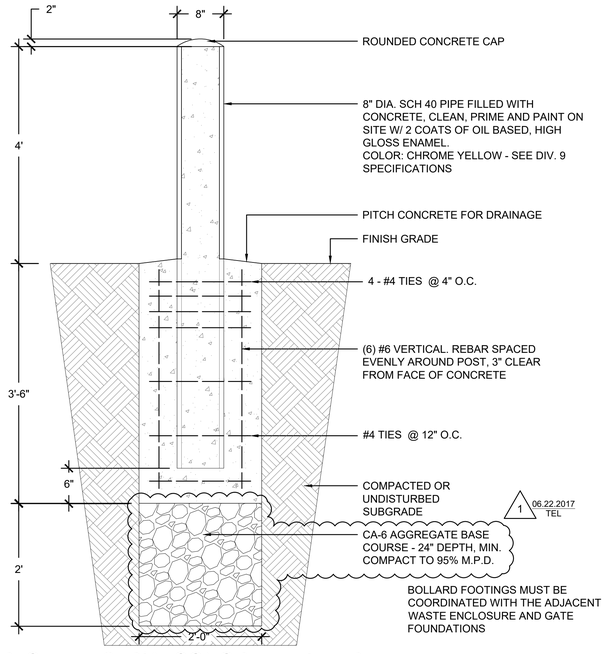






NOTES:
1. FIELD LOCATE TRASH CANS PRIOR TO INSTALLATION.
2. SURFACE MOUNT TRASH CAN PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

4 TRASH RECEPTACLE
SCALE: NTS



5 BOLLARD, STEEL, 8" DIA, CONCRETE FILLED
SCALE: NTS

1 06.22.2017 TEL

GENERAL NOTE:

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- REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.

LICENSED LANDSCAPE ARCHITECT
BROOKE A. DAVIS
157-001571
STATE OF ILLINOIS

Chicago Public Schools

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LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

ISSUANCE

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PROJECT NAME: SOUTH LOOP ES OUC
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SMNG-A PROJECT NO:
TITLE

SITE FURNITURE DETAILS

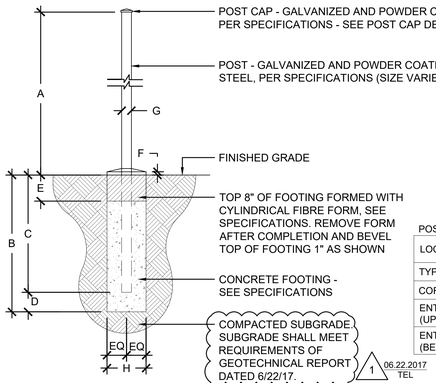
SHEET

L3.2

1. ALL FENCE AND GATES 4'-0" TALL UNLESS NOTED OTHERWISE ON PLAN.
2. CONTRACTOR SHALL GENERATE SHOP DRAWINGS FOR ALL FENCING ELEMENTS FOR SUBMITTAL TO THE ARCHITECT FOR APPROVAL PRIOR TO COMMENCEMENT OF FABRICATION AND INSTALLATION.
3. CONTRACTOR SHALL CLEAN ALL PAVEMENT SURFACES AFTER COMPLETION OF FENCING INSTALLATION.
4. CONTRACTOR SHALL COORDINATE FENCE FOOTING LOCATIONS WITH PROPOSED UTILITIES. CONTRACTOR TO NOTIFY ENGINEER OF ANY CONFLICTS.
5. CONTRACTOR SHALL REMOVE FENCE FOOTING FORMWORK AFTER COMPLETION OF INSTALLATION.

1 06.22.2017 TEL

GENERAL NOTE:
- COMPACTED SUBGRADE PER GEO-TECHNICAL REQUIREMENTS. SUBGRADE TO BE CA-6 UNDER ALL PAVEMENTS AND STORMWATER MANAGEMENT FACILITIES WHERE NECESSARY. CONTRACTOR TO INSTALL PER GEOTECHNICAL REQUIREMENTS, REFER TO GEO-TECHNICAL REPORT DATED 6/22/17.
- REFER TO ENVIRONMENTAL SHEET RD2.0 FOR SUBGRADE ELEVATIONS AND SOIL REMOVALS.



POST DIMENSIONS / FOOTING DEPTH

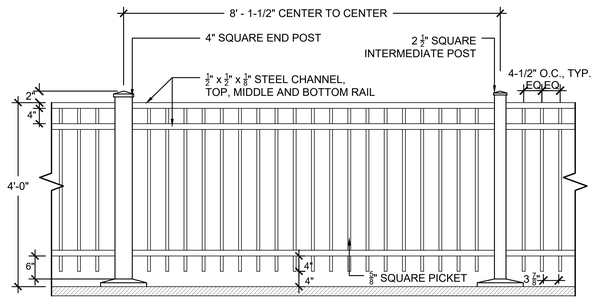
A	4'-0"
B	3'-6"
C	3'-0"
D	6"
E	8"
F	1"

POST DIMENSIONS

LOCATION	G POST SIZE	H DIAMETER
TYPICAL INTERMEDIATE POSTS	2-1/2" SQ	12"
CORNER POSTS/END POSTS	4" SQ	16"
ENTRY GATE POSTS (UP TO 12'-0" WIDE OPENING)	4" SQ	16"
ENTRY GATE POSTS (BEYOND 12'-0" WIDE OPENING)	4" SQ	24"

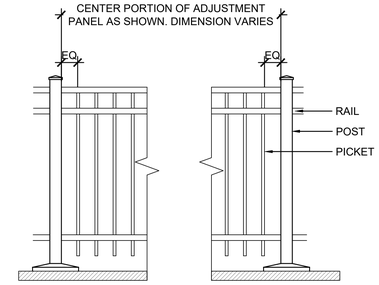
1 06.22.2017 TEL

1 ORNAMENTAL FENCE POST AND FOOTING DETAIL
SCALE: NTS

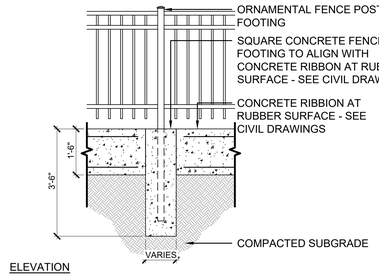


2 ORNAMENTAL FENCE - TYPICAL PANEL
SCALE: NTS

NOTE:
1. ADJUSTMENT PANELS MAY BE SELECTIVELY CUT AT RAIL ENDS TO FIT ON SITE AS SPECIFIED.
2. ALL EXPOSED METAL EDGES TO BE TREATED AND FINISHED PER SPECIFICATIONS.



3 ORNAMENTAL FENCE - ADJUSTMENT PANEL
SCALE: NTS



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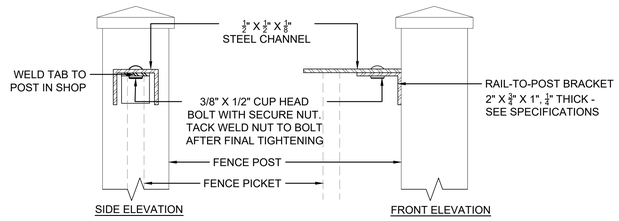
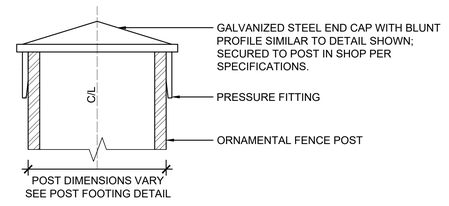
4 ORNAMENTAL FENCE - CONCRETE RIBBON
SCALE: NTS



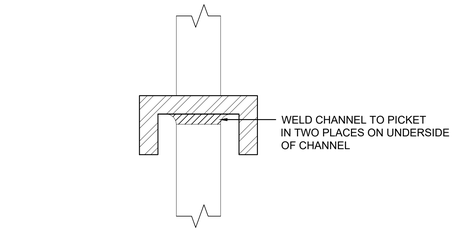
NOTES:
1. TAMPER RESISTANT BOLTS AND NUTS ARE SUBJECT TO APPROVAL BY THE OWNER'S REPRESENTATIVE.

5 ORNAMENTAL FENCE - POST TO RAIL CONNECTION
SCALE: NTS



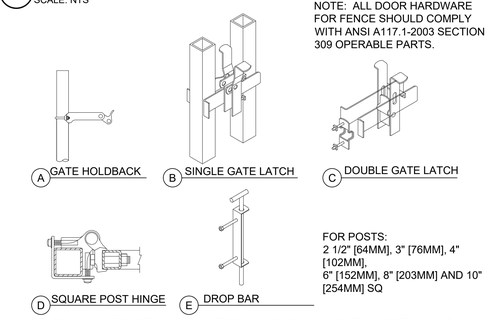
NOTES:
1. ALL METAL COMPONENTS SHALL BE FINISHED WITH POLYESTER POWDER COAT PER SPECIFICATIONS.
2. ALL FENCE HARDWARE SHALL BE BLACK IN COLOR

6 POST CAP DETAIL
SCALE: NTS

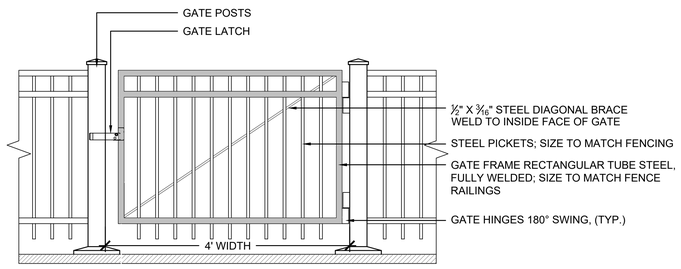


7 PICKET WELDING DETAIL
SCALE: NTS

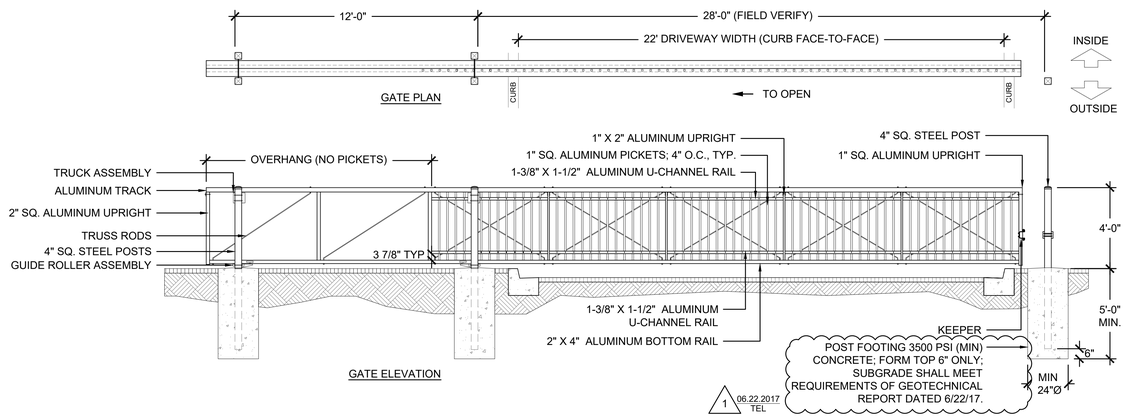
NOTE: ALL DOOR HARDWARE FOR FENCE SHOULD COMPLY WITH ANSI A117.1-2003 SECTION 309 OPERABLE PARTS.



8 ORNAMENTAL GATE HARDWARE DETAILS
SCALE: NTS



9 ORNAMENTAL GATE - SINGLE LEAF 4' WIDTH
SCALE: NTS



1 06.22.2017 TEL

10 DRIVEWAY SLIDING GATE DETAIL (MANUALLY OPERATED)
SCALE: NTS

BROOKE A. DAVIS
157-001571
LICENSED LANDSCAPE ARCHITECT
STATE OF ILLINOIS

Chicago Public Schools

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dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

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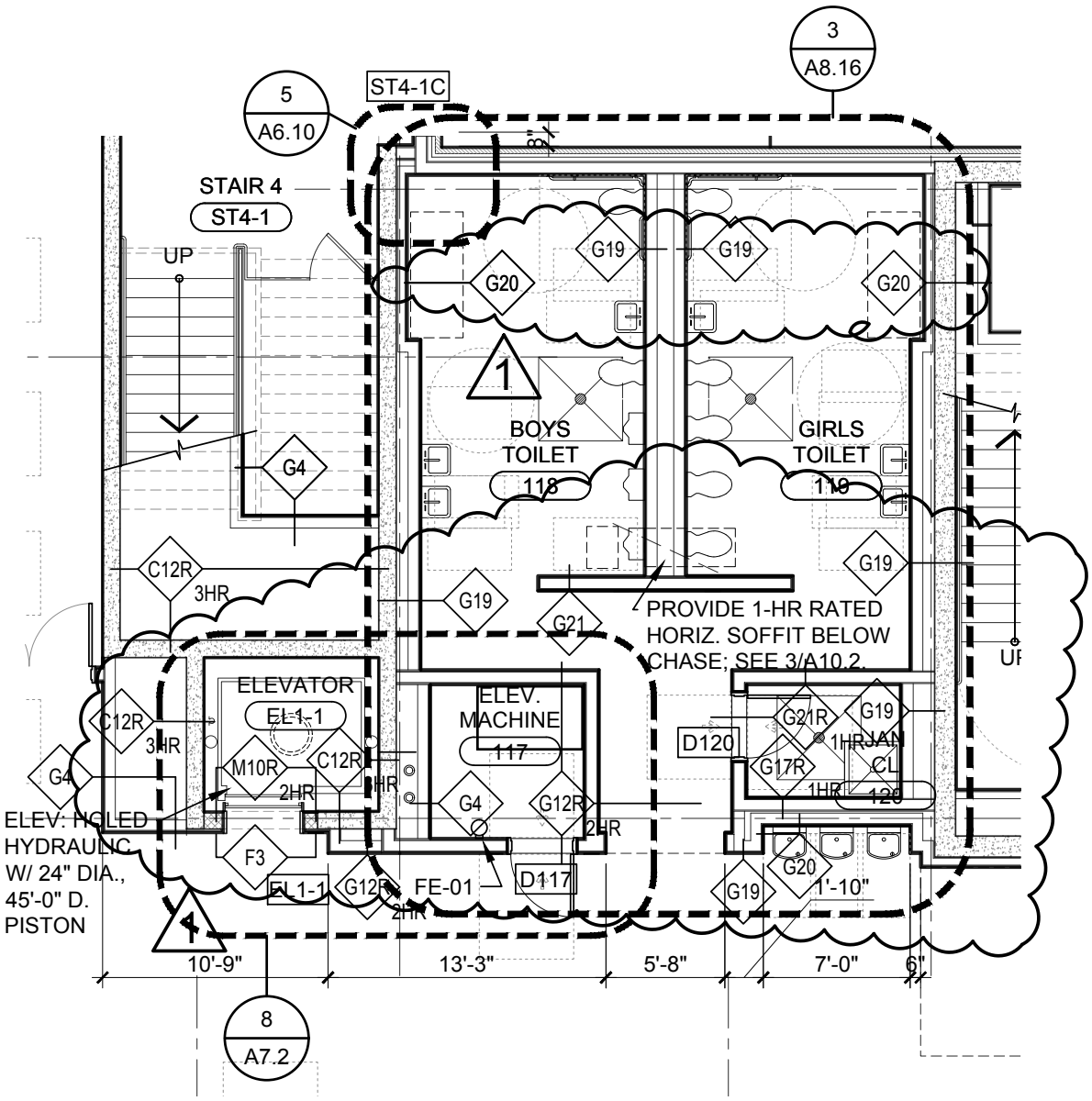
TITLE

FENCING DETAILS

SHEET

L3.3



FIRST FLOOR PLAN - NORTH

1
ASK-01
SCALE: 1/8" = 1'-0"

1/A1.1A

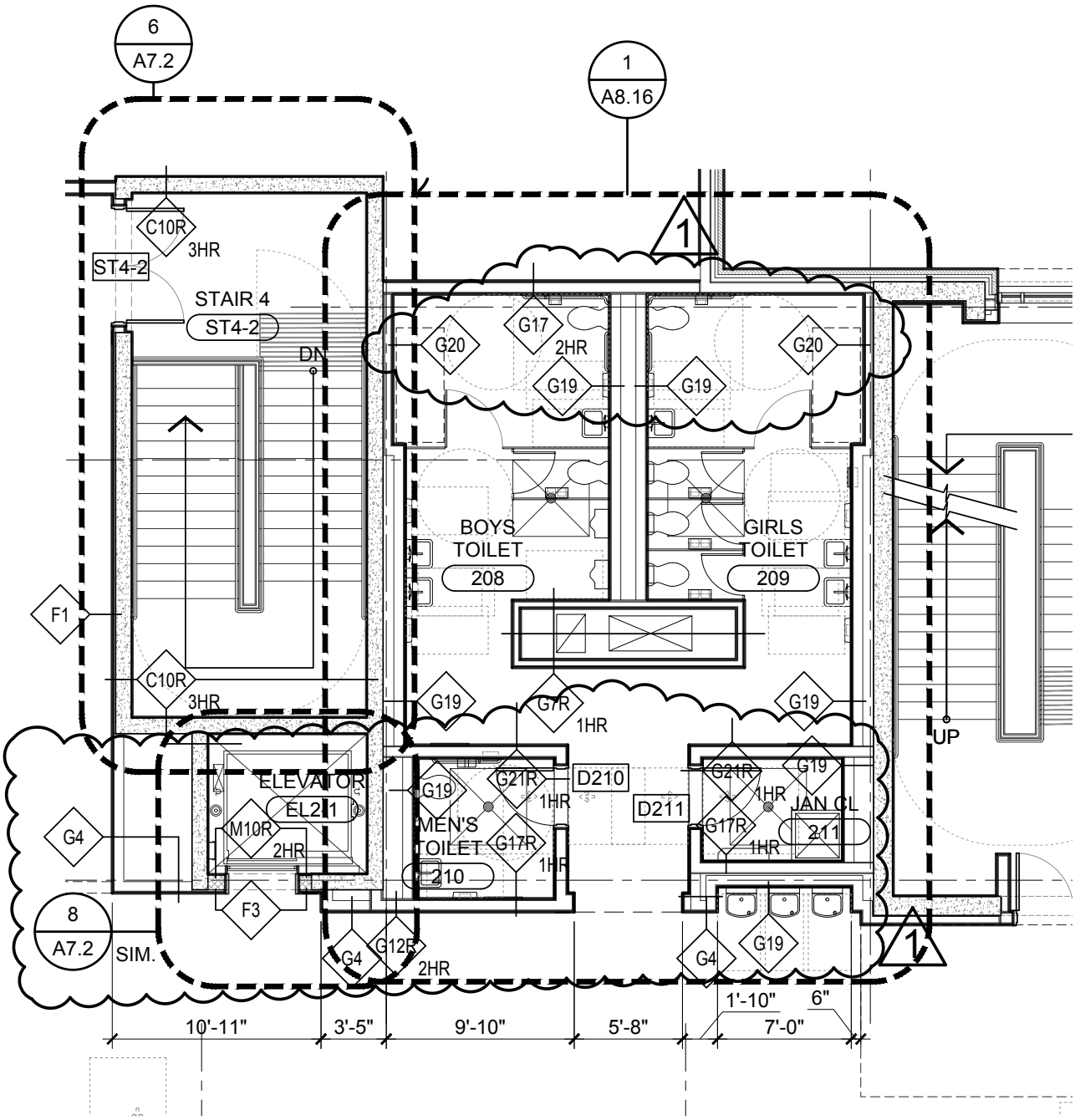
SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

Chicago Public Schools
PUBLIC BUILDING COMMISSION

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

ASK-01



1 A1.2A PARTIAL 2ND FL PLAN - NORTH

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

1/A1.2A

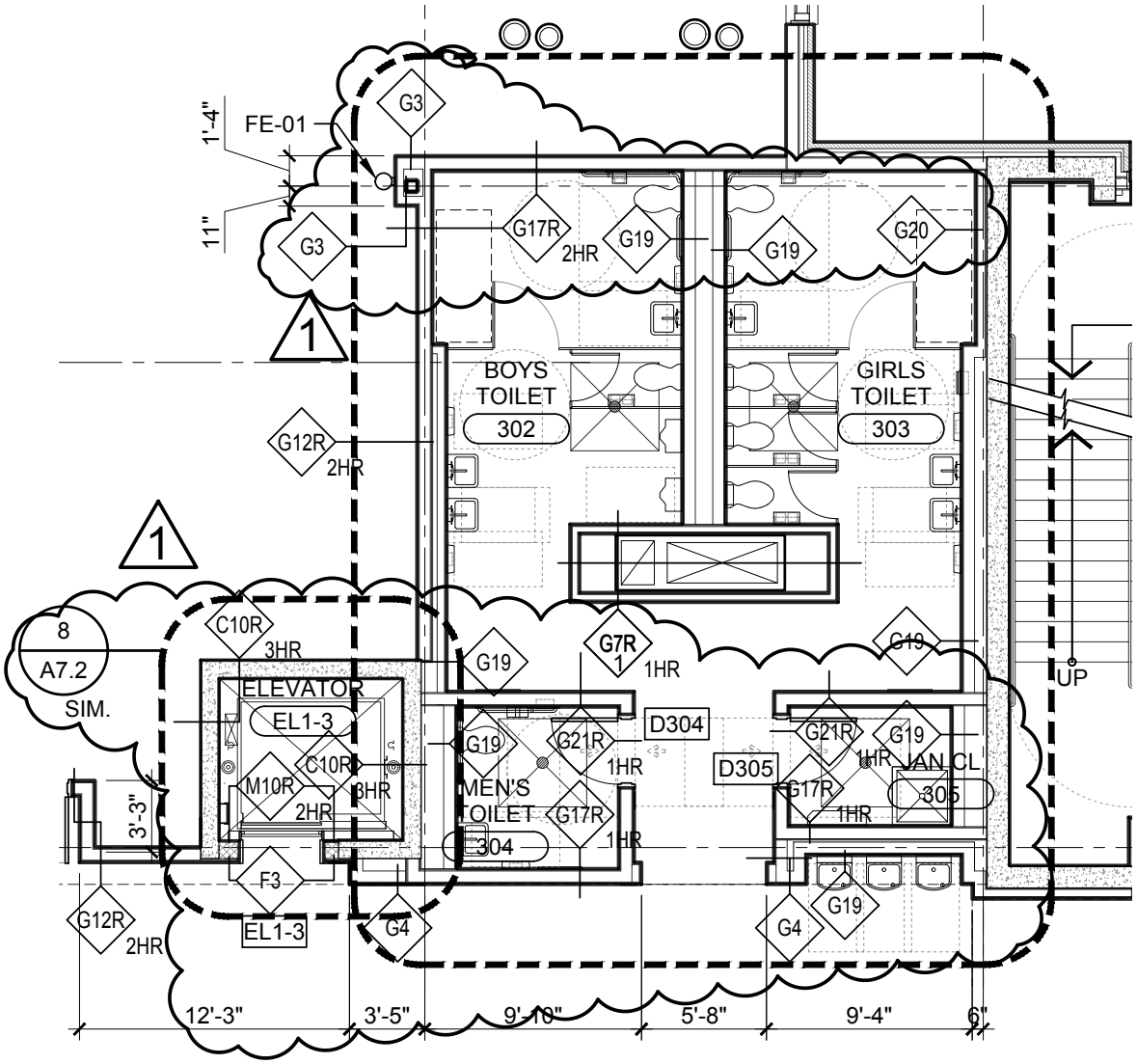
SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

Chicago Public Schools
PUBLIC BUILDING COMMISSION

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

ASK-02



1 / A1.3A PARTIAL 3RD FL PLAN - NORTH

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

1/A1.3A

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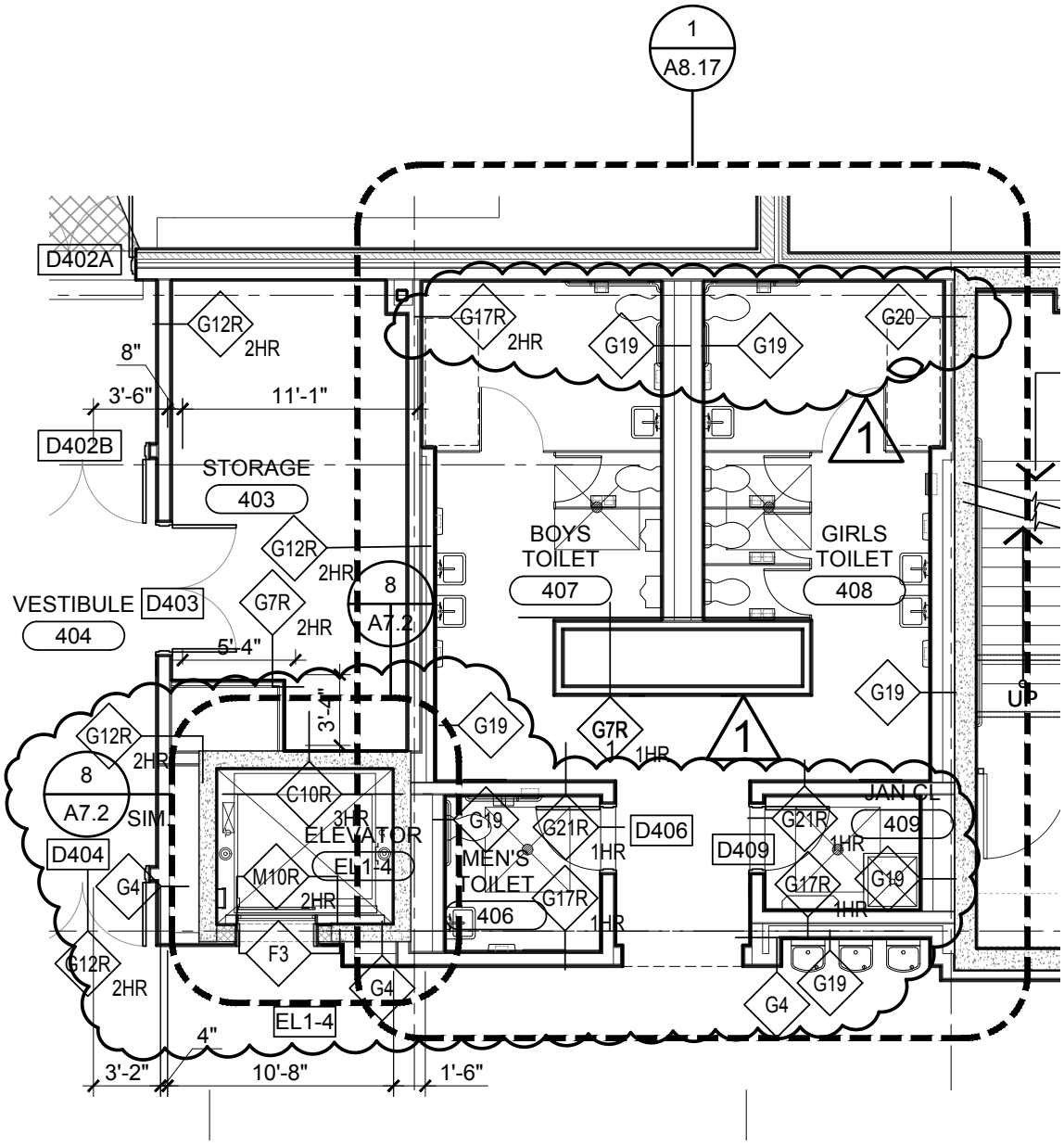
312.829.3355

Chicago Public Schools
PUBLIC BUILDING COMMISSION

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

ASK-03



1 A1.4A PARTIAL 4TH FL PLAN - NORTH

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

1/A1.4A

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Chicago Public Schools
PUBLIC BUILDING COMMISSION

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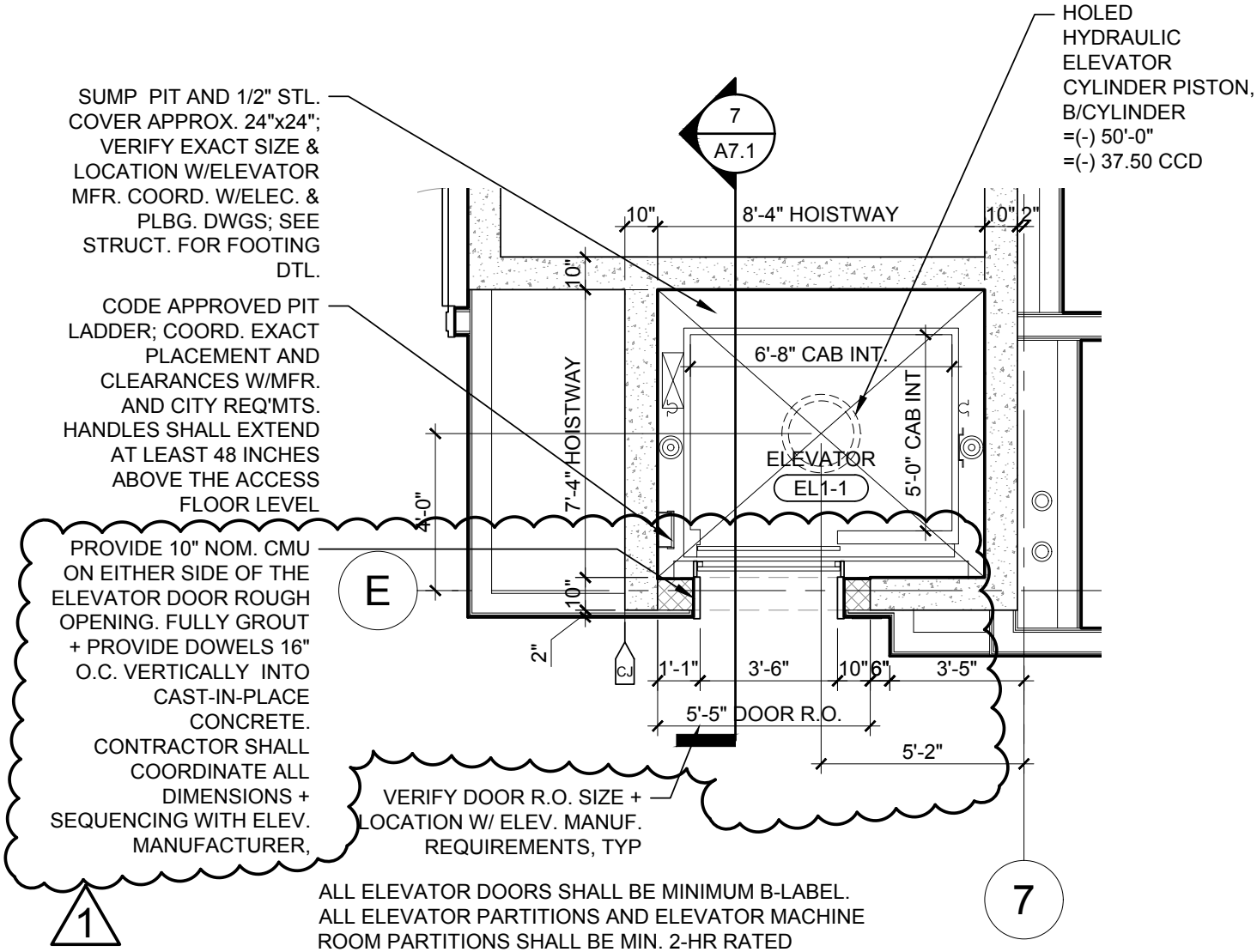
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

ASK-04



PARTIAL ELEVATOR PLAN

8
A7.2

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

8/A7.2

TITLE: **ASK-05**

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

STUDENT / STAFF LOCKERS

LOCKERS REQ'D FOR GRADES 1-8 ONLY (NO PRE-K / K)

SCHOOL CAPACITY: 1,080 STUDENTS
(MAX. CAPACITY)
4 PRE-K / K CLASSROOMS
@ 28 STUDENTS EA. = 112 STUDENTS
1,080 STUDENTS - 112 PRE-K/K = **968 TOTAL LOCKERS**

ACCESSIBLE LOCKERS REQ'D: MIN. 5% OF TOTAL LOCKERS
968 x 5% = 48 FULL HT (ADA) LOCKERS
TOTAL PROVIDED: **71 FULL HT (ADA) LOCKERS**

2-TIER LOCKERS REQ'D: 920 LOCKERS
TOTAL PROVIDED: **1066 LOCKERS**

KITCHEN STAFF LOCKERS
TOTAL PROVIDED: 10 **LOCKERS**

	1st FLR.	2nd FLR.	3rd FLR.	4th FLR.	BY TYPE TOTAL
2-TIER	298	256	256	256	1066
FULL HEIGHT (ADA)	20	17	17	17	71
BY FLOOR TOTAL	318	273	273	273	1137

1

CPS LOCKER DIMENSIONS:

FULL HEIGHT (ADA)	12"w x 15"d x 60"h
2-TIER (STACKED)	12"w x 15"d x 30"h
FULL HEIGHT (KITCHEN STAFF)	12"w x 15"d x 60"h

NOTE: COORDINATE AGE GROUP / REACH RANGES WITH CPS-FURNISHED ADA DRAWING SHEETS

A1.1B

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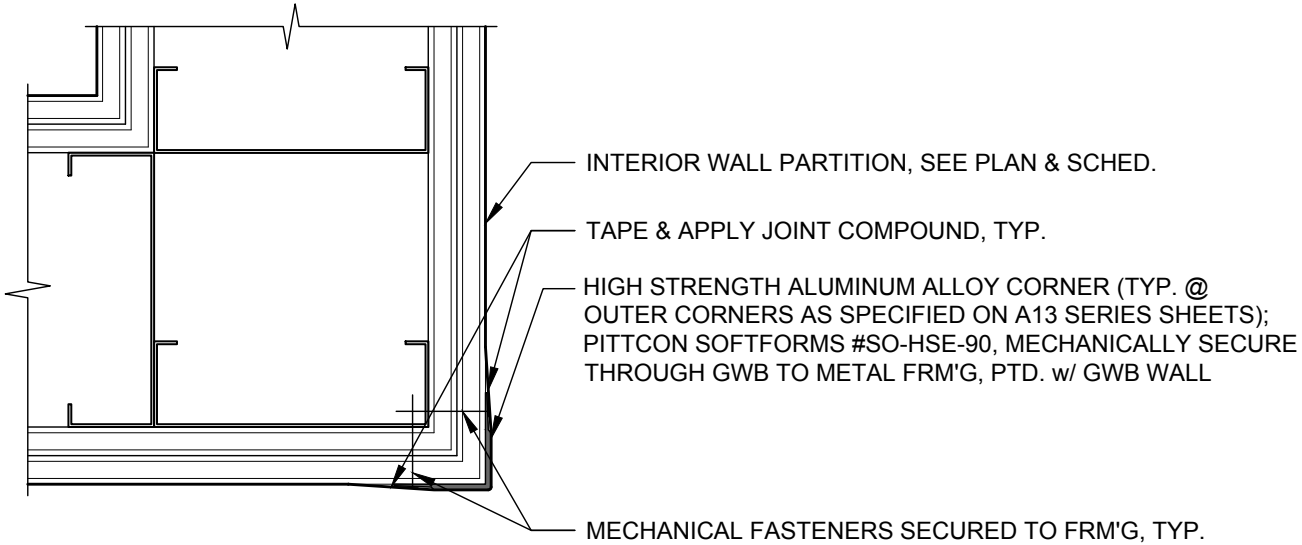
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

ASK-06



9 / A9.2

TYP. HIGH-STRENGTH WALL CORNER

1

N.T.S.

9/A9.2

TITLE: **ASK-07**

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

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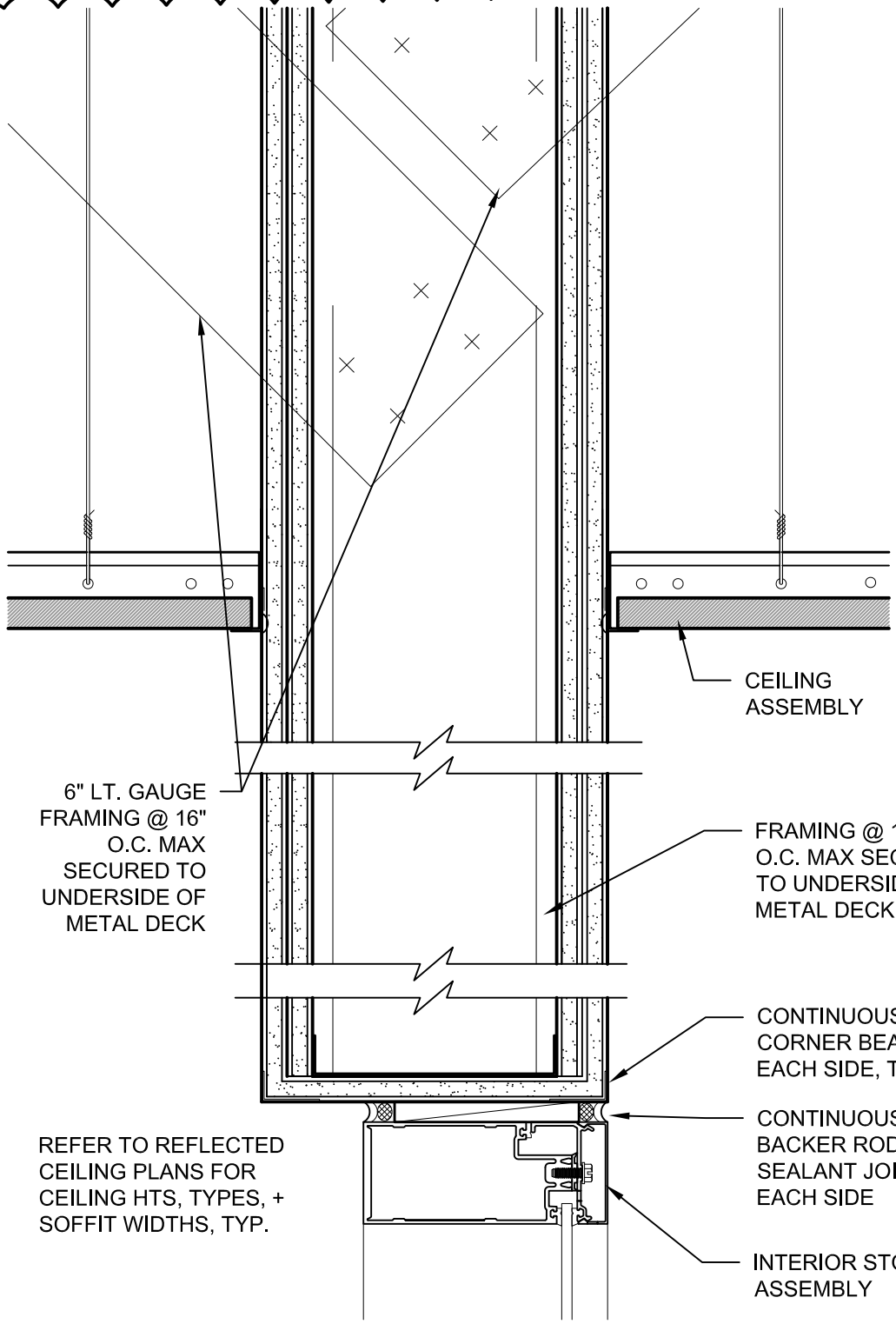

1

ANCHORAGE OF STOREFRONT ASSEMBLY SHALL BE ENGINEERED BY STOREFRONT SYSTEM'S DELEGATED DESIGN ENGINEER. CONTRACTOR SHALL FURNISH RESULTANT LOADS TO FRAMING CONTRACTOR. FRAMING CONTRACTOR SHALL PROVIDE ADDITIONAL BRACING + FASTENERS + INCREASE GAUGES IF NECESSARY TO ACCOMMODATE LOADING

16
A10.2

HEAD DTL @ PULL-IN CR STOREFRONT

SCALE: 2 237/256" = 1'-0"

DETAIL APPLIES TO ALL PARTITIONS ABOVE STOREFRONT ASSEMBLIES IN RMS 124, 134, 215, 224, 309, 318, 413, 420

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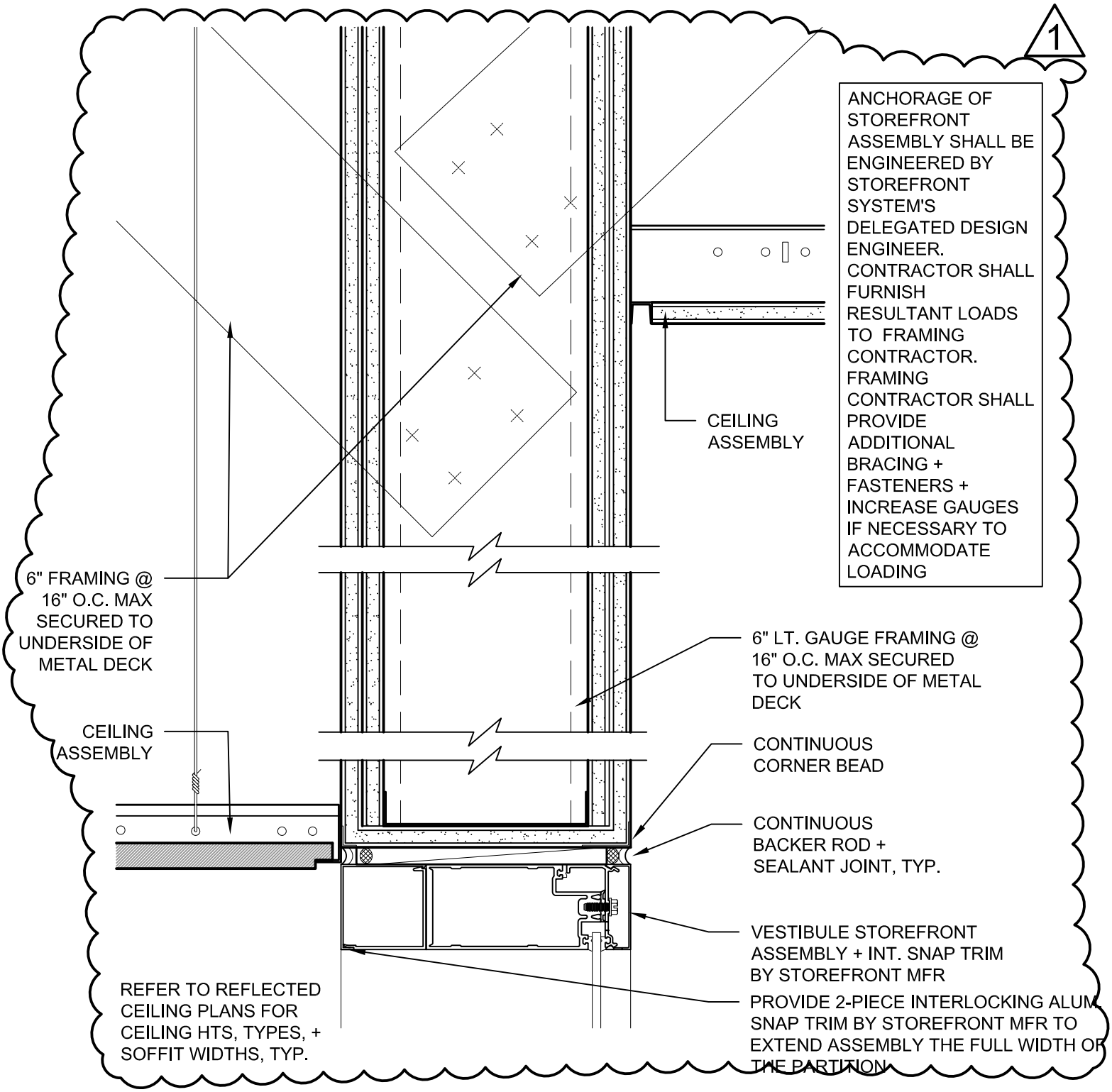
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

ASK-08

Date of Issue: June 23, 2017



5 / A10.2 DETAIL @ VESTIBULE DOOR HEADERS

SCALE: 3" = 1'-0"

DETAIL APPLIES TO STOREFRONT SYSTEMS A VESTIBULES 404 + 127

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1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

ASK-09

Date of Issue: June 23, 2017

1/32" = 1'-0" 1/16" = 1'-0" 1/8" = 1'-0" 1/4" = 1'-0" 1/2" = 1'-0" 1" = 1'-0" 1-1/2" = 1'-0" 3" = 1'-0" 6" = 1'-0"

OPENING SCHEDULE

FLOOR	OPNG NO.	OPENING TYPE	WIDTH	HT	THK	TRANS	MAT	HDW SET	FRAME TYPE	FRAME MAT	HEAD	JAMB	SILL	GLAZING	LABEL	STC. RATING	NOTE KEY
FIRST	D100A	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	47	SF	AL	3/A6.17SIM			G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	D100B	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	47	SF	AL	3/A6.17SIM			G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	D100C	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	42A	SF	AL	3/A6.17SIM			G5-L	NA	NA	N1, N2, N3, N5, N10, N11, N15, N18
	D100D	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	44A	SF	AL	3/A6.17SIM			G5-L	NA	NA	N1, N2, N3, N5, N6, N10, N11, N15, N18
	D101A	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	48	SF	AL	1/A6.17SIM	1/A6.10SIM		G2	NA	NA	N1, N2, N11, N15,
	D101B	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	48	SF	AL	1/A6.17SIM	1/A6.10SIM		G2	NA	NA	N1, N2, N11, N15,
	D101C	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	48	SF	AL	1/A6.17SIM	1/A6.10SIM		G2	NA	NA	N1, N2, N11, N15,
	D101D	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	49	SF	AL	1/A6.17SIM	1/A6.10SIM		G2	NA	NA	N1, N2, N6, N10, N11, N15
	D102A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N7, N11, N15, N18
	D102B	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N7, N11, N15, N18
	D102C	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	64	SF	AL	1/A6.7SIM			G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	D103	A2	6'-0"	7'-0"	1- 3/4"	N	HM	19	1	HM	10/A12.1	10/A12.1	NA	NA	B	NA	N15, N18
	D104A	C2	6'-0"	7'-0"	1- 3/4"	N	HM	56	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N14, N18
	D104B	C2	6'-0"	7'-0"	1- 3/4"	N	HM	56	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N14, N18
	D104C	C2	6'-0"	7'-0"	1- 3/4"	N	HM	56	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N14, N18
	D105	B1	4'-0"	7'-0"	1- 3/4"	N	HM	25	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N11, N16, N15, N18
	D106	A1	3'-0"	7'-0"	1- 3/4"	N	HM	12	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N18
	D107	A1	3'-0"	7'-0"	1- 3/4"	N	HM	9	1	HM	10/A12.1	10/A12.1	NA	NA	B	NA	N15, N18
	D108A	A1	3'-0"	7'-2"	1- 3/4"	N	FRP	2	1	AL	4/A12.1	7/A6.3		NA	NA	NA	N3, N5, N17, N15, N18
	D108B	E	8'-0"	7'-2"	COILING	NA	GALV		NA	GALV	2/A12.1	5/A12.1		NA	NA	NA	N3, N5
	D109A	A1	4'-0"	7'-2"	1- 3/4"	N	FRP	59	1	AL	4/A12.1	7/A6.3		NA	NA	NA	N3, N5, N11, N15, N16, N17, N18
	D109B	A1	3'-0"	7'-0"	1- 3/4"	N	HM	5	1	HM	10/A12.1	10/A12.1	NA	NA	B	NA	N4, N9, N15, N18
	D110A	A2	6'-0"	7'-2"	1- 3/4"	N	FRP	42	2	AL	6/A12.1	7/A6.10		NA	NA	NA	N3, N5, N11, N12, N13, N15, N17, N18
	D110B	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	B	NA	N15, N18
	D111	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1	NA	NA	C	NA	N15, N18
	D112	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1	NA	NA	C	NA	N15, N18
	D113	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1	NA	NA	C	NA	N15, N18
	D114	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1	NA	NA	C	NA	N15, N18
	D115	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1	NA	NA	C	NA	N15, N18
	D116	C1	3'-0"	7'-0"	1- 3/4"	N	HM	4	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N15, N18
	D117	A1	3'-0"	7'-0"	1- 3/4"	N	HM	5	1	HM	10/A12.1	10/A12.1	NA	NA	B	NA	N4, N9, N15, N18, N20
	D120	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1	NA	NA	C	NA	N15, N18
	D121	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D122	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D123A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D123B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4, N18
	D124	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D125A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D125B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4, N18
	D126	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D127A	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	44A	SF	AL	6/A12.1	3/A6.10SIM		G5-L	NA	NA	N1, N2, N3, N5, N6, N10, N11, N15, N18
	D127B	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	42A	SF	AL	6/A12.1	3/A6.10SIM		G5-L	NA	NA	N1, N2, N3, N5, N10, N11, N15, N18
	D127C	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	44A	SF	AL	5/A10.2	5/A10.2SIM		G2	NA	NA	N1, N2, N6, N10, N11, N15, N18
	D127D	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	42A	SF	AL	5/A10.2	5/A10.2SIM		G2	NA	NA	N1, N2, N10, N11, N15, N18
	D128	A2	6'-0"	7'-0"	1- 3/4"	N	HM	57	1	HM	10/A12.1	10/A12.1	NA	NA	B	NA	N4, N9, N15, N18
	D132	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D133A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D133B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4, N18
	D134	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D135A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D135B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4, N18
	D136	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D137	A1	3'-0"	7'-0"	1- 3/4"	N	HM	34	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D138	A1	3'-0"	7'-0"	1- 3/4"	N	WD	18	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D139	A1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D140	A1	3'-0"	7'-0"	1- 3/4"	N	WD	18	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D141	C1	3'-0"	7'-0"	1- 3/4"	N	HM	34	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D142	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D143	A1	3'-0"	7'-0"	1- 3/4"	N	HM	34	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D144	A1	3'-0"	7'-0"	1- 3/4"	N	WD	18	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D145	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N4, N15, N18
	D146	A1	3'-0"	7'-0"	1- 3/4"	N	WD	18	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D147	A1	3'-0"	7'-0"	1- 3/4"	N	HM	34	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	D148	C1	3'-0"	7'-0"	1- 3/4"	N	WD	4	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N15, N18
	D149	A1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	N18
	D150	C1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N18
	D151	A1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	N18
	D152	A1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	N18
	D153	C1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N18
	D154	C1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N18
	D155	C1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N18
	D156	C1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	G2	NA	NA	N18
	D158	A1	3'-0"	7'-0"	1- 3/4"	N	HM	50	1	HM	10/A12.1	10/A12.1	NA	NA	B	NA	N7, N15, N18
	D159	A1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	N18
	D160	A1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	N18
	D161	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	N18
	D162	A1	3'-0"	7'-0"	1- 3/4"	N	WD	62	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	N18
	D163	C1	3'-0"	7'-0"	1- 3/4"	N	WD	4	1	HM	10/A12.1	10/A12.1	NA	G3	C	NA	N18
	D165A	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	47	SF	AL	7/A6.5SIM	3/A6.9		G5-L	NA	NA	N1, N2, N3, N5, N11, N15,N18
	D165B	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	47	SF	AL	7/A6.5SIM	3/A6.9		G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	D165C	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	48	SF	AL	5/A10.2	5/A10.2SIM	NA	G2	NA	NA	N1, N2, N11, N15
	D165D	D1	3'-0"	7'-2"	1- 3/4"	Y	AL	48	SF	AL	5/A10.2	5/A10.2SIM	NA	G2	NA	NA	N1, N2, N11, N15
	D166	D1	3'-0"	7'-2"	1- 3/4"	Y	WD	12	1	HM	10/A12.1	10/A12.1	NA	NA	NA	NA	
	EL1-2	ELEV.	SEE SPECIFICATION SECTION 14 24 27												B	NA	N21
	ST1-1A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	36	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N7, N15, N18
	ST1-1B	B2	6'-0"	7'-0"	1- 3/4"	N	HM	27	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N7, N15, N18
	ST1-1C	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	64	SF	AL	3/A5.4	4/A6.9SIM		G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	ST1-1D	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	64	SF	AL	3/A5.4	4/A6.9SIM		G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	ST1-1E	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	64	SF	AL	3/A5.4	4/A6.9SIM		G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	ST1-1F	D1	3'-1"	7'-2"	1- 3/4"	Y	AL	64	SF	AL	3/A5.4	4/A6.9		G5-L	NA	NA	N1, N2, N3, N5, N11, N15, N18
	ST2-1A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N7, N11, N15, N18
	ST3-1A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N7, N11, N15, N18
	ST4-1A	B1	3'-0"	7'-0"	1- 3/4"	N	HM	22	1	HM	10/A12.1	10/A12.1	NA	G3	B	NA	N11, N15, N18
	ST4-1B	A1	3'-0"	7'-2"	1- 3/4"	Y	FRP	39	3	AL	6/A12.1	6/A6.10		NA	NA	NA	N3, N5, N11, N15, N17, N18
	ST4-1C	A1	3'-0"	7'-2"	1- 3/4"	Y	FRP	40	3	AL	6/A12.1	6/A6.10SIM.		NA	NA	NA	N3, N5, N11, N15, N17, N18
	GT1A	GATE	6'-0"	7'-0"	1- 3/4"	N										NA	SEE SECTION 32 31 20
	GT1B	GATE	6'-0"	7'-0"	1- 3/4"	N										NA	SEE SECTION 32 31 20
	L166	LITE	SEE NOTES			N	GL	NA	6	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L167	LITE	SEE NOTES			N	GL	NA	6	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L168	LITE	SEE NOTES			N	GL	NA	8	HM	7+8/A12.1			G3	60 MIN.	NA	HM FRAME+ FIRELITE PLUS
	L169	LITE	SEE NOTES			N	GL	NA	5	HM	7+8/A12.1			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L170	LITE	SEE NOTES			N	GL	NA	5	HM	7+8/A12.1			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L171	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L172	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L173	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L174	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT

FLOOR	OPNG NO.	OPENING TYPE	WIDTH	HT	THK	TRANS	MAT	HDW SET	FRAME TYPE	FRAME MAT	HEAD	JAMB	SILL	GLAZING	LABEL	STC. RATING	NOTE KEY
SECOND	D200A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	36	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D200B	B2	6'-0"	7'-0"	1- 3/4"	N	HM	27	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D201A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D201B	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D201C	B2	6'-0"	7'-0"	1- 3/4"	N	HM	8	1	HM	10/A12.1	10/A12.1		G3	B	NA	N11, N15
	D202A	B1	3'-0"	7'-0"	1- 3/4"	N	HM	58	1	HM	10/A12.1	10/A12.1		G3	C	NA	N11, N15
	D202B	B1	3'-0"	7'-0"	1- 3/4"	N	HM	58	1	HM	10/A12.1	10/A12.1		G3	C	NA	N11, N15
	D202C	B-LABEL FIRE RATED DOOR, FRAME, HARDWARE AND CLOSER PROVIDED BY PLATFORM LIFT MANUFACTURER, REFER TO SPEC. SECTION 14 4200												G3	C	NA	N21 - CONNECT TO LIFT CONTROLS
	D203	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	D204	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	D205	A2	6'-0"	7'-0"	1- 3/4"	N	HM	19	1	HM	10/A12.1	10/A12.1		NA	B	NA	N9, N15
	D206	C1	3'-0"	7'-0"	1- 3/4"	N	HM	12	1	HM	10/A12.1	10/A12.1		NA	NA	NA	
	D207	A2	6'-0"	7'-0"	1- 3/4"	N	HM	19	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	D210	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D211	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D212	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D213	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D214A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D214B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D215	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D216A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D216B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D217	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D218	A2	6'-0"	7'-0"	1- 3/4"	N	HM	57	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	D219	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D222	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D223A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D223B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D224	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D225A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D225B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D226	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D227	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D228	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D229	A1	3'-0"	7'-0"	1- 3/4"	N	WD	33	1	HM	10/A12.1	10/A12.1		NA	NA	NA	
	D230	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D231	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N4, N9, N15
	D232	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N4, N9, N15, N20
	D233A	C2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N7, N11, N15
	D233B	C1	3'-0"	7'-0"	1- 3/4"	N	HM	25	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N11, N15
	EL1-2	ELEV.	SEE SPECIFICATION SECTION 14 24 27												B	NA	N21
	ST2-2	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	ST3-2	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	ST4-2	B2	6'-0"	7'-0"	1- 3/4"	N	HM	8	1	HM	10/A12.1	10/A12.1		G3	B	NA	N11, N15
	L234	LITE	SEE NOTES			N	GL	NA	6	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L235	LITE	SEE NOTES			N	GL	NA	6	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L236	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L237	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L238	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L239	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT

FLOOR	OPNG NO.	OPENING TYPE	WIDTH	HT	THK	TRANS	MAT	HDW SET	FRAME TYPE	FRAME MAT	HEAD	JAMB	SILL	GLAZING	LABEL	STC. RATING	NOTE KEY
THIRD	D300A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	36	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D300B	B2	6'-0"	7'-0"	1- 3/4"	N	HM	27	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D301	A2	6'-0"	7'-0"	1- 3/4"	N	HM	19	1	HM	10/A12.1	10/A12.1		NA	B	NA	N9, N15
	D304	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D305	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D306	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D307	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D308A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D308B	D1	3'-0"	7'-0"	1- 3/4"	N	AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D309	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D310A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D310B	D1	3'-0"	7'-0"	1- 3/4"		AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D311	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D312	A2	6'-0"	7'-0"	1- 3/4"	N	HM	57	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	D313	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D316	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D317A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D317B	D1	3'-0"	7'-0"	1- 3/4"		AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D318	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D319A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D319B	D1	3'-0"	7'-0"	1- 3/4"		AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D320	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D321	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D322	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D323	A1	3'-0"	7'-0"	1- 3/4"	N	WD	33	1	HM	10/A12.1	10/A12.1		NA	NA	NA	
	D324	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D325	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N4, N9, N15
	D326A	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N4, N9, N15
	D326B	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N4, N9, N15
	D327A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D327B	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D328	A1	3'-0"	7'-0"	1- 3/4"	N	WD	33	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	D329	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D330	A1	3'-0"	7'-0"	1- 3/4"	N	WD	33	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	EL1-2	ELEV.	SEE SPECIFICATION SECTION 14 24 27												B	NA	N21
	ST2-3	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	ST3-3	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	L331	LITE	SEE NOTES			N	GL	NA	6	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L332	LITE	SEE NOTES			N	GL	NA	6	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L333	LITE	SEE NOTES			N	GL	NA	7	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L334	LITE	SEE NOTES			N	GL	NA	7	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L335	LITE	SEE NOTES			N	GL	NA	7	AL-FR	16/10.2SIM			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING SEE FRAME TYPE FOR W. + HT
	L336	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L337	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L338	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L339	LITE	SEE NOTES			N	GL	NA	10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT

PUBLIC BUILDING COMMISSION
Chicago Public Schools

SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ARCHITECT OF RECORD:
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CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

FOODSERVICE CONSULTANT:
EDGE ASSOCIATES

ACOUSTICAL CONSULTANT:
SHINER + ASSOCIATES

THEATER CONSULTANT:
BILL CONNER ASSOCIATES LLC

ISSUANCE

MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

PROJECT NAME: SOUTH LOOP ELEMENTARY SCHOOL
PBC CONTRACT NO: 05035
SMNG-A PROJECT NO: 1620

TITLE
OPENING SCHEDULE

SHEET
A12.0

1/32" = 1'-0" | 1/16" = 1'-0" | 1/8" = 1'-0" | 1/4" = 1'-0" | 1/2" = 1'-0" | 1" = 1'-0" | 1-1/2" = 1'-0" | 3" = 1'-0" | 6" = 1'-0"

SCHEDULE INFORMATION AND NOTES

DOOR + FRAME NOTES:

1. UNLESS NOTED OTHERWISE THE WIDTH OF HOLLOW METAL FRAMES ARE ACTUAL PARTITION THICKNESS PLUS 1" (SEE PARTITION TYPES ON SHEET A9.1) PARTITION TYPES ARE KEYED ON FLOOR PLANS. REFER TO DETAILS FOR ADDITIONAL INFO, WHERE SHOWN

2. PROVIDE SPECIFIED FRAME ANCHORS (LISTED IN SPECIFICATION SECION 08110 - STEEL AND DOORS AND FRAMES) TO ACCOMMODATE PARTITION TYPES AND REQUIREMENTS FOR FIRE RATING.

3. NOT USED

4. AT ALL MASONRY PARTITIONS, SOLIDLY GROUT THE ENTIRE VOID IN THE HOLLOW METAL FRAME

5. PROVIDE SEALANT AT JUNCTURE OF ALL FRAMES TO PARTITIONS AND FRAMES TO FLOOR W/RATING AS REQ'D, AT NON-RATED ASSEMBLIES CAULK IN COLOR TO MATCH FRAME PAINT COLOR.

6. AT ALL FRAMES ANCHORED TO CAST IN PLACE CONCRETE, PRECAST CONCRETE, OR MASONRY (IF MASONRY ANCHORS NOT OTHERWISE SPECIFIED) PROVIDE 3/8" DIA EXPANSION ANCHORS WITH FLAT COUNTERSUNK HEADS, DIMPLE FRAME WITH 1/16" DEPRESSION TO RECEIVE SCREW HEAD, PROVIDE METAL BODY PUTTY FILL OVER SCREW HEAD + GRIND SMOOTH, PRIME + PT

7. PAINT ALL METAL GLAZING STOPS, LITE KIT TRIM, AND METAL LOUVERS TO MATCH FINAL DOOR / FRAME FINISH.

8. HEIGHT & WIDTH OF DOOR OPENING INDICATED ON SCHEDULE ARE DIMENSIONS EXCLUSIVE OF HOLLOW METAL FRAME

9. HEIGHT & WIDTH OF HOLLOW METAL LITES /VISION FRAMES AND COILING DOORS INDICATED ON SCHEDULE INCLUDE OVERALL NOMINAL FRAME DIMENSION.

10. ALL GLAZING IN DOORS AND SIDE LITES SHALL BE CERTIFIED SAFETY GLASS AS PER ANSI-Z-97. CONTRACTOR SHALL SUBMIT CERTIFICATION AS PART OF PRODUCT DATA SUBMITTAL FOR REVIEW BY AOR PRIOR TO FABRICATION.

11. ALL DOOR FRAMES SHALL MATCH THE FIRE DOOR RATING AND UL LABEL

12. ALL HOLLOW METAL DOORS/FRAMES SHALL BE PTD., SEE FIN. SCHEDULE FOR COLOR

13. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND QUANTITIES PRIOR TO FABRICATION AND IS RESPONSIBLE FOR FIT AND OPERATION

14. REFERENCE SHEET A3.0 AND SPECIFICATION FOR GLAZING SCHEDULE / DESCRIPTION

15. PROVIDE SOLID FIRE TREATED WOOD BLOCKING IN ALL FRAME WALLS AT THE LOCATION OF ALL WALL-MOUNTED DOOR STOPS. GC TO COORDINATE WITH HARDWARE HEIGHTS.

FINISH HARDWARE GENERAL NOTES:

1. ACCESSIBILITY REQUIREMENTS:
A. ALL DOORS TO REQUIRED ACCESSIBLE ROOMS AND SPACES TO RECEIVE HARDWARE PER ADAAG 4.13.9, MINIMUM 32" CLEAR OPENING, AND COMPLY WITH ALL ADAAG SECTION 4.13 REQUIREMENTS
B. ALL DOORS TO HAZARDOUS ROOMS, INCLUDING ALL ELECTRICAL, MECHANICAL, MDF RM, KILN RM, + SIMILAR ROOMS SHALL HAVE KNURLED HARDWARE PER ADAAG SECTION 4.27.3, SEE KEYNOTE 'N9' AND IN SCHEDULE.

2. ORNAMENTAL STEEL FENCE GATES:
PROVIDE ADA COMPLIANT LATCH HARDWARE AND LOCK HASP FOR OWNER AND/OR UTILITY PROVIDED LOCKS, REFER TO LANDSCAPE PLANS/DETAILS AND SITE PLAN, COORD W/ FENCING CONTRACTOR AS REQ'D, COM-ED ENCL TO RECEIVE HASP (LOCK PROVIDED BY UTILITY COMPANY).

3. ALL RATED DOORS SHALL BE PROVIDED WITH CLOSERS.

4. ALL DOORS USED FOR EGRESS MUST BE KEYLESS IN THE DIRECTION OF EGRESS TRAVEL. CONTRACTOR SHALL COORDINATE WITH ALL HARDWARE SETS ACCORDINGLY.

5. DOOR HOLD-OPENS DESIGNATED AS 'N7' SHALL BE IN CONFORMANCE WITH CHICAGO BUILDING CODE 7(15-8-180)

ABBREVIATIONS:

AL ALUMINUM	ST STEEL	NR NOT REQUIRED
HM HOLLOW METAL	WD WOOD	NA NOT APPLICABLE
GALV. GALVANIZED STEEL	N NO	SF STOREFRONT
SS STAINLESS STEEL	Y YES	ASSEMBLY
AL-FR FIRE RATED ALUMINUM		

GLAZING KEY:
REFER TO SPECIFICATION AND A3 SERIES SHEETS FOR GLAZING LEGEND. GLAZING LEGEND INCLUDE G3 (90 MINUTE) AND G7 (120 MINUTE) FIRE-RATED GLAZING ASSEMBLIES.

MAXIMUM FIRE-RATED GLASS SIZES	
WALL RATING + OPENING LABEL	5/16" FIRELITE PLUS CERAMIC FIRE-RATED GLAZING
C; 1-HR / C 3/4	3325 SQ. IN./23.09 SF.
60 MINUTES	3325 SQ. IN./23.09 SF.
B; 2-HR / B 1-1/2	2627 SQ. IN./18.24 SF.
	2-1/8" PILKINGTON PYROSTOP 120-104 FIRE-RATED GLAZING
120 MINUTES	3730 SQ. IN./25.90 SF.

NOTE KEY:

N1 INTEGRAL W/ WINDOW WALL COORD W/GC, AND WIN MFR AS REQ'D

N2 STOREFRONT DOOR; COORDINATE EXACT DOOR AND FRAME SIZE W/ EXISTING CONDITIONS. DIMENSIONS SHOWN ARE MINIMUM REQUIRED FOR CODE: DOOR LEAF WIDTHS SHALL BE INCREASED TO FIT MASONRY + PARTITION OPENINGS.

N3 PROVIDE + INSTALL WEATHERSTRIPPING ON ALL SIDES

N4 PROVIDE + INSTALL ACOUSTICAL SOUND SEAL ON ALL JAMBS AND HEADS AT ALL CLASSROOMS AND MECHANICAL + ELECT RMS.

N5 DOOR CONTACT COORDINATE W/ELECTRICAL DWGS. COORD. FOR FIT.

N6 AUTOMATIC DOOR OPERATOR, COORDINATE W/ELEC., CONNECT TO AIPHONE REFER TO SPEC SECTION 08 71 13 FOR MORE INFO.

N7 MAGNETIC HOLD OPEN COORDINATE W/ELEC AS REQ'D, HOLD-OPEN SHALL RELEASE UPON ACTIVATION OF THE FIRE ALARM.

N8 DOOR LOUVERS, MIN. FREE VENTILATING AREA 0.6 Sq. Ft. LOUVER SHALL BE SHOP-PRIMED, SHOP PAINTED TO MATCH DOOR FRAMES, AND SHOP-INSTALLED BY DOOR MANUFACTURER. 8" Ht. x 24" W. LOUVER PENDING MIN 50% FREE AREA, TOP OF LOUVER SHALL BE 6'-6", CONTRACTOR SHALL REVIEW AND VERIFY.

N9 PROVIDE AND INSTALL KNURLED HARDWARE PER IAC AND ANSI A117.1 2003

N10 ELECTRIC STRIKE, TIE TO AIPHONE

N11 PROVIDE AND INSTALL EXIT DEVICES (PANIC HARDWARE) ON EXITING SIDE OF DOOR

N12 PROVIDE DOOR SCOPE, 48" A.F.F. CENTERED ON DOOR LEAF. REFER TO SECTION 08 71 13 FOR MORE INFO.

N13 PROVIDE REMOVABLE MULLION

N14 NON-MAGNETIC DOOR CATCH (NON-RATED DOORS ONLY)

N15 PROVIDE DOOR CLOSER

N16 PROVIDE EXTRA HEAVY HINGES

N17 INSULATED EXTERIOR DOOR/FRAME SEE SPECIFICATION

N18 PROVIDE DOOR SWEEP, REF. TO H/W SET, IF NOT OTHERWISE INDICATED, PROVIDE PEMKO 18100CNB; OTHER MANUFACTURERS PRODUCTS MEETING DESIGN CRITERIA WILL BE CONSIDERED SUBJECT TO COMPLIANCE WITH PROJECT REQ'MTS.

N19 METAL GATE, HINGES BY MFG, GATE TO ACCOMIDATE MORTISE LOCK SET

N20 ENHANCED ACOUSTICAL SOUND SEALS AND DOOR BOTOM

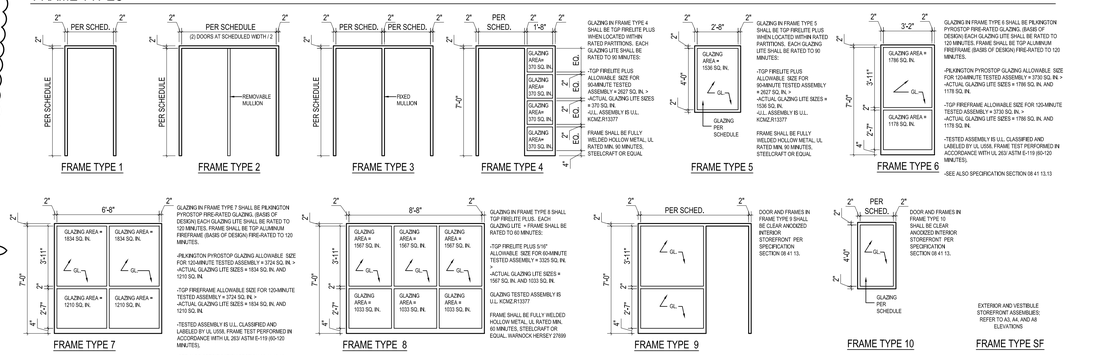
N21 PROVIDE CONNECTION TO FIRE ALARM SYSTEM

LABEL KEY:
A LABEL - 3 HOUR
B LABEL - 1-1/2 HOUR
C LABEL - 3/4 HOUR

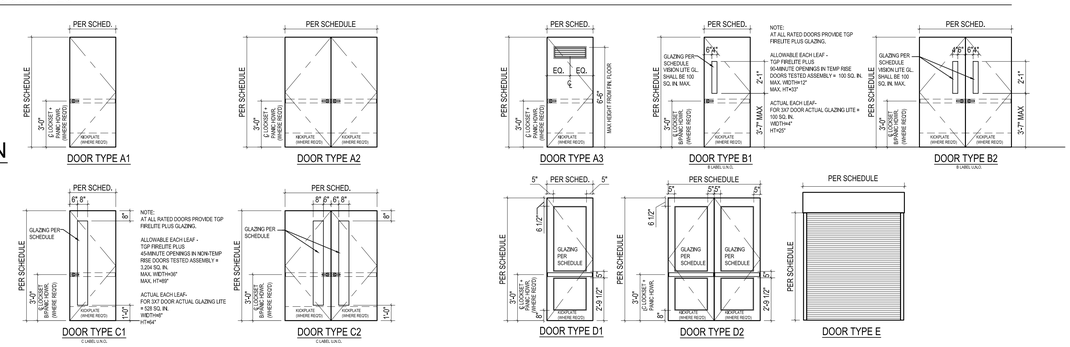
FLOOR	OPNG NO.	OPENING TYPE	SIZE WIDTH	SIZE HT	SIZE THK	SIZE TRANS	OPENING MAT	HDW SET	FRAME TYPE	FRAME MAT	FRAME DETAILS HEAD	FRAME DETAILS JAMB	FRAME DETAILS SILL	GLAZING	LABEL	STC. RATING	NOTE KEY
FOURTH	D400A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	36	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D400B	B2	6'-0"	7'-0"	1- 3/4"	N	HM	27	1	HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	D401A	B2	6'-0"	7'-2"	1- 3/4"	Y	FRP	43	1	AL	6/A12.1			G5-L	NA	NA	N1, N2, N3, N5, N11, N13, N15
	D401B	B2	6'-0"	7'-2"	1- 3/4"	Y	FRP	43	1	AL	6/A12.1			G5-L	NA	NA	N1, N2, N3, N5, N11, N13, N15
	D402A	A2	6'-0"	7'-2"	1- 3/4"	N	FRP	43	1	AL	6/A12.1			NA	NA	NA	N3, N5, N13, N15
	D402B	A2	6'-0"	7'-0"	1- 3/4"	N	HM	52	1	HM	10/A12.1	10/A12.1		NA	NA	NA	N13, N15
	D403	A2	6'-0"	7'-0"	1- 3/4"	N	HM	57	1	HM	10/A12.1	10/A12.1		NA	B	NA	N15
	D404	D2	6'-0"	7'-0"	1- 3/4"	N	AL	8	9	AL	5/A10.2			G2	NA	NA	N11, N15
	D405	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D406	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D409	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D410	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D411	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D412A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D412B	D1	3'-0"	7'-0"	1- 3/4"		AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D413	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D414A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D414B	D1	3'-0"	7'-0"	1- 3/4"		AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D415	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D417	A2	6'-0"	7'-0"	1- 3/4"	N	HM	57	1	HM	10/A12.1	10/A12.1		NA	B	NA	N18, N15
	D419A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D419B	D1	3'-0"	7'-0"	1- 3/4"		AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D420	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D421A	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D421B	D1	3'-0"	7'-0"	1- 3/4"		AL	12	9	AL	16/A10.2			G3	NA	NA	N1, N2, N4
	D422	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D423	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D424	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D425	A1	3'-0"	7'-0"	1- 3/4"	N	WD	33	1	HM	10/A12.1	10/A12.1		NA	NA	NA	
	D426	C1	3'-0"	7'-0"	1- 3/4"	N	WD	1	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15
	D427	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	B	NA	N4, N9, N15
	D428	A2	6'-0"	7'-0"	1- 3/4"	N	HM	57	1	HM	10/A12.1	10/A12.1		NA	B	NA	N4, N15
	D429	C2	6'-0"	7'-0"	1- 3/4"	N	WD	17	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15, N20
	D430	C1	3'-0"	7'-0"	1- 3/4"	N	WD	25	1	HM	10/A12.1	10/A12.1		G3	C	NA	N4, N15, N20
	D431	A1	3'-0"	7'-0"	1- 3/4"	N	WD	4	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D432	A1	3'-0"	7'-0"	1- 3/4"	N	WD	15	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	D435	A1	3'-0"	7'-0"	1- 3/4"	N	HM	3	1	HM	10/A12.1	10/A12.1		NA	C	NA	N15
	EL1-2	ELEV.	SEE SPECIFICATION SECTION 14 24 27												B	NA	N21
	ST2-4A	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23		HM	10/A12.1	10/A12.1		G3	B	NA	N1, N2, N4
	ST2-4B		4'-0"	7'-0"		N	MTL.	33							B	NA	N19; GATE + HARDWARE BY STAIR FABRICATOR
	ST3-4	B2	6'-0"	7'-0"	1- 3/4"	N	HM	23		HM	10/A12.1	10/A12.1		G3	B	NA	N7, N11, N15
	L436	LITE	SEE NOTES			N	GL		6	AL-FR	16/10.2			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING
	L437	LITE	SEE NOTES			N	GL		6	AL-FR	16/10.2			G7	120 MIN.	NA	ALUM. FIREFRAME + PYROSTOP GLAZING
	L438	LITE	SEE NOTES			N	GL		8	HM	5+6/A12.1			G3	60 MIN.	NA	HM FRAME+ FIRELITE PLUS
	L439	LITE	SEE NOTES			N	GL		8	HM	5+6/A12.1			G3	60 MIN.	NA	HM FRAME+ FIRELITE PLUS
	L440	LITE	SEE NOTES			N	GL		8	HM	5+6/A12.1			G3	60 MIN.	NA	HM FRAME+ FIRELITE PLUS
	L441	LITE	SEE NOTES			N	GL		10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L442	LITE	SEE NOTES			N	GL		10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L443	LITE	SEE NOTES			N	GL		10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT
	L444	LITE	SEE NOTES			N	GL		10	AL	16/10.2			G2	NA	NA	SEE FRAME TYPE FOR W. + HT

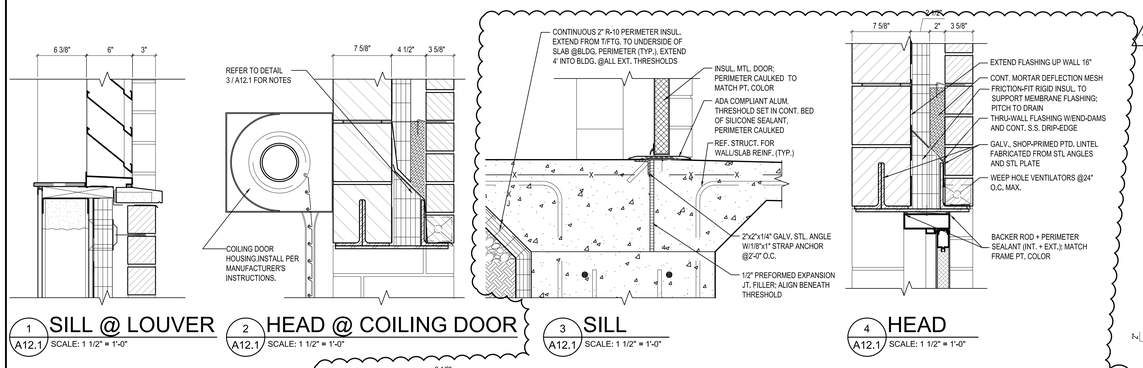
FLOOR	OPNG NO.	OPENING TYPE	SIZE WIDTH	SIZE HT	SIZE THK	SIZE TRANS	OPENING MAT	HDW SET	FRAME TYPE	FRAME MAT	FRAME DETAILS HEAD	FRAME DETAILS JAMB	FRAME DETAILS SILL	GLAZING	LABEL	STC. RATING	NOTE KEY
ROOF	ST2-5	A2	6'-0"	7'-2"	1- 3/4"		FRP	67	1	AL	4/A12.1SIM			NA	NA	NA	

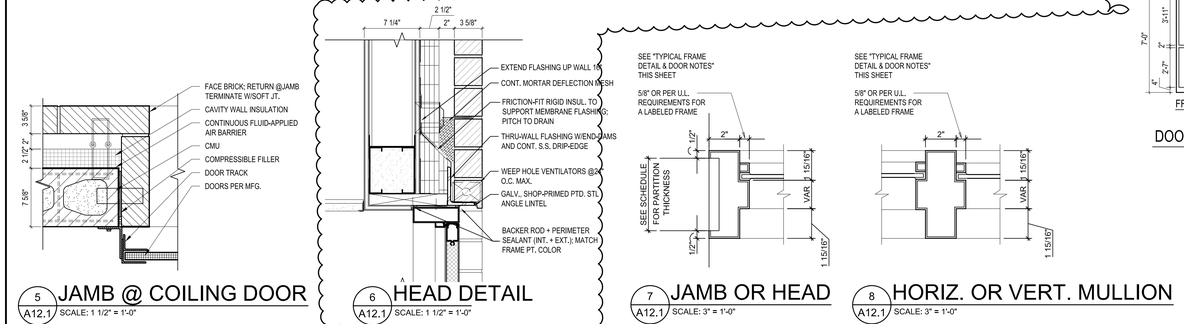
FRAME TYPES

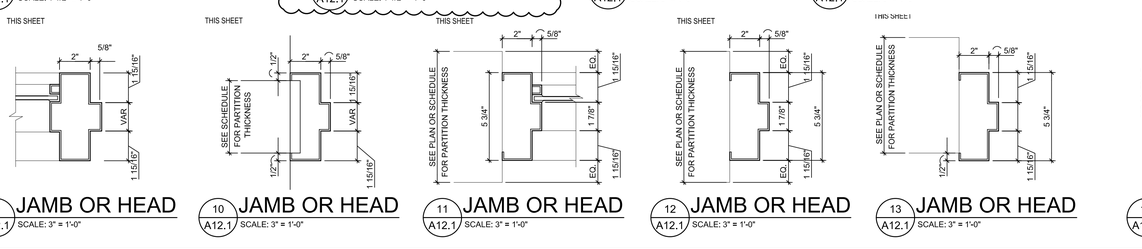


DOOR TYPES









14 FRAME AND DOOR TYPES A12.1 SCALE: 1/4" = 1'-0"

SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ARCHITECT OF RECORD:
SMNG A LTD.

ADDRESS: 936 W. HURON STREET CHICAGO, ILLINOIS 60642
PHONE: 312.829.3355
FAX: 312.829.8187
WEB: www.smng-arch.com

ASSOCIATE ARCHITECT:
URBAN WORKS

STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

FOODSERVICE CONSULTANT:
EDGE ASSOCIATES

ACOUSTICAL CONSULTANT:
SHINER + ASSOCIATES

THEATER CONSULTANT:
BILL CONNER ASSOCIATES LLC

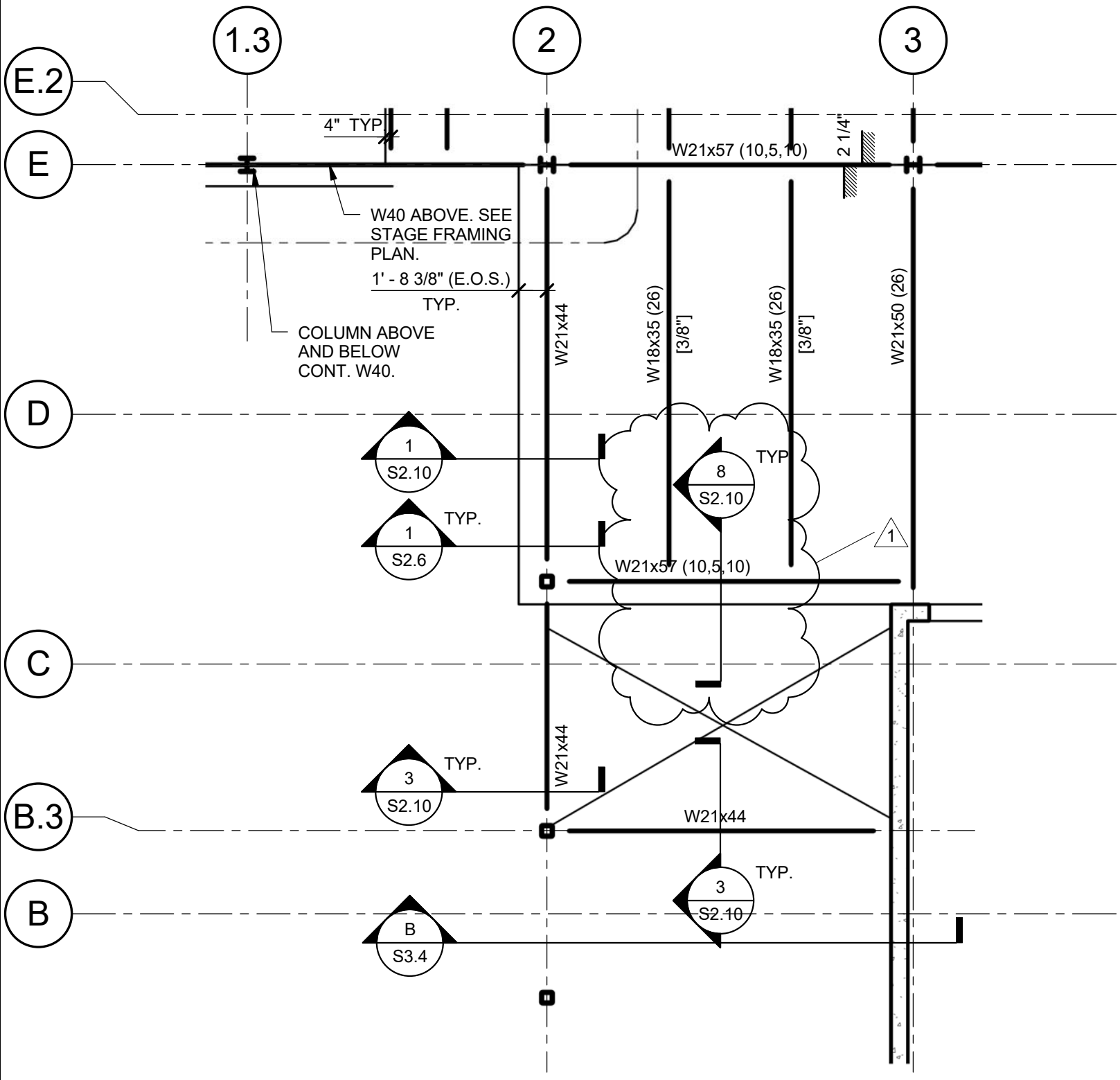
ISSUANCE

MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

PROJECT NAME: SOUTH LOOP ELEMENTARY SCHOOL
PBC CONTRACT NO: 05035
SMNG-A PROJECT NO: 1620

TITLE
OPENING SCHEDULE + DETAILS

SHEET
A12.1



A PARTIAL SECOND FRAMING PLAN - NORTH

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

(SHEET S1.3A)

N

SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

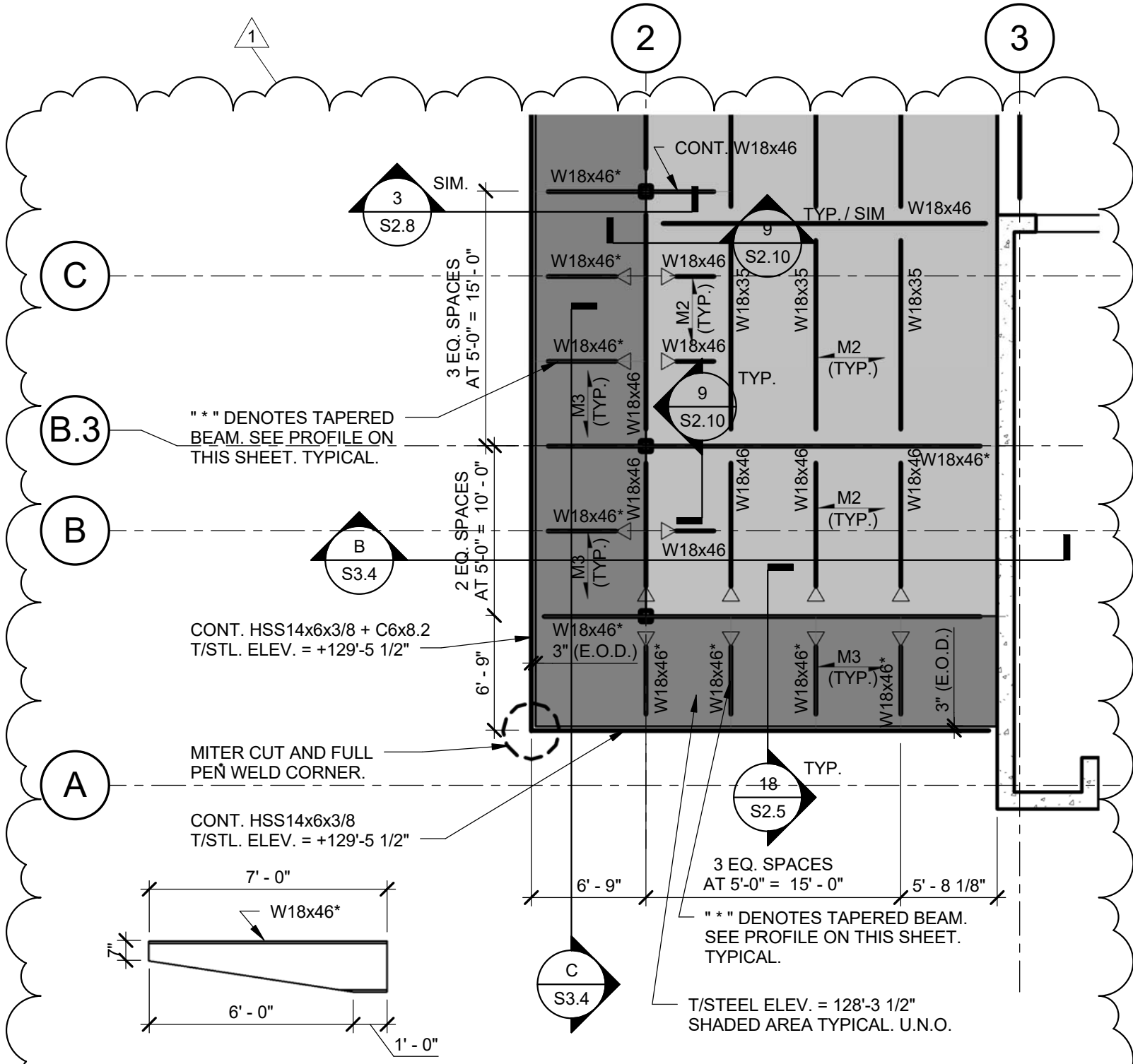
PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

PARTIAL SECOND FLOOR FRAMING PLAN - NORTH

SSK-01

Date of Issue: June 23, 2017



TAPERED BEAM PROFILE

A PARTIAL THIRD FLOOR FRAMING PLAN - NORTH

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

N

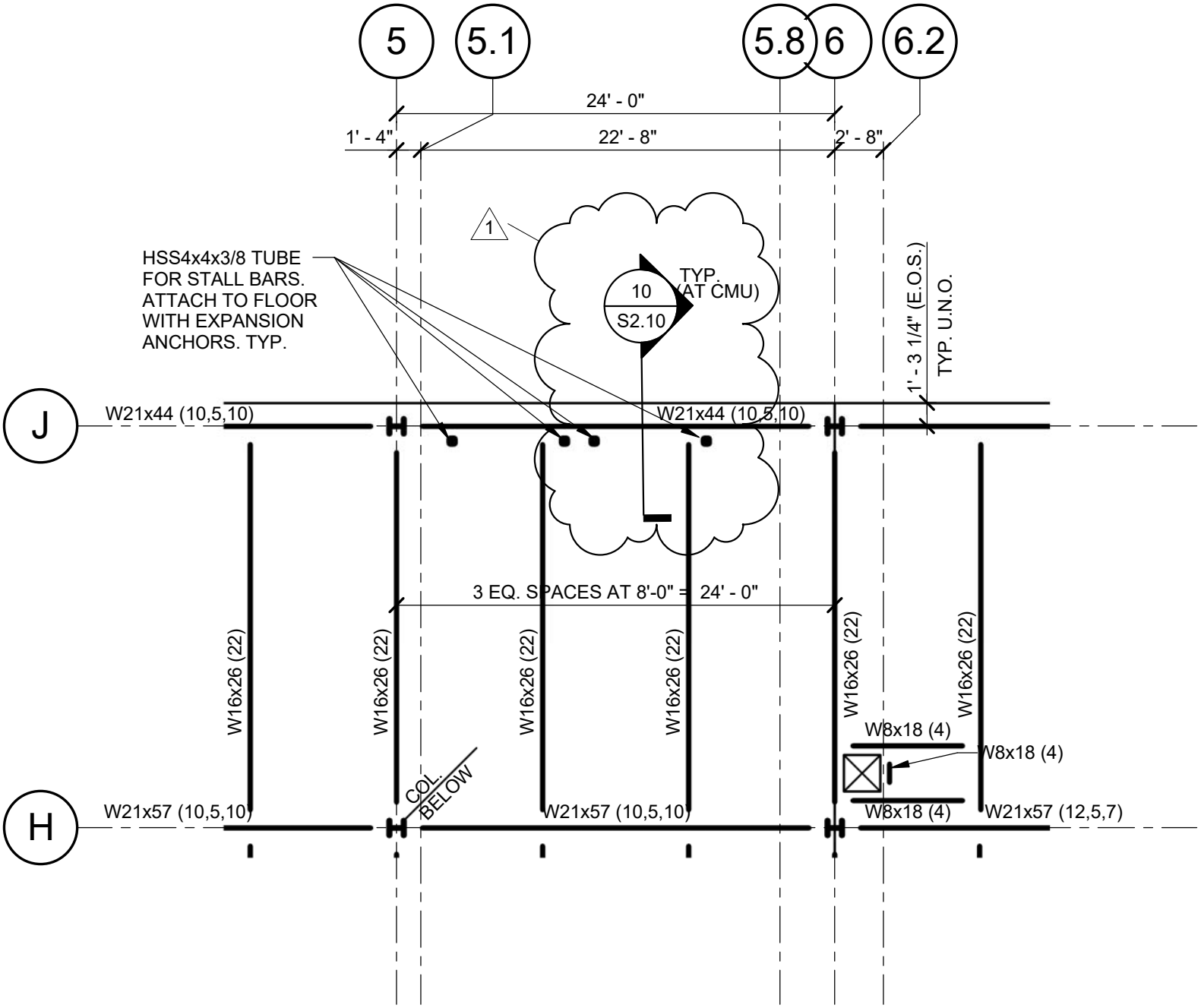
(SHEET S1.4A)

SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
PARTIAL THIRD FLOOR FRAMING PLAN - NORTH

SSK-02



A PARTIAL SECOND FRAMING PLAN - NORTH

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

(SHEET S1.3A)

N

SMNGA
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CHICAGO, ILLINOIS 60642
312.829.3355

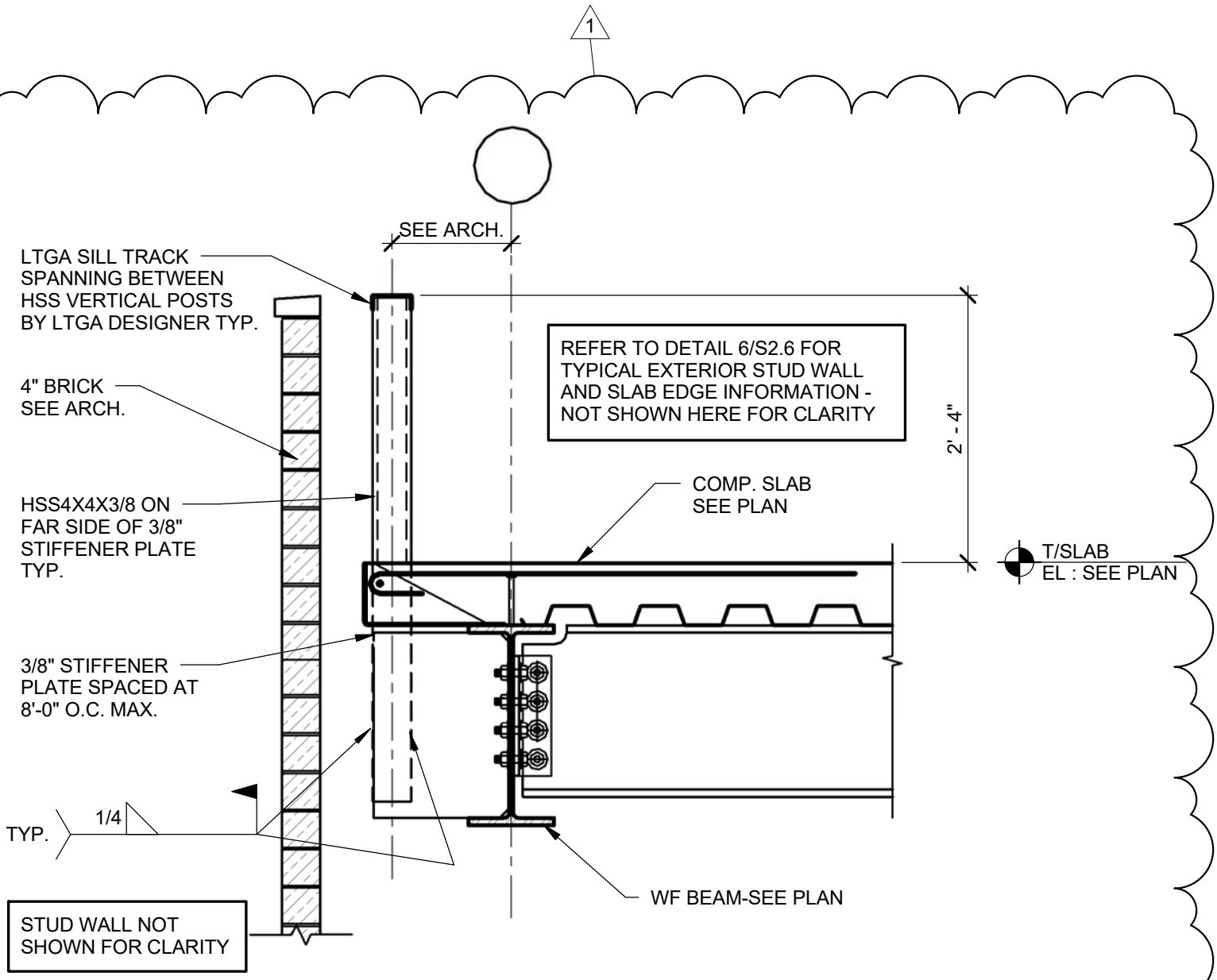
PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

PARTIAL SECOND FLOOR FRAMING PLAN - NORTH

SSK-03

Date of Issue: June 23, 2017



7 TYPICAL WALL BRACING DETAIL AT PERPENDICULAR FLOOR FRAMING

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

DTL. 7/S2.10

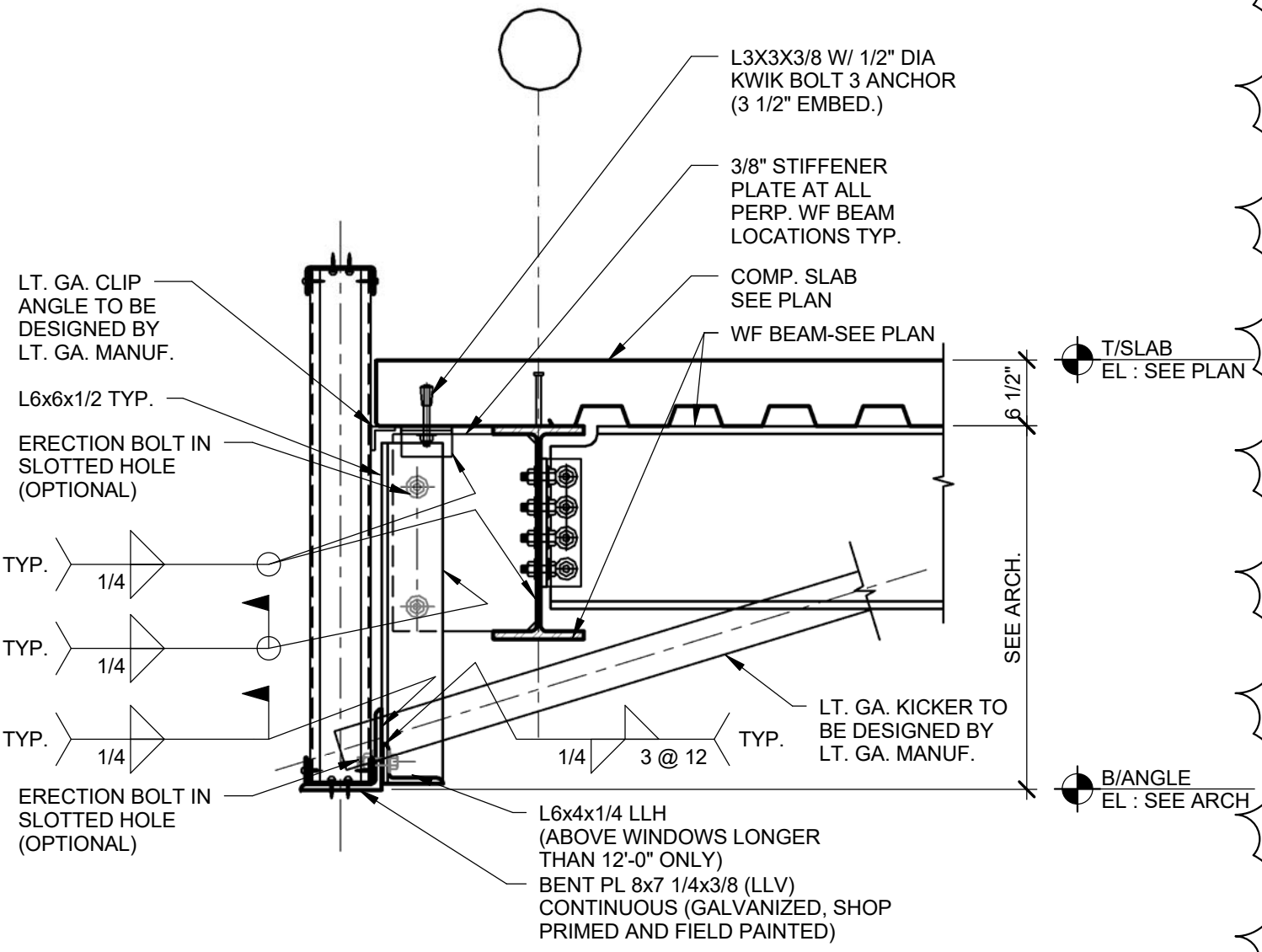
SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

STEEL FRAMING DETAILS (DTL.7/S2.10)

SSK-04



8 TYPICAL SHELF ANGLE DETAIL AT VESTIBULE

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

DTL. 8/S2.10

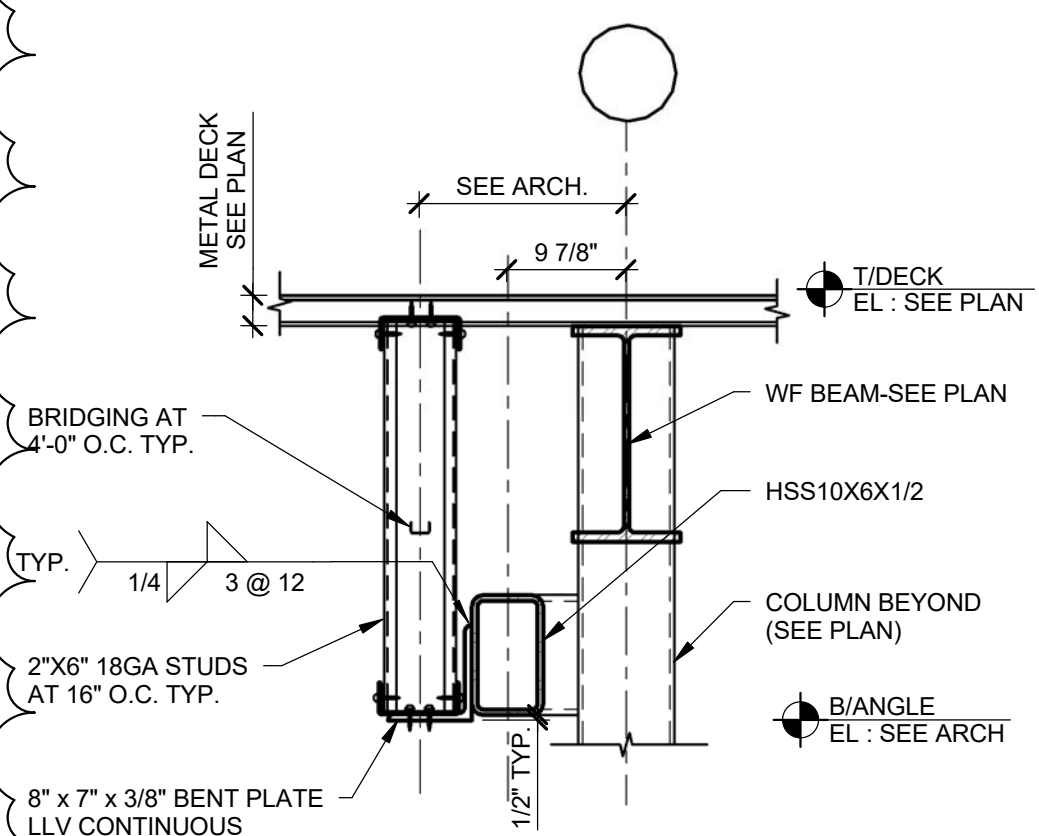
SMNGA
943 W. SUPERIOR STREET
CHICAGO, ILLINOIS 60642
312.829.3355

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

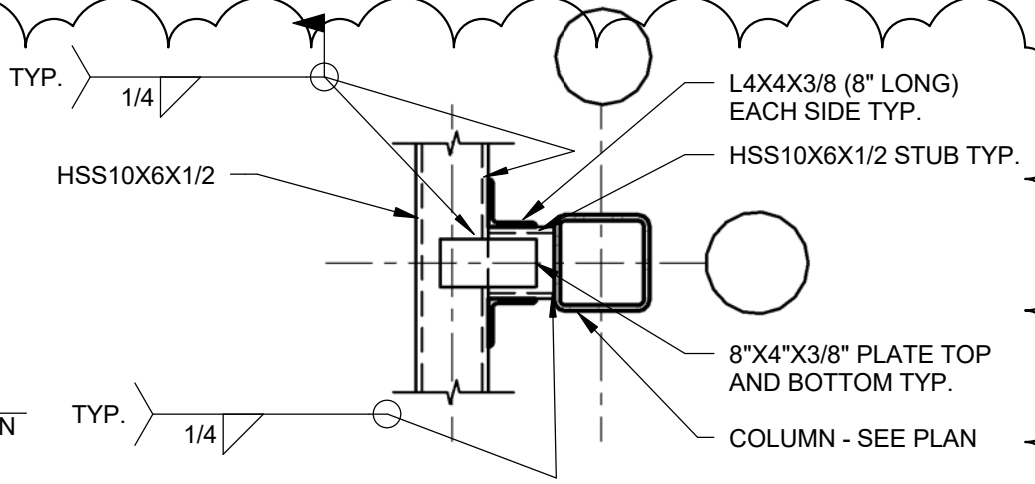
TITLE:

STEEL FRAMING DETAILS (DTL. 8/S2.10)

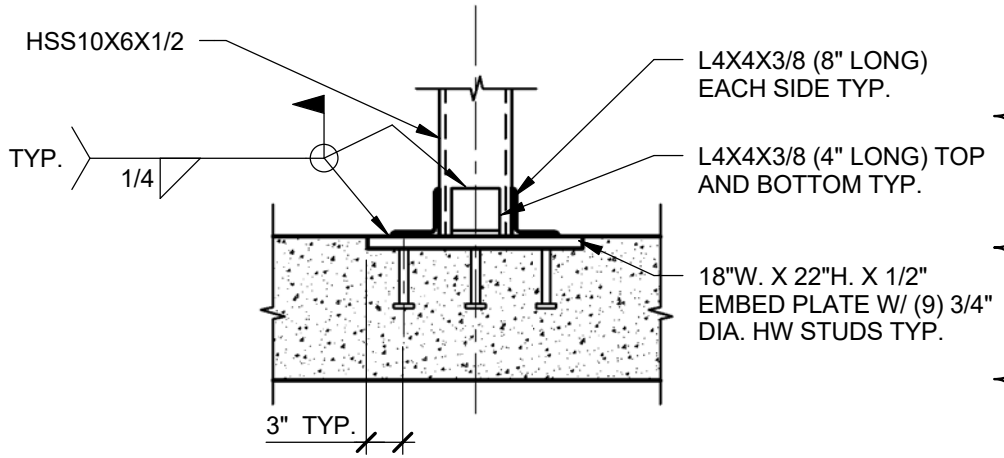
SSK-05



SECTION VIEW



PLAN VIEW - CONN. TO HSS COLUMN



PLAN VIEW - CONN. TO CONC. WALL

9 TYPICAL SHLF. ANGLE/LINTEL DTL. AT ATRIUM SPANDREL ON THIRD FLR.

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

DTL. 9/S2.10

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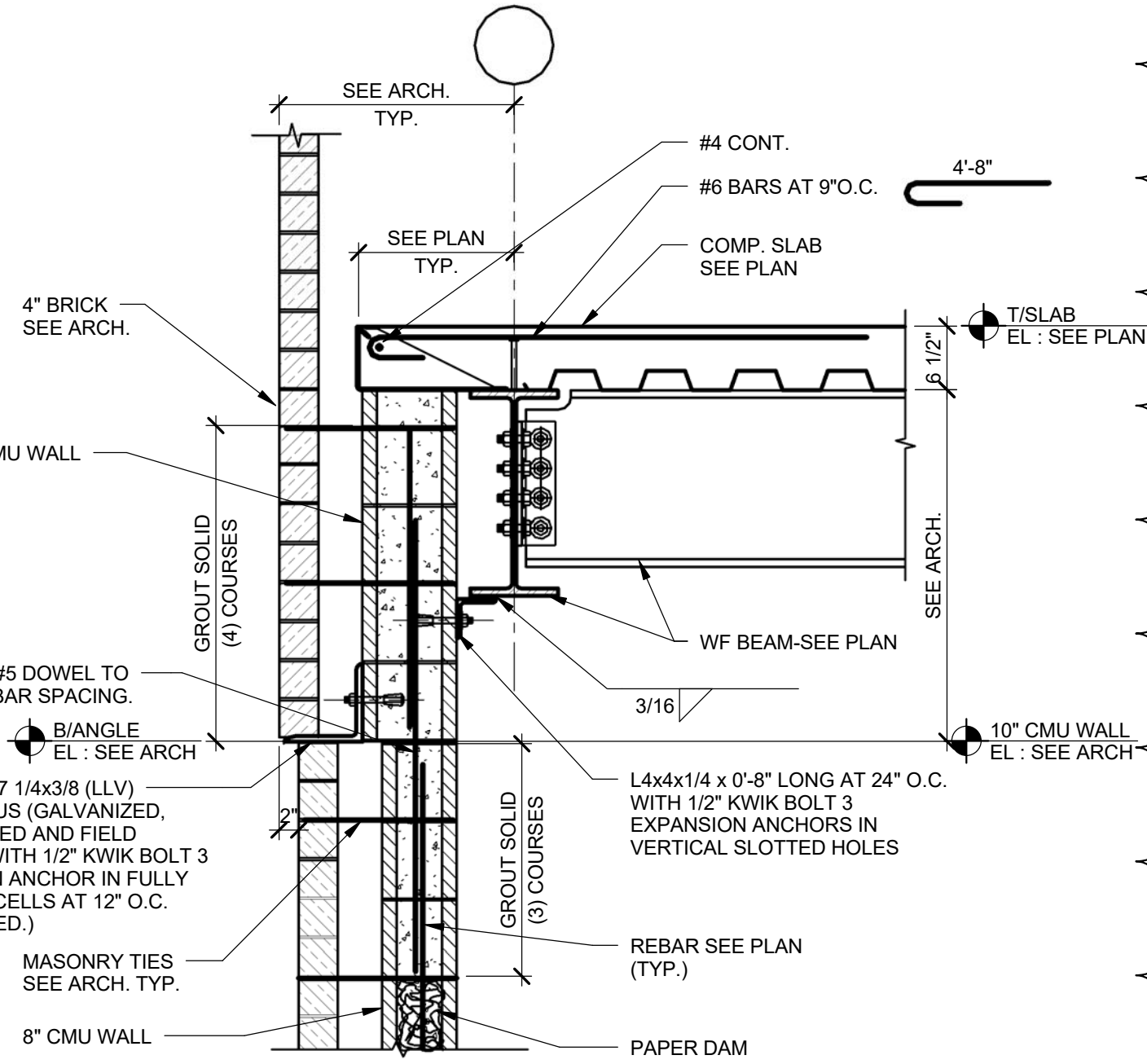
CHICAGO, ILLINOIS 60642
312.829.3355

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
STEEL FRAMING DETAILS (DTL. 9/S2.10)

SSK-06

1



10 TYPICAL EXTERIOR WALL WITH CMU BACKUP

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

DTL. 10/S2.10

1

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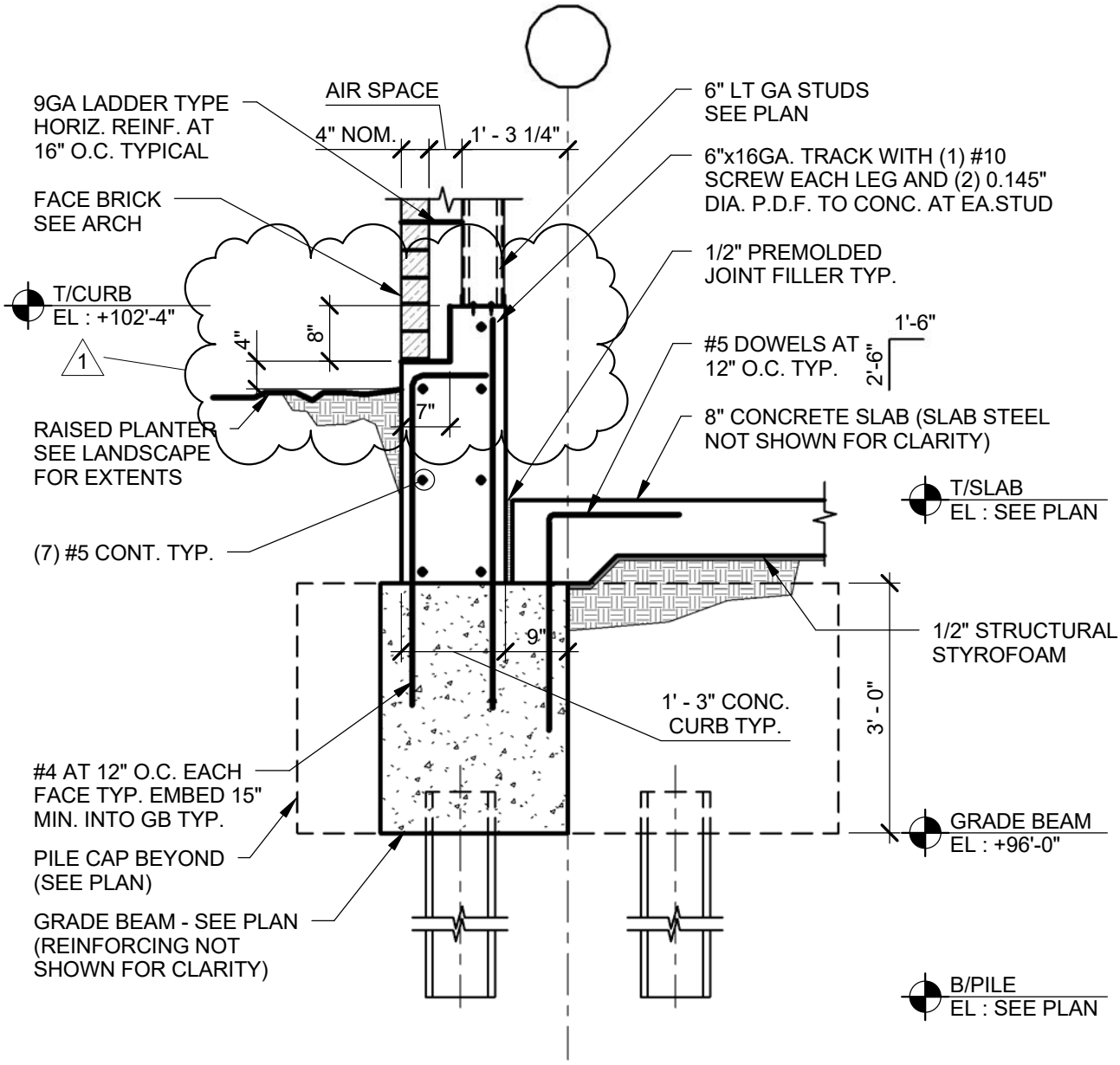
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.21.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

STEEL FRAMING DETAILS (DTL. 10/S2.10)

SSK-07



SEE ARCH DRAWINGS FOR LOCATIONS WHERE 8" STUDS ARE REQUIRED. PROVIDE 8"x16 GA. TRACK AT 8" STUDS.

6 TYPICAL FOUNDATION SECTION AT LT. GA. EXTERIOR WALL AT PLANTER

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

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DATE: 06.15.2017
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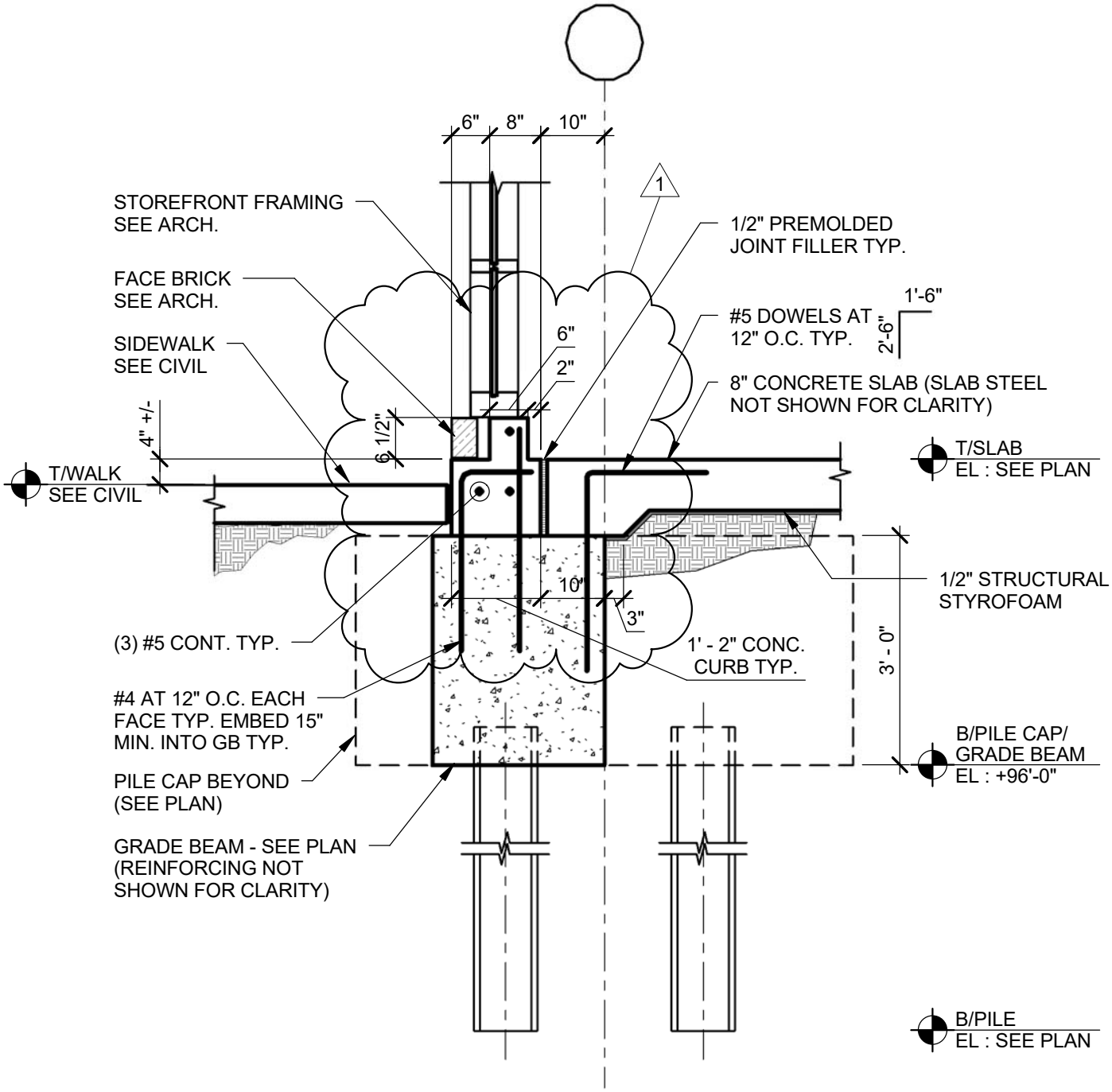
NOTES:

TITLE:
FOUNDATION DETAILS (DTL. (6/S2.2)

SSK-08



7 TYPICAL FOUNDATION SECTION AT WINDOW WALL SYSTEM AT LINE '2'

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

(DTL. (7/S2.2)

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CHICAGO, IL 60616
DATE: 06.15.2017
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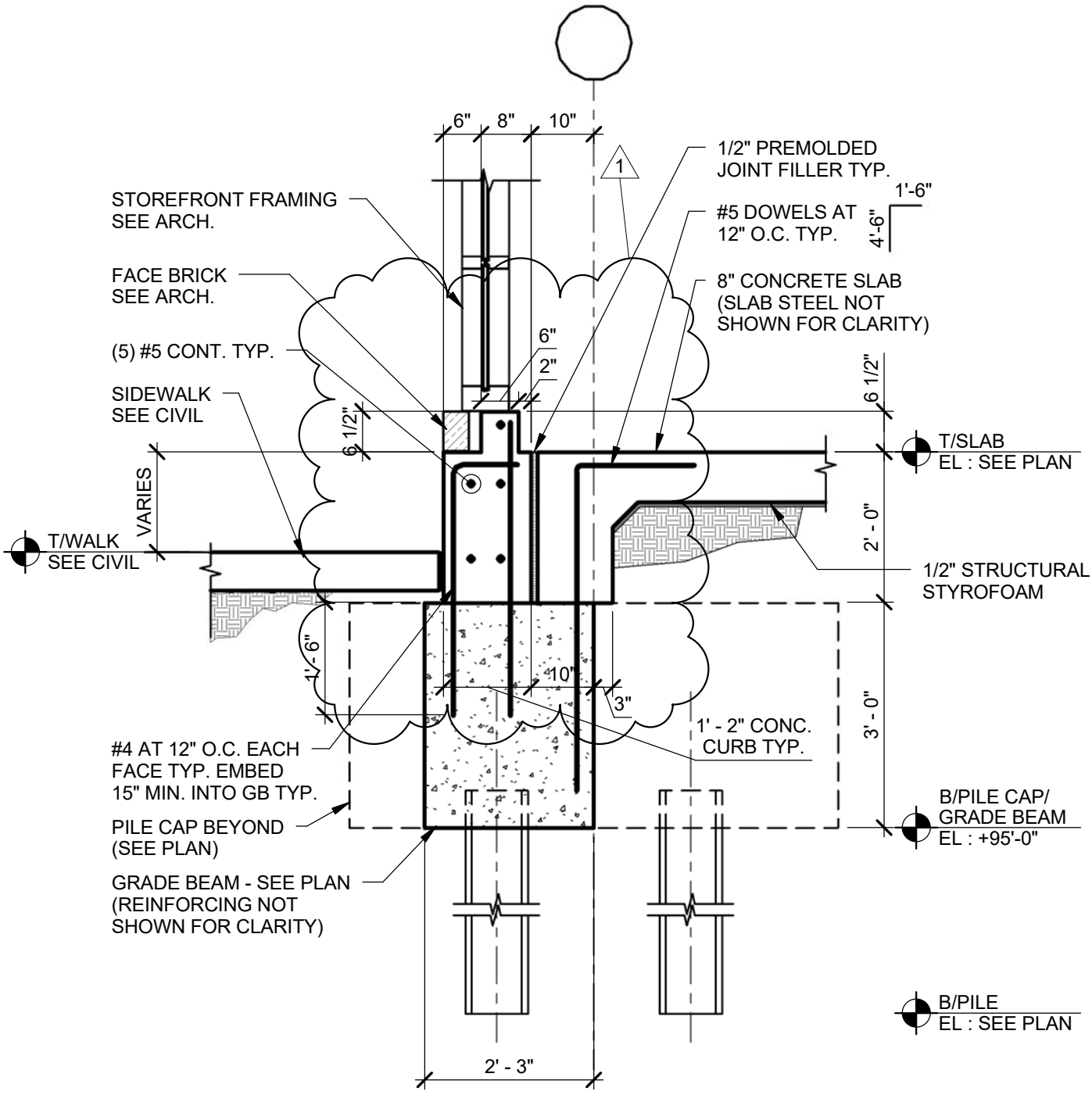
NOTES:

TITLE:

FOUNDATION DETAILS (DTL. (7/S2.2)

SSK-09



8 TYPICAL FOUNDATION SECTION AT WINDOW WALL SYSTEM NORTH OF LINE '2'

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

(DTL. (8/S2.2)

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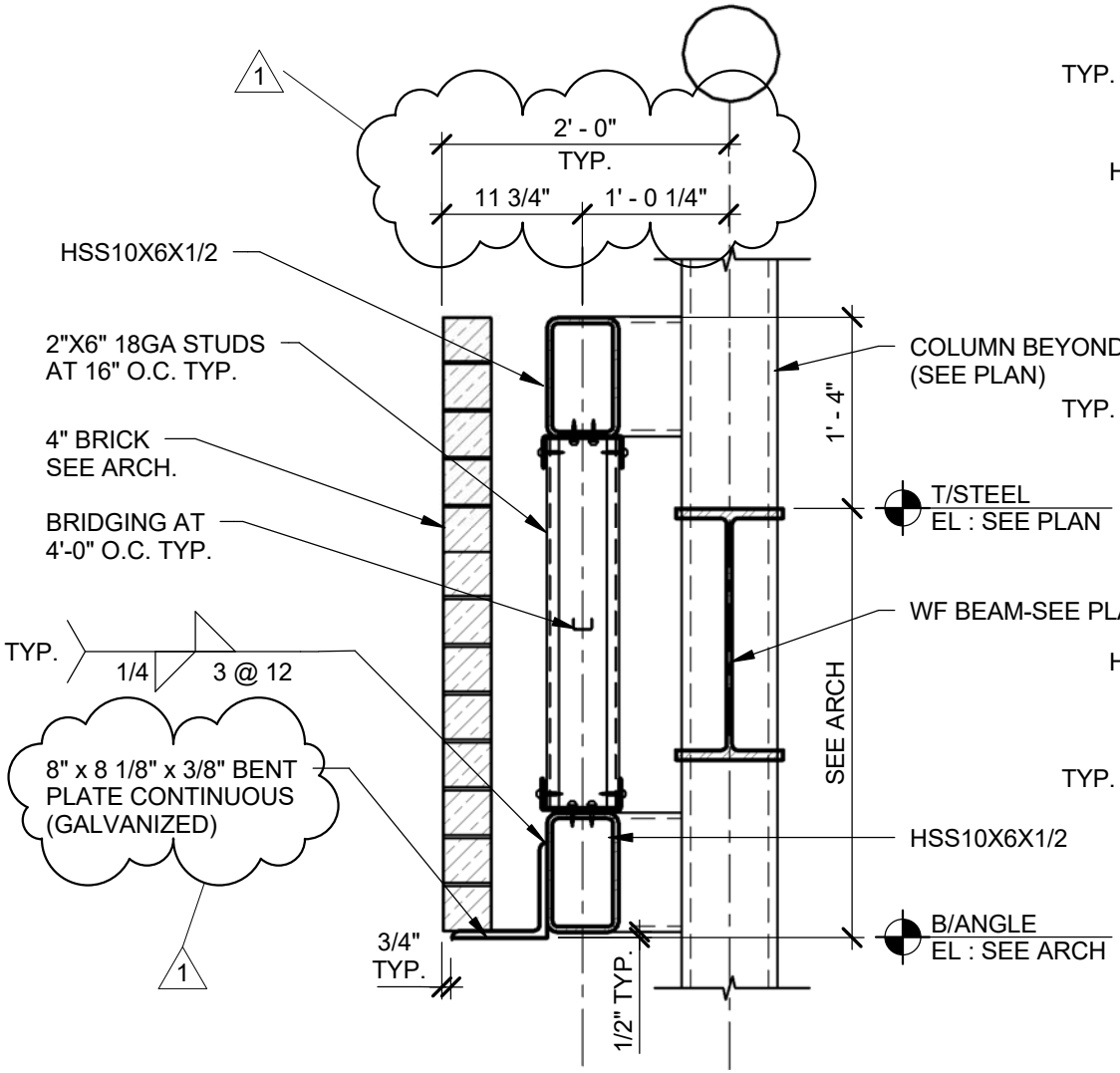
NOTES:

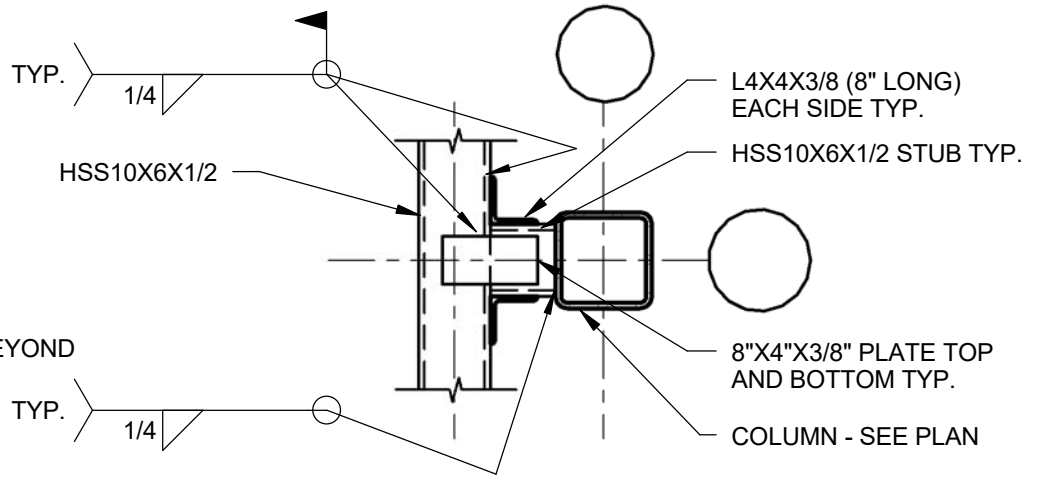
TITLE:

FOUNDATION DETAILS (DTL. (8/S2.2)

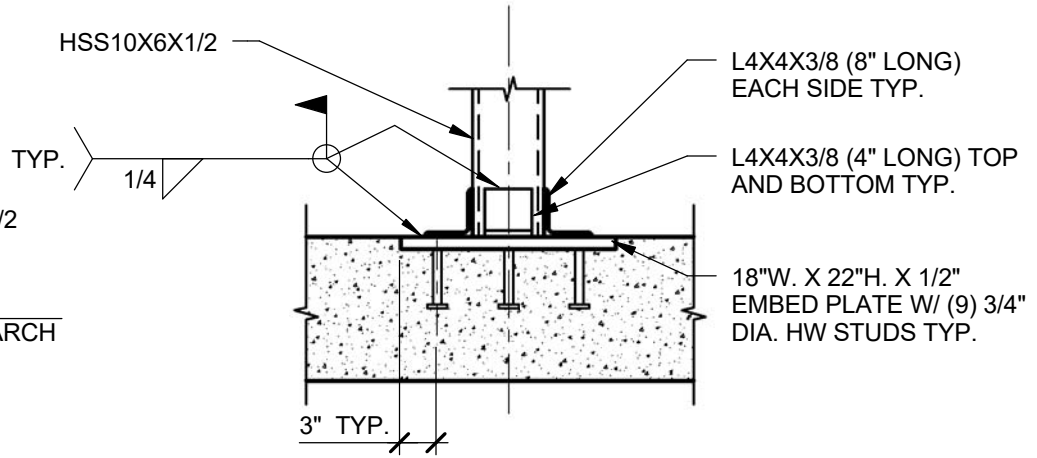
SSK-10



SECTION VIEW



PLAN VIEW - CONN. TO HSS COLUMN



PLAN VIEW - CONN. TO CONC. WALL

3 TYPICAL SHELF ANGLE/LINTEL DETAIL AT ATRIUM SPANDREL

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

DTL. 3/S2.10

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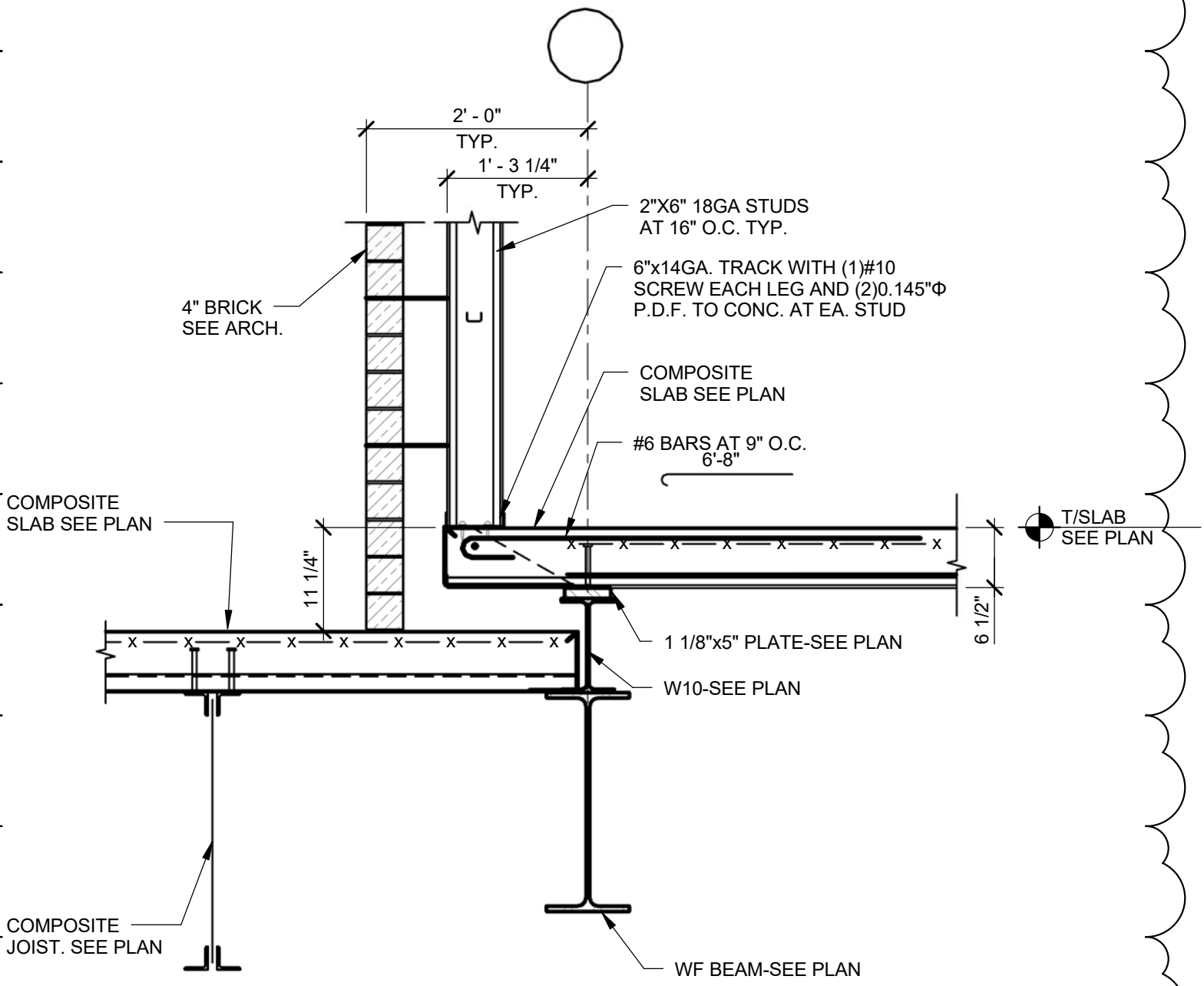
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
STEEL FRAMING DETAILS (DTL. 3/S2.10)

SSK-11



11 SECTION ALONG GRID '6' BETWEEN 'F' AND 'G' (FOURTH FLOOR)

NOT TO SCALE

DTL. 11/S2.10

1

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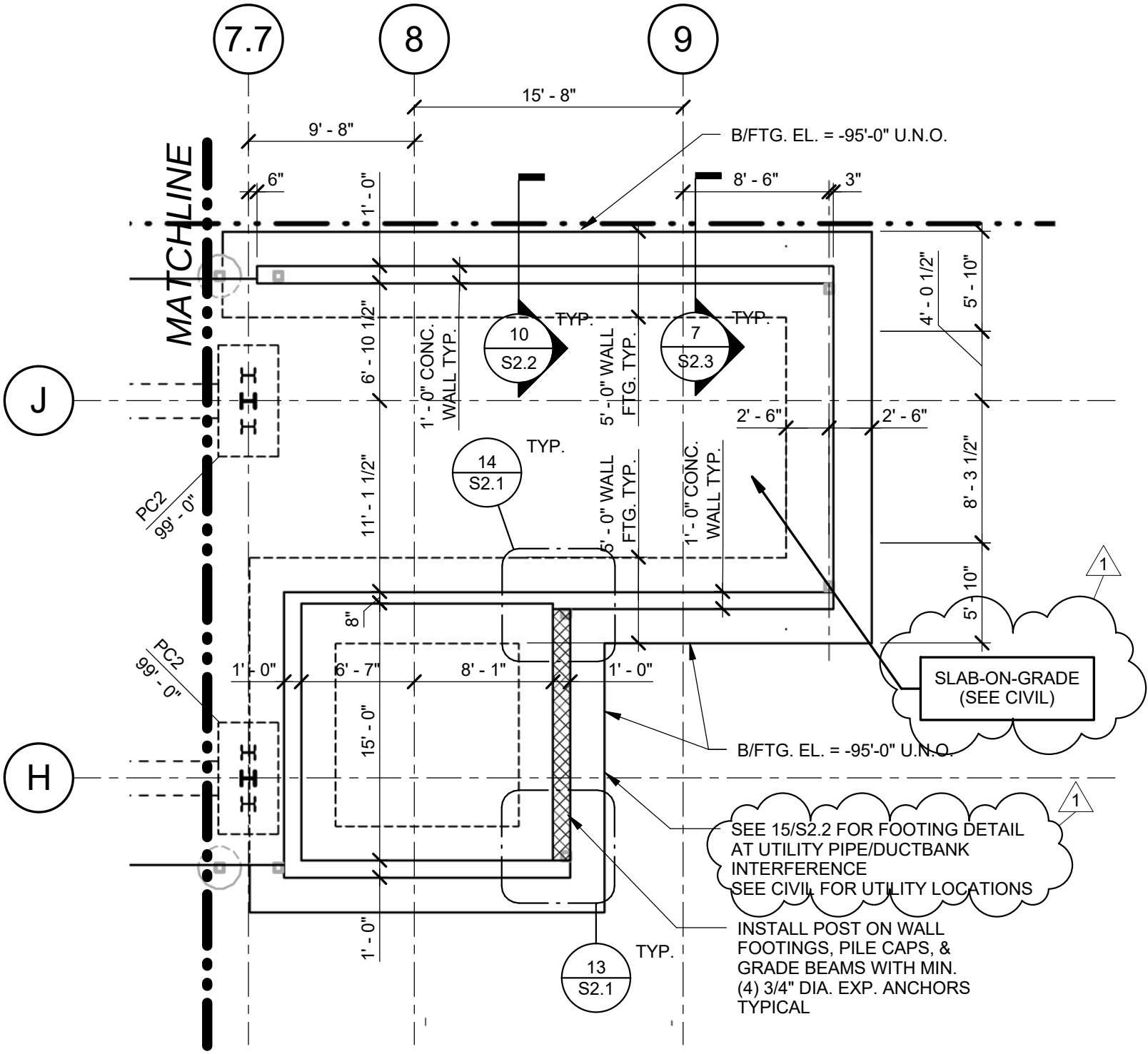
TITLE:

STEEL FRAMING DETAILS (DTL. 11/S2.10)

SSK-12



A PARTIAL FIRST FLOOR/FOUNDATION PLAN - SOUTH

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

0' 16'

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DATE: 06.21.2017
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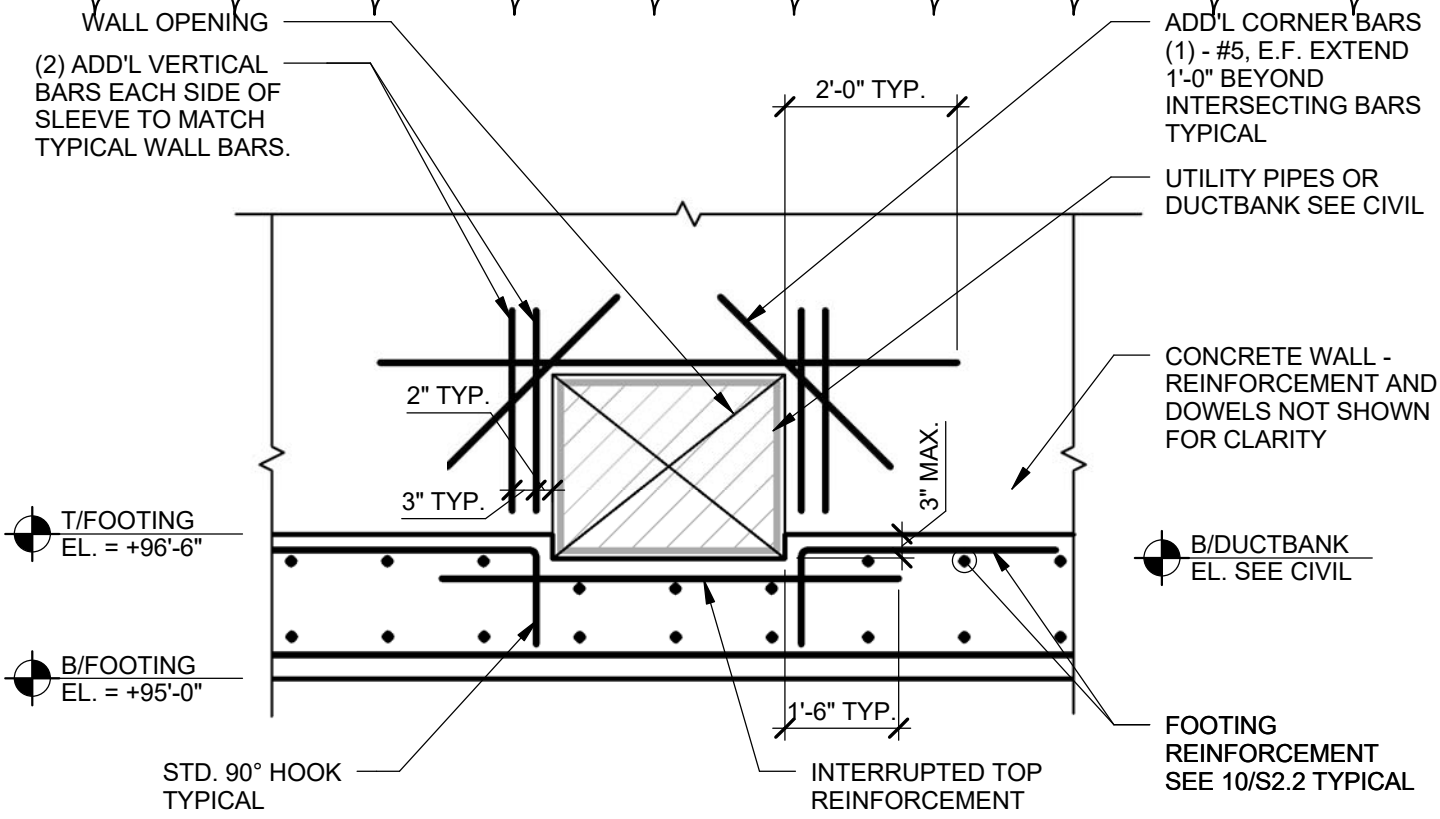
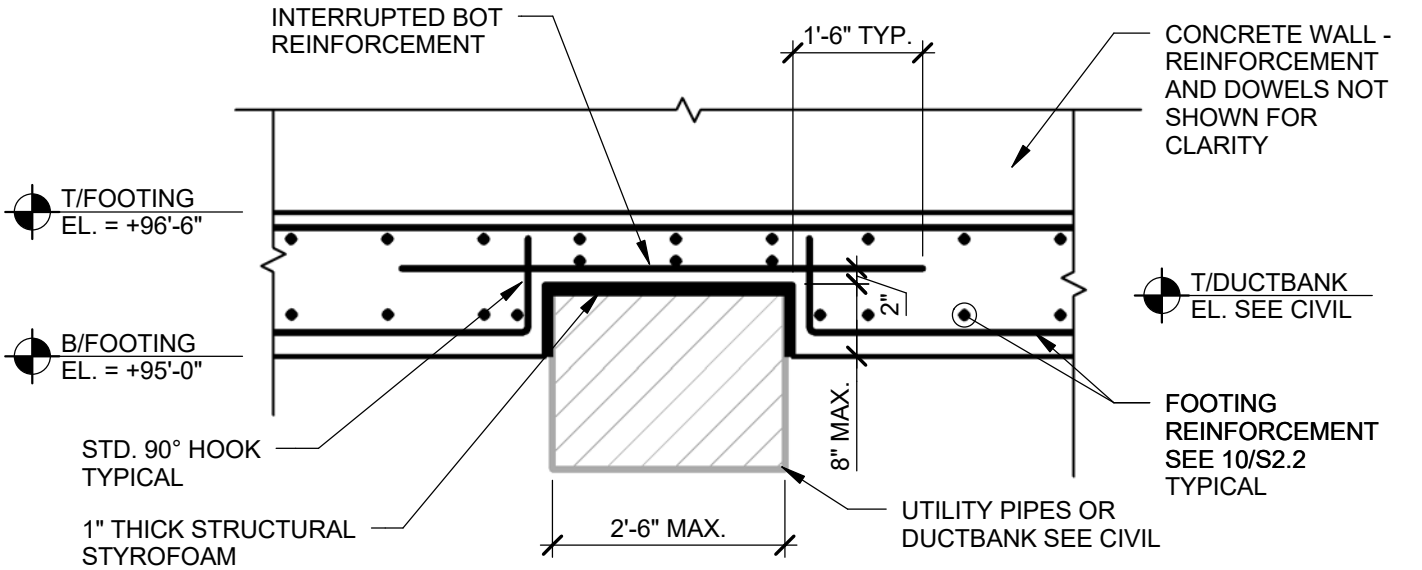
TITLE:
PARTIAL FIRST FLOOR/FOUNDATION PLAN - SOUTH

SSK-13

Date of Issue: June 23, 2017



15B-UTILITY ABOVE FOOTING



1

15A-UTILITY BELOW FOOTING

15 TYPICAL FOOTING DETAIL AT UTILITY INTERFERENCE

NOT TO SCALE (DTL. 15/S2.2)

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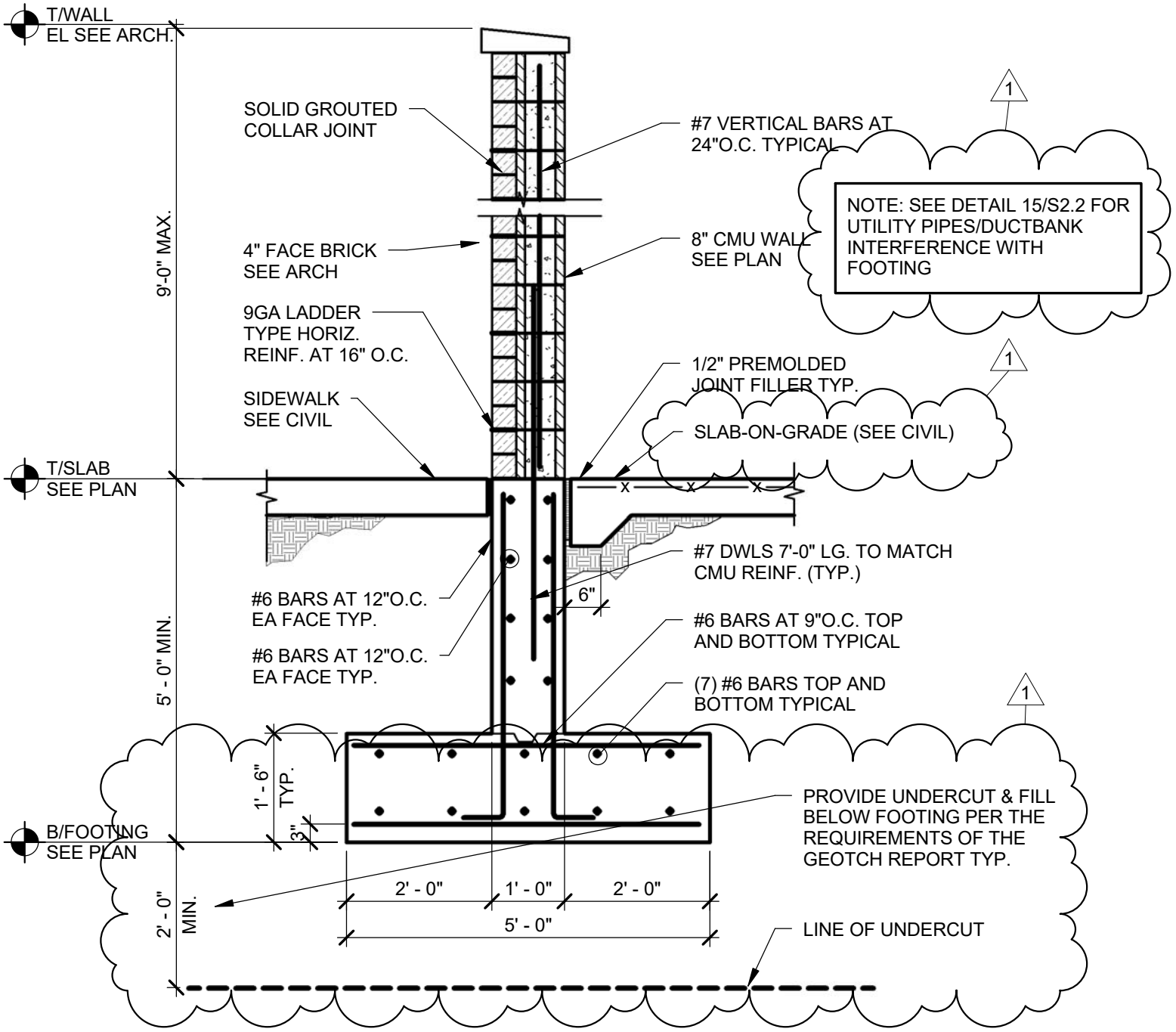
CHICAGO, IL 60616
DATE: 06.21.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
FOUNDATION DETAILS (DTL. 15/S2.2)

SSK-14



1 TYPICAL SECTION THRU WASTE/TRANSFORMER ENCLOSURE SCREEN WALL

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

DETAIL 10/S2.2

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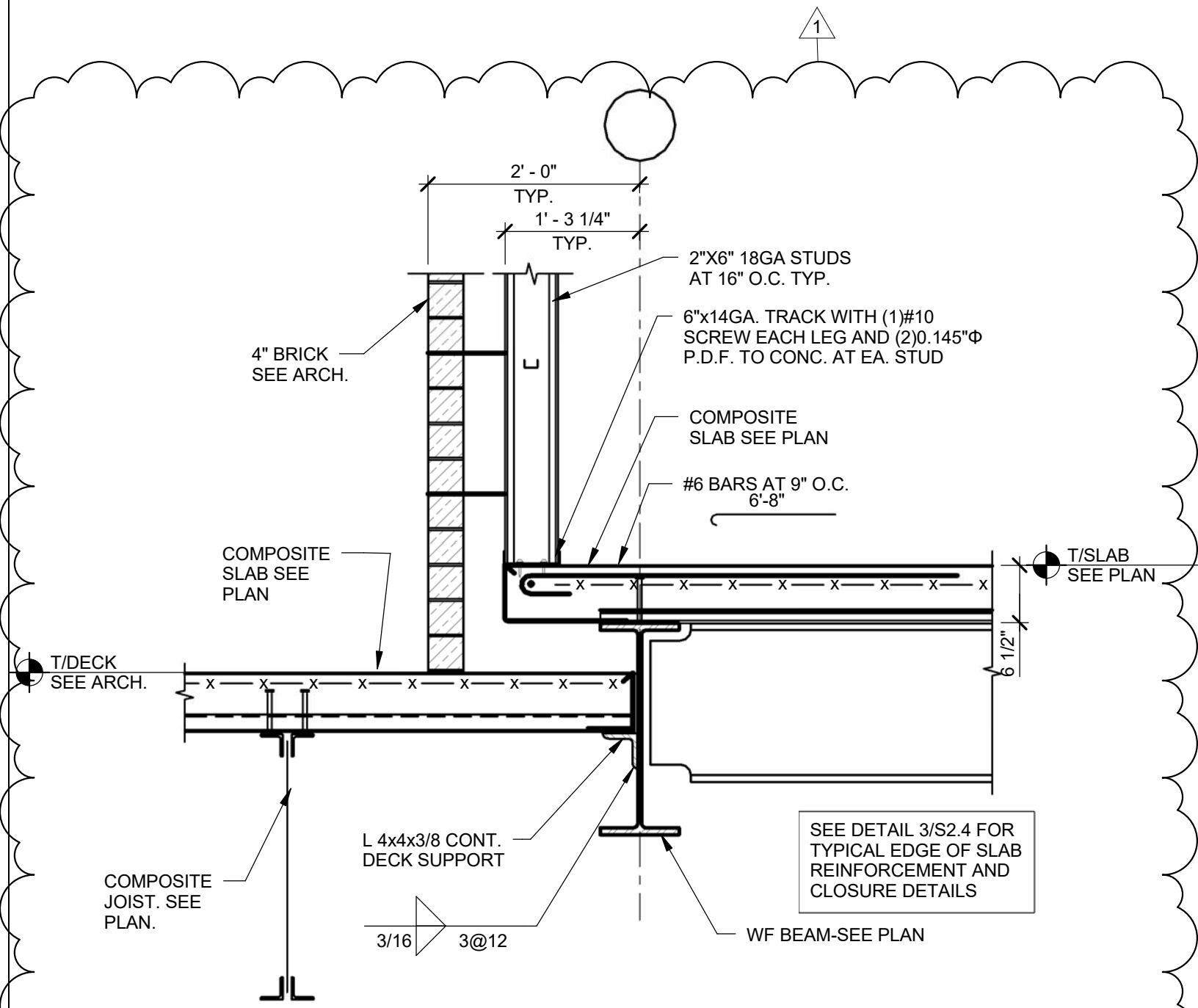
CHICAGO, IL 60616
DATE: 06.21.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

TYP. SCREEN WALL SECTION (DTL. 10/S2.2)

SSK-15



12 TYPICAL LOW ROOF SECTION AT PARALLEL COMPOSITE JOIST FRAMING

NOT TO SCALE

(DTL. 12/S2.10)

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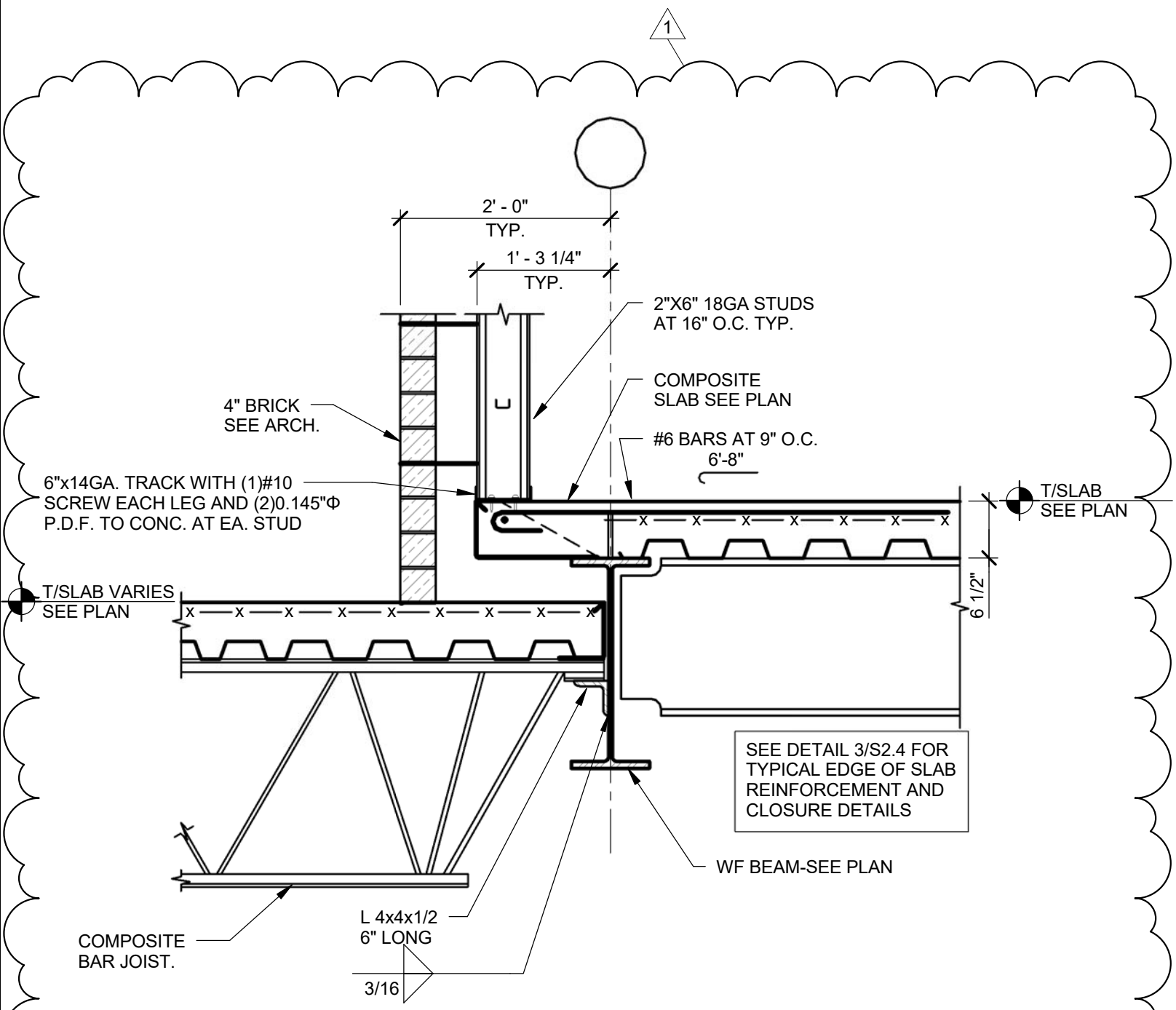
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.21.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

STEEL FRAMING DETAILS (DTL. 12/S2.10)

SSK-16



13 TYPICAL LOW ROOF SECTION AT PERPENDICULAR COMPOSITE JOIST FRAMING

NOT TO SCALE

(DTL. 13/S2.10)

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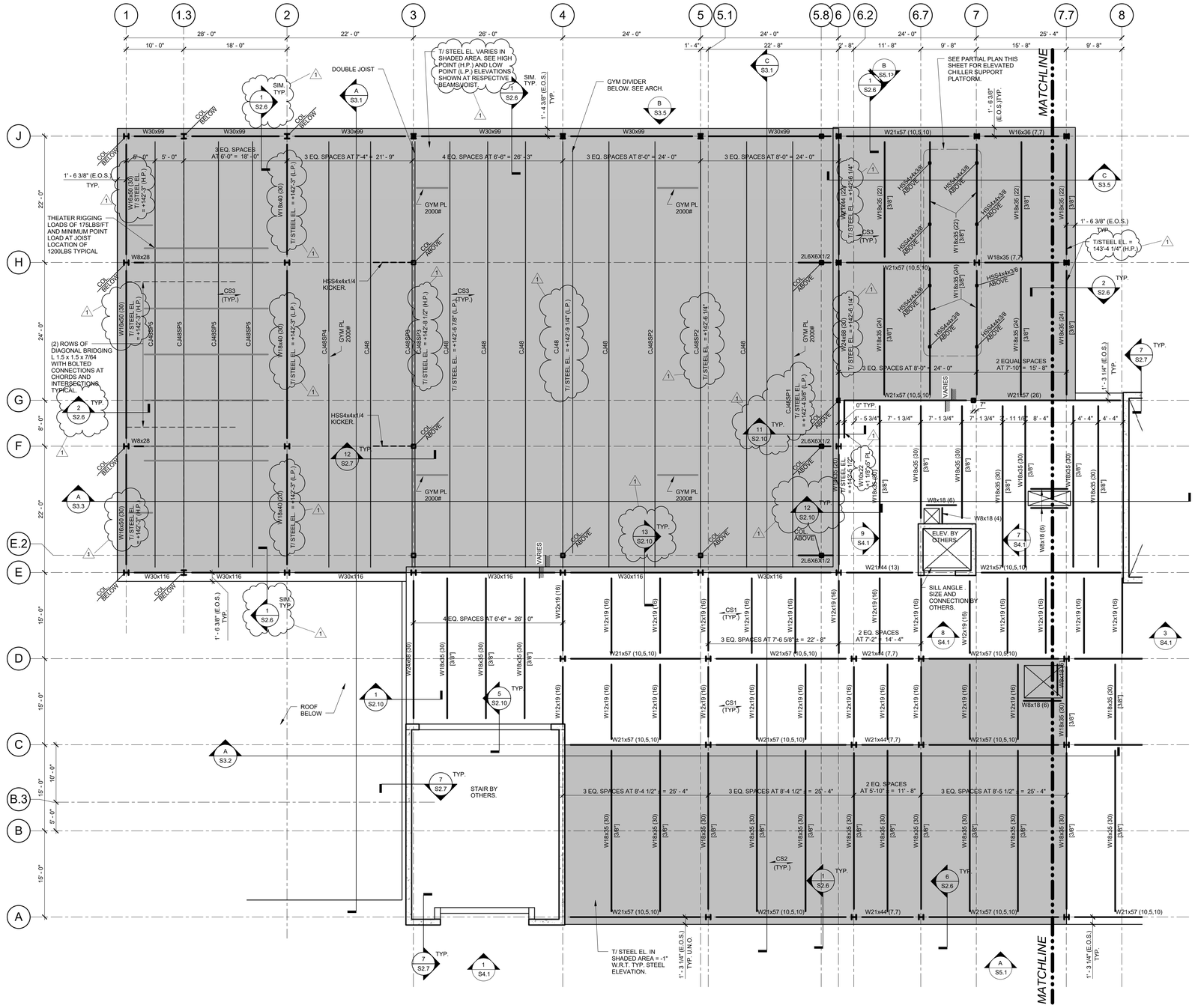
CHICAGO, IL 60616
DATE: 06.21.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:

STEEL FRAMING DETAILS (DTL. 13/S2.10)

SSK-17



A PARTIAL FOURTH FLOOR FRAMING PLAN - NORTH

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

T/SLAB ELEV. = 144'-0" U.N.O.
T/ STEEL ELEV. = 143' - 5 1/2" U.N.O.

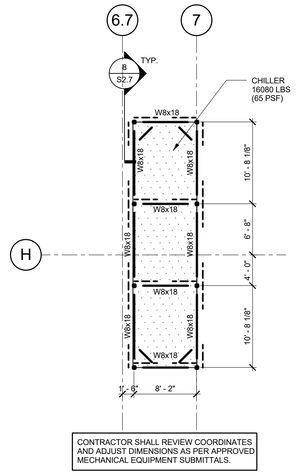
COMPOSITE JOIST DESIGNATION
CJ48 = 48 CJ 2550/1300/530
CAMBER = 2.75"
(82) 3/4" Ø H.W. STUDS

CS1	2" COMPOSITE METAL DECK 20GA + 4 1/2" N. WT. CONC. (F'c = 4000 PSI) SLAB W/ 6x6-W2.1xW2.1 W.W.F. (TYP.)
CS2	2" COMPOSITE METAL DECK 18GA. + 5 1/2" N. WT. CONC. (F'c = 4000 PSI) SLAB W/ 6x6-W2.1xW2.1 W.W.F. (TYP.)
CS3	2" COMPOSITE ACOUSTIC (NRC 0.70) METAL DECK 20GA + 4 1/2" N. WT. CONC. (F'c = 4000 PSI) SLAB W/ 6x6-W2.1xW2.1 W.W.F. (TYP.)
M1	1 1/2" WIDE RIB METAL DECK TYPE 'B' 20GA
M2	2 1/2" EPIC METALS "TORIS-A" (NRC 0.95) MIN. 20GA OR EQUAL.
M3	2 1/2" EPIC METALS "TORIS" (NRC 0.95) MIN. 20GA OR EQUAL.

3 SPAN CONT. (MIN.) TYPICAL FOR EACH DECK

A NOTE REGARDING CONNECTION OF SLAB TO CONC. WALLS: SEE DETAIL 9/S2.4 FOR COMPOSITE SLAB TO CONCRETE WALL CONNECTION. USE ANGLES INDICATED ON THE DETAIL. ANGLES ARE NOT SHOWN ON PLANS FOR CLARITY.

COORDINATE ALL SLAB OPENINGS WITH ARCHITECTURAL AND MEP DRAWINGS. SEE DETAIL 8/S2.4 FOR TYPICAL SLAB OPENING DETAIL.

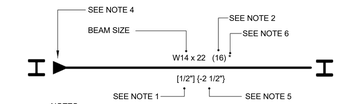


CONTRACTOR SHALL REVIEW COORDINATES AND ADJUST DIMENSIONS AS PER APPROVED MECHANICAL EQUIPMENT SUBMITTALS.

B PARTIAL CHILLER PLATFORM FRAMING PLAN

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

T/ STEEL ELEV. = 146' - 5 1/2" U.N.O.



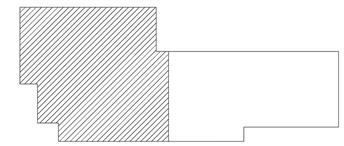
NOTES:
1. [ ] DESIGNATES AMOUNT OF MIDSPAN CAMBER.
2. ( ) DESIGNATES NUMBER OF 3/4" DIA. HEADED WELDED STUDS 5" LONG. (WELDED THRU DECK)
3. ALL STEEL ASTM A992 GRADE 50 (TYP. U.N.O)
4. ◀ INDICATES MOMENT CONNECTIONS.
5. { } DESIGNATES TOP OF BEAM W.R.TO TYP. FLOOR STEEL.
6. * DESIGNATES TAPERED BEAM. SEE PROFILE THIS SHEET.

BEAM LEGEND

GYM PL 2000#

1. GYM PL - DESIGNATES LOCATION OF POINT LOAD ON FLOOR FRAMING FROM SUSPENDED GYM EQUIPMENT.

GYM EQUIPMENT LOADS LEGEND



KEY PLAN

SOUTH LOOP ELEMENTARY SCHOOL

1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ARCHITECT OF RECORD:
SMNG A LTD.

ADDRESS: 936 W. HURON STREET
CHICAGO, ILLINOIS 60642
PHONE: 312.829.3355
FAX: 312.829.8187
WEB: www.smng-arch.com

ASSOCIATE ARCHITECT:
URBAN WORKS

STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

FOODSERVICE CONSULTANT:
EDGE ASSOCIATES

ACOUSTICAL CONSULTANT:
SHINER + ASSOCIATES

THEATER CONSULTANT:
BILL CONNER ASSOCIATES LLC

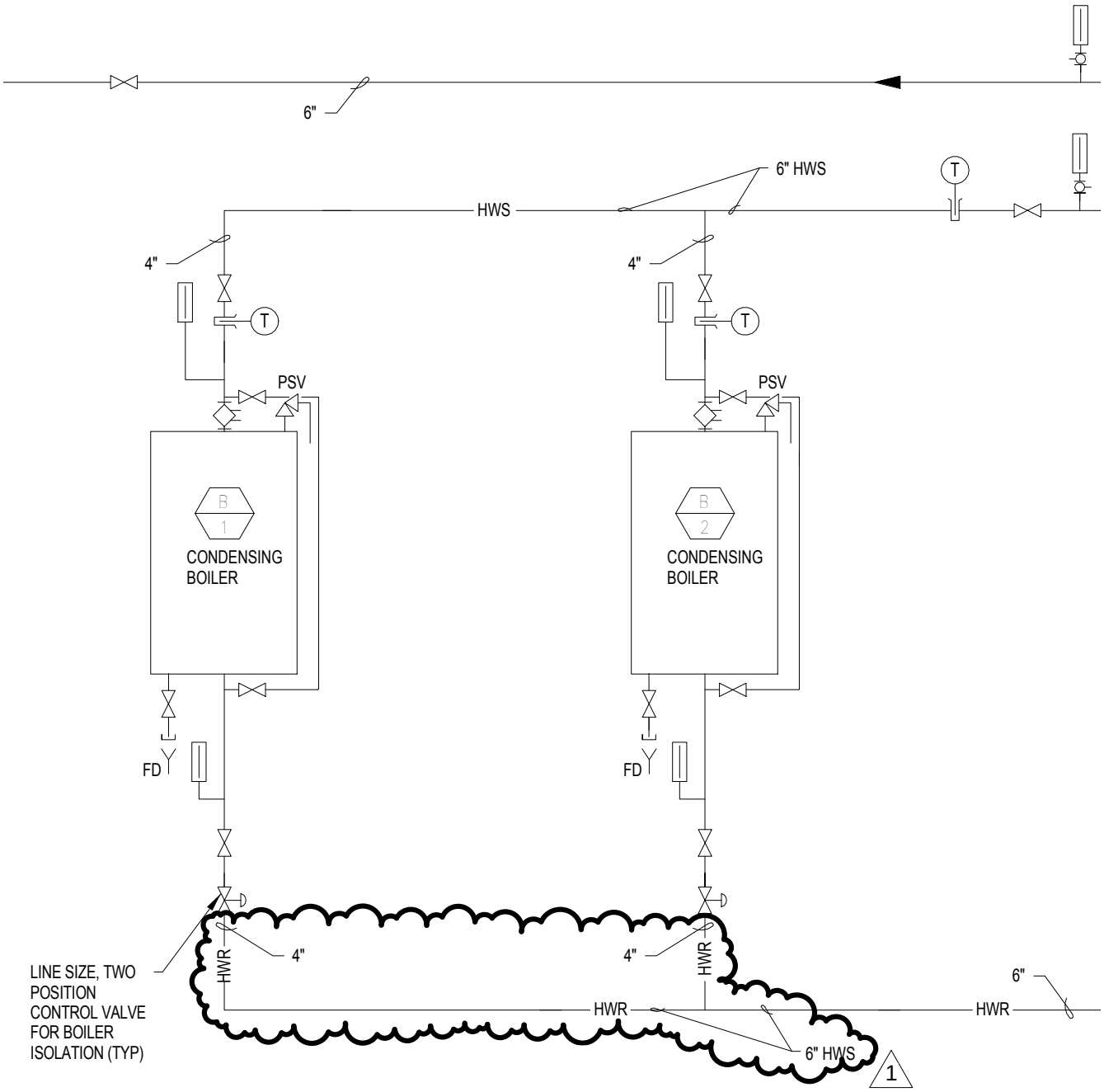
ISSUANCE

MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.15.17

PROJECT NAME: SOUTH LOOP ELEMENTARY SCHOOL
PBC CONTRACT NO: 05035
SMNG-A PROJECT NO: 1620

TITLE
PARTIAL FOURTH FLOOR FRAMING PLAN - NORTH

SHEET
S1.5A



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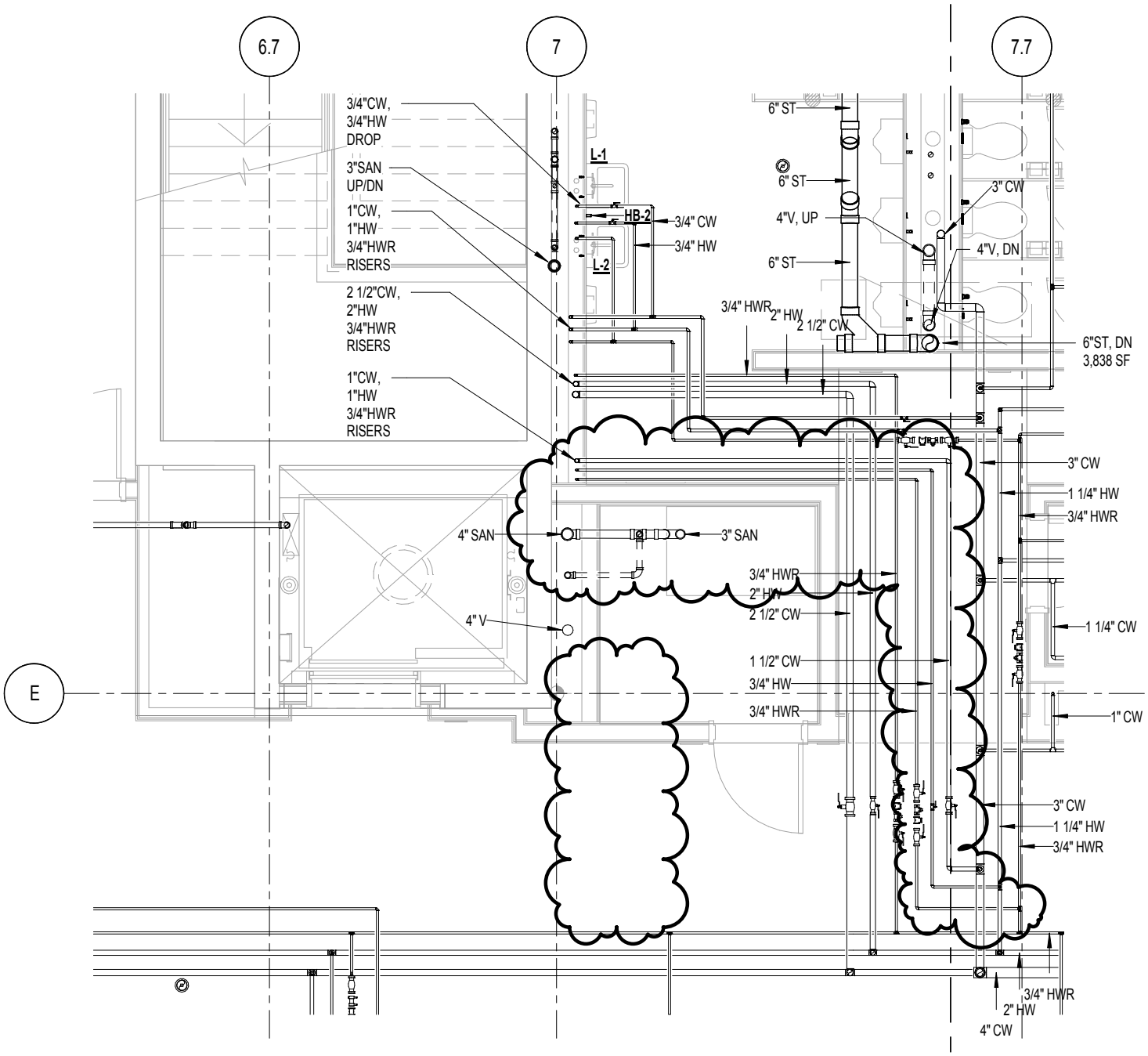
Chicago Public Schools
PUBLIC BUILDING COMMISSION

PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
M4.1 MECHANICAL
SYSTEMS
DIAGRAMS - PIPING

MSK-1



1 FIRST FLOOR -PSK-1

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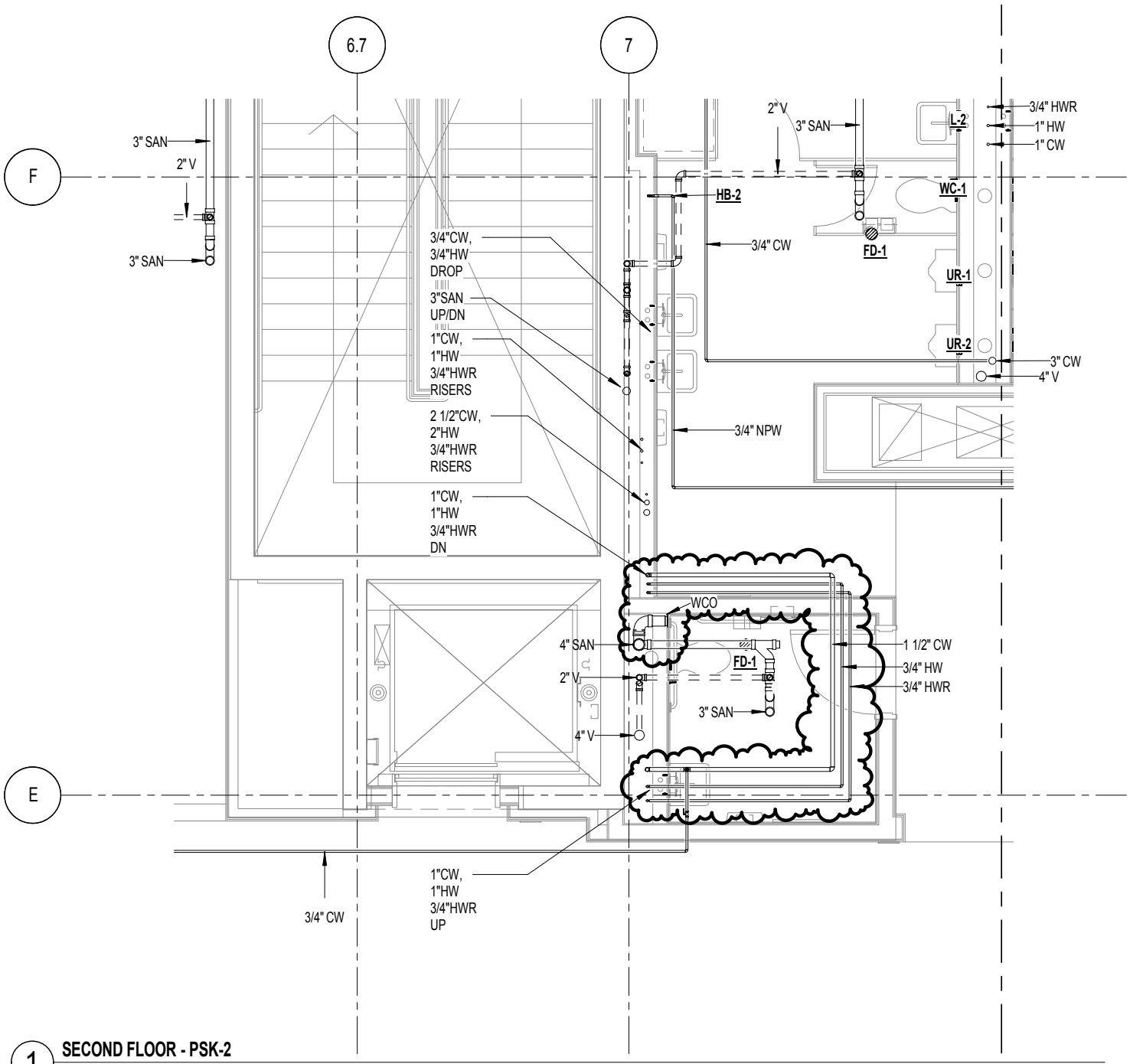
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
P2.1A PARTIAL FIRST FLOOR -PLUMBING PLAN - NORTH

PSK-1



1 **SECOND FLOOR - PSK-2**
1/4" = 1'-0"

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1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
P2.2A PARTIAL SECOND FLOOR -PLUMBING PLAN - NORTH

PSK-2

LIGHT FIXTURE MOTOR, LISTED-EQUIPMENT, SWITCHES-OPERATORS

3 $ A
LCC K

"A-Z"	SWITCH LEG CONTROL LETTER CODE(S)
"D"	DIMMER 1,000W CONTROL SWITCH
"2"	DOUBLE-POLE TOGGLE SWITCH
"3"	THREE POLE TOGGLE SWITCH
"3W"	THREE WAY SWITCH
"4W"	FOUR WAY SWITCH
"K"	KEY OPERATED SWITCH
"TS"	THERMAL SWITCH
"WS"	WALL SWITCH

TOGGLE SWITCH WITH PILOT LIGHT

LTG SWITCHES SHOWN ON LTG PLAN VIEWS, EQP SWITCHES SHOWN ON PWR PLAN VIEWS

$ SINGLE POLE TWO-POSITION 20A TOGGLE SWITCH U.N.O. ON THE DWGS WITH SUBSCRIPT CODE(S)

(OS) CEILING MOUNTED DUAL TECHNOLOGY 360° OCCUPANCY SENSOR, UNLESS NOTED OTHERWISE

(VS) CEILING MOUNTED DUAL TECHNOLOGY 360° VACANCY SENSOR, UNLESS NOTED OTHERWISE

(VS) WALL MOUNTED DUAL TECHNOLOGY 360° VACANCY SENSOR, UNLESS NOTED OTHERWISE

1

$D WALL SWITCH MOUNTED PASSIVE INFRARED 180° OCCUPANCY SENSOR

(FL) JUNCTION BOXES FOR FLUSH SENSORS. CONTRACTOR TO PROVIDE CIRCUIT SHOWN AND ALL ASSOCIATED CONDUIT AND WIRING FOR A COMPLETE AND OPERATING SYSTEM. TYPICAL FOR EVERY LAVATORY, URINAL AND TOILET FLUSH LOCATION. MULTIPLE LAVATORIES AT TOILETS REQUIRED A SINGLE CONNECTION. PROVIDE TRANSFORMERS ABOVE CEILING W/ ACCESS PANELS AND PROVIDE GFI CKT BREAKER AT CORRESPONDING BREAKER.

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DATE: 06.15.2017
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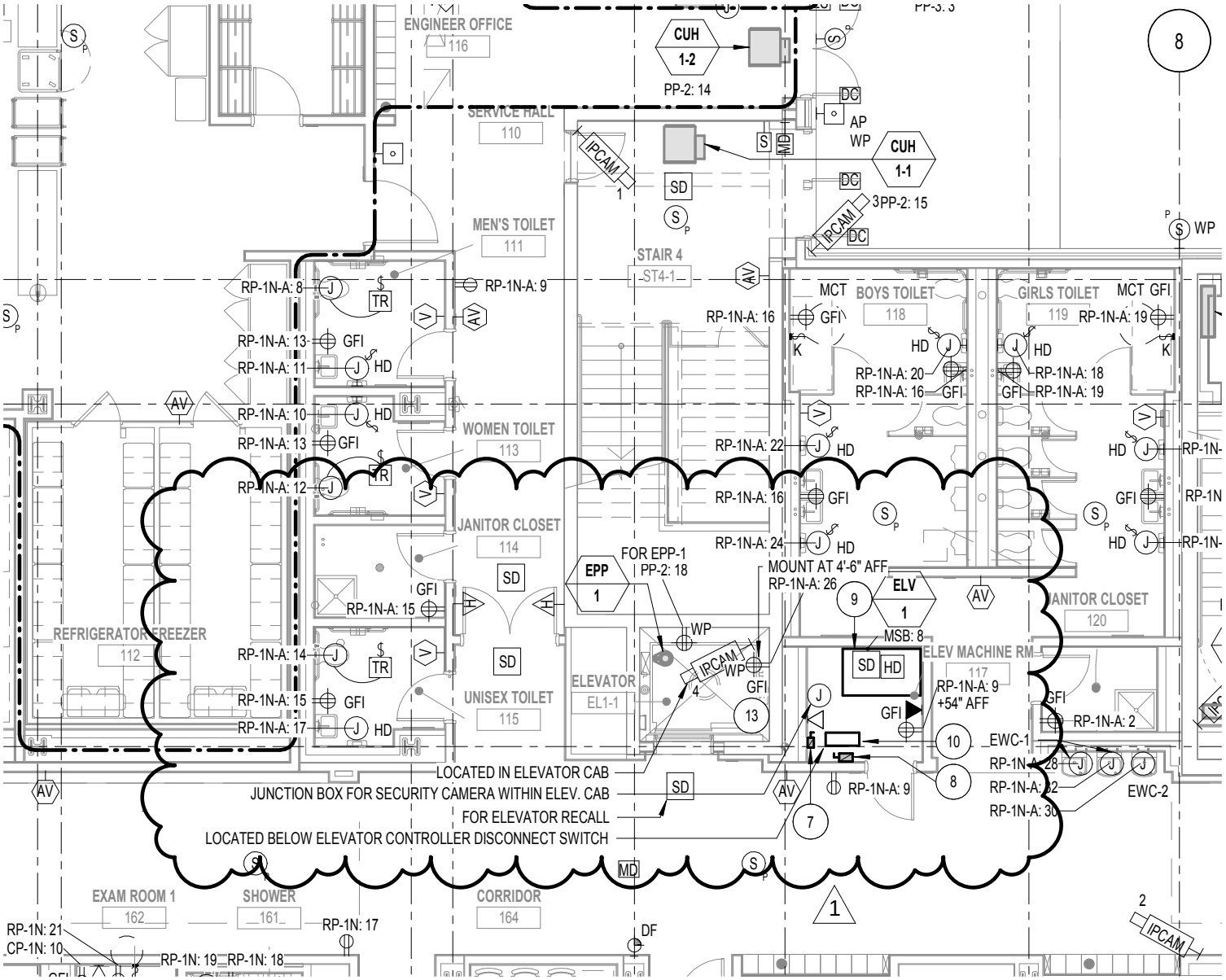
NOTES:

TITLE:
E0.0 - ELECTRICAL SYMBOLS, NOTES & ABBREVIATIONS

ESK-1



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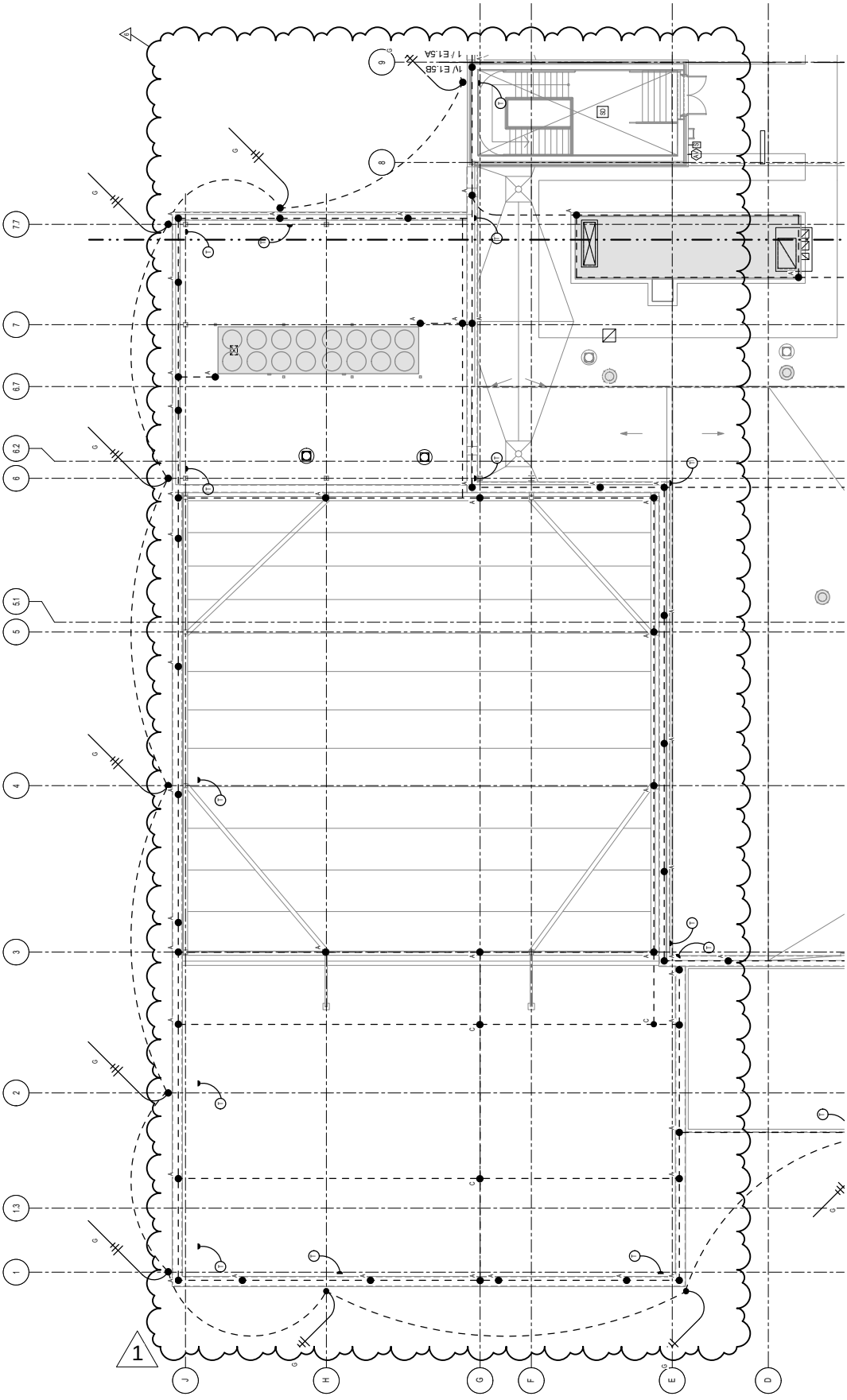
PROJECT: SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616
DATE: 06.15.2017
ISSUANCE: ADDENDUM 1
NOTES:

TITLE:
E1.1A - PARTIAL FIRST FLOOR PLAN - POWER NORTH

ESK-2



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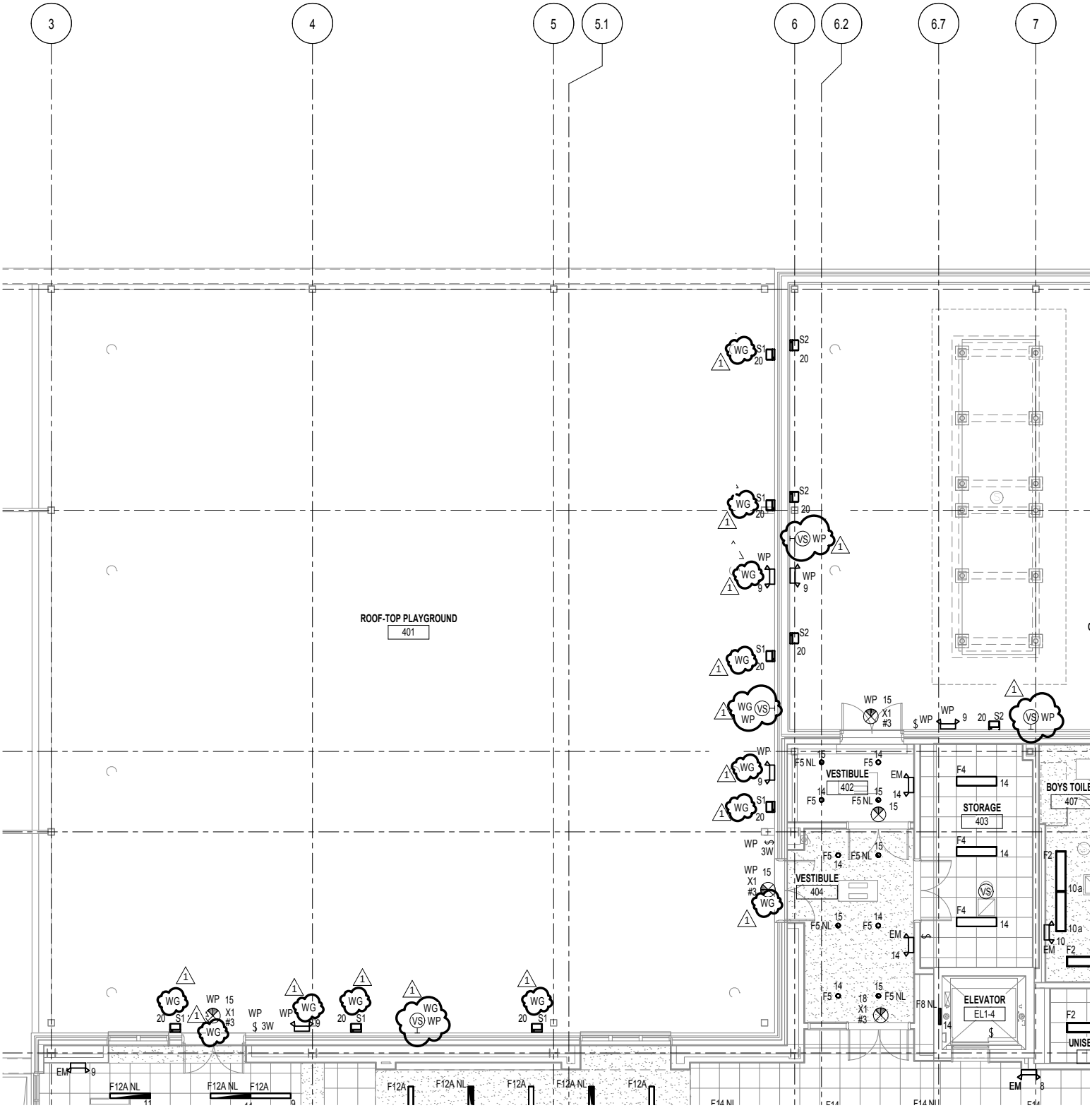
NOTES:

TITLE:
E1.6A - PARTIAL ROOF PLAN - LIGHTNING PROTECTION NORTH

ESK-3



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NOTES:

TITLE:
E2.4A - PARTIAL FOURTH FLOOR PLAN - LIGHTING NORTH

ESK-4

STEPS	1			2	3										4A	4B	5					6 & 7
	EQUIPMENT			EQUIPMENT UNIT NAME	EQUIPMENT POWER CHARACTERISTICS										FEED	FEED	OCPD: SW-CB FRAME:FR					FDR
ITEM	LOCATION - TAG - QUANTITY				& LOAD SPECIFICATIONS										PWR	FROM	FUSE-CB TRIP:TR					BRNCH
No.	NAME	TAG	No.	NAME - TAG - AREA - AREA #	V	Ø	N	G	PIN	W	HP	MCA	FLA	KW	SYS	PANEL	SW FR	FU TR	CB FR	CB TR	P	TAG
56	(DUPLEX PUMP SYST.) WATER RM.	BP	1	BOOSTER PUMP BP-1 (DUPLEX PUMP SYST.) WATER RM.	480	3	1	1	4	5	10	-	14.0	11.63	NML	PP-1	NA	NA	30	25	3	2B
57	ELEV. PIT	EPP	1	ELEVATOR PIT PUMP EPP-1 ELEV. PIT	120	1	1	1	2	3	1/2	-	9.8	1.18	NML	PP-2	NA	NA	30	20	1	2G
58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	FIRE PUMP RM.	FP	1	FIRE PUMP FP-1 FIRE PUMP RM.	480	3	1	1	4	5	60	-	77.0	63.94	NML	COMED	NA	NA	200	150	3	9B

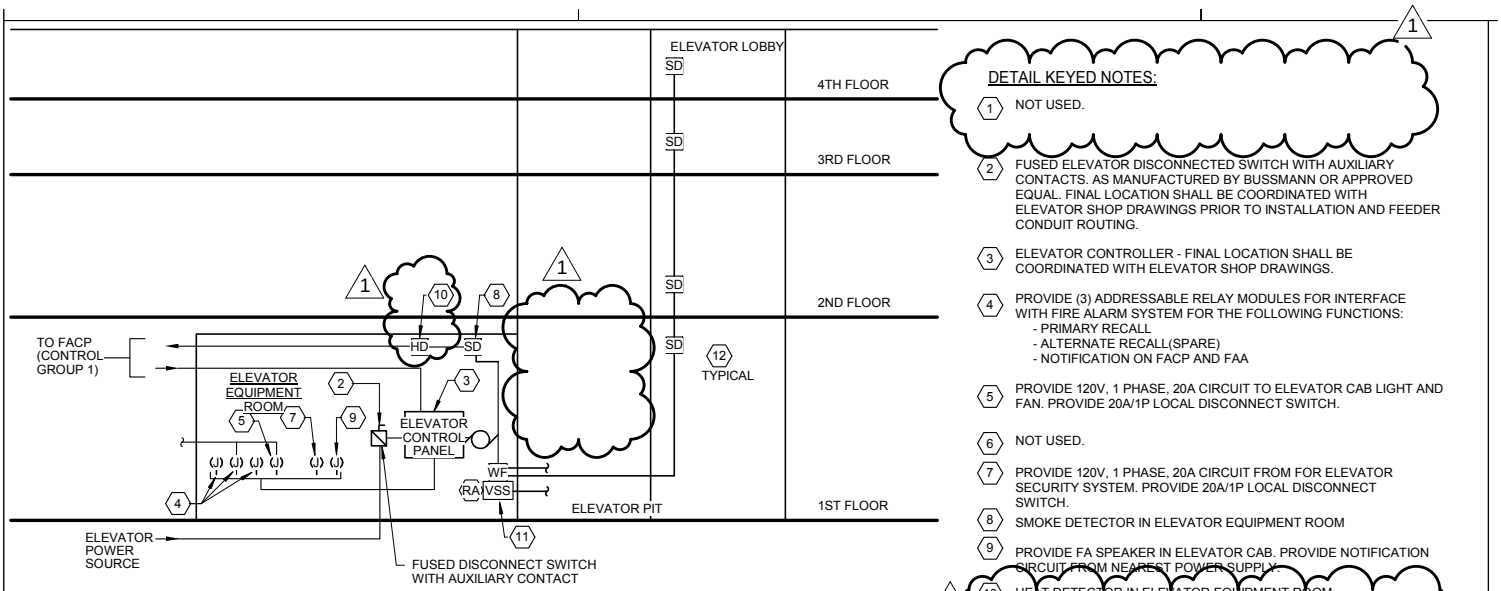
8 & 9												10							11												12
MOTOR-LISTED EQP - CONTROLLER-STARTER TYPES & LOCATIONS												LOCAL DISCONNECT SWITCH							MOTOR-LISTED EQUIP CONN & OEM REQUIREMENTS												
MTR CONTROLLER - SWITCH RATING - OCPD TRIP SIZE												FOR LOCAL LOCK-OUT & TAG-OUT							CORD & PLUG REC OR FLEX WHIP FOR MOTOR OR SINGLE POINT CONN												REMARKS
PB	FB	IB	ROOM	SIZE	TYPE	ENC	CPT	DS-SW	OCPD	P	NOTE	PB	FB	IB	SIZE	ENC	P	NOTE	PB	FB	IB	REC	LOC	NEMA	GFI	REC No	CPC	HWC	FWC	NOTE	
PC	-	-	(DUPLEX PUMP SYST.) WATER RM.	-	VFC	3R	NA	30	30	3	2	EC	-	-	30	3R	3	3	EC	-	-	NA	-	NA	NA	NA	NA	NA	YES	YES	4	
PC	-	-	ELEV. PIT	-	RMUC	3R	NA	30	20	1	1	NA	-	-	-	-	-	-	EC	-	-	YES	[redacted]	5-20R	NA	DUPLEX	YES	NA	NA	4	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
FPC	-	-	FIRE PUMP RM.	-	RMUC	3R	NA	200	150	3	1	FPC	-	-	-	3R	-	-	EC	-	-	NA	-	NA	NA	NA	NA	YES	YES	4	

1

SMNGA 943 W. SUPERIOR STREET CHICAGO, ILLINOIS 60642 312.829.3355	Chicago Public Schools PUBLIC BUILDING COMMISSION	PROJECT: SOUTH LOOP ELEMENTARY SCHOOL 1601 SOUTH DEARBORN STREET CHICAGO, IL 60616 DATE: 06.15.2017 ISSUANCE: ADDENDUM 1 NOTES:

TITLE:
E5.00 - ELECTRICAL SCHEDULES - POWERED EQUIPMENT

ESK-5



DETAIL NOTES:

1. FIRE ALARM DEVICE WIRING PER MANUFACTURER'S RECOMMENDATIONS AND ASSOCIATED SPECIFICATIONS.
2. REFER TO FLOOR PLANS FOR LOCATIONS OF ELEVATOR EQUIPMENT ROOMS, CONTROLLERS AND AUXILIARY ELEVATOR CONNECTIONS.

DETAIL KEYED NOTES:

1. NOT USED.
2. FUSED ELEVATOR DISCONNECTED SWITCH WITH AUXILIARY CONTACTS. AS MANUFACTURED BY BUSSMANN OR APPROVED EQUAL. FINAL LOCATION SHALL BE COORDINATED WITH ELEVATOR SHOP DRAWINGS PRIOR TO INSTALLATION AND FEEDER CONDUIT ROUTING.
3. ELEVATOR CONTROLLER - FINAL LOCATION SHALL BE COORDINATED WITH ELEVATOR SHOP DRAWINGS.
4. PROVIDE (3) ADDRESSABLE RELAY MODULES FOR INTERFACE WITH FIRE ALARM SYSTEM FOR THE FOLLOWING FUNCTIONS:
   - PRIMARY RECALL
   - ALTERNATE RECALL(SPARE)
   - NOTIFICATION ON FACP AND FAA
5. PROVIDE 120V, 1 PHASE, 20A CIRCUIT TO ELEVATOR CAB LIGHT AND FAN. PROVIDE 20A/1P LOCAL DISCONNECT SWITCH.
6. NOT USED.
7. PROVIDE 120V, 1 PHASE, 20A CIRCUIT FROM FOR ELEVATOR SECURITY SYSTEM. PROVIDE 20A/1P LOCAL DISCONNECT SWITCH.
8. SMOKE DETECTOR IN ELEVATOR EQUIPMENT ROOM
9. PROVIDE FA SPEAKER IN ELEVATOR CAB. PROVIDE NOTIFICATION CIRCUIT FROM NEAREST POWER SUPPLY.
10. HEAT DETECTOR IN ELEVATOR EQUIPMENT ROOM
11. WATERFLOW AND VALVE SUPERVISORY SWITCHES ADJACENT TO ELEVATOR PIT - PROVIDE SEPARATE ZONES ON FACP AND FAA. PROVIDE REMOTE INDICATORS WITH TEST SWITCHES.
12. SMOKE DETECTORS IN ELEVATOR LOBBY FOR ELEVATOR RECALL.

9 ELEVATOR FIRE PROTECTION CONTROL SCHEMATIC
NTS

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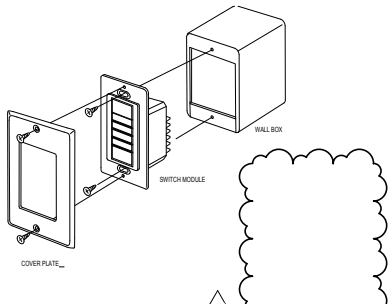
NOTES:

TITLE:
E6.02 - ELECTRICAL DETAILS

ESK-6



CONTROLLER NOTES:

GENERAL: ALL PROGRAMMING TO BE CONFIRMED WITH OWNER IN FIELD TO MEET OWNER REQUIREMENTS. CONFIRM LABEL NAMES WITH OWNER.

1. PROVIDE KEY LOCK FOR SWITCHES (WHERE INDICATED) EITHER INTEGRAL TO SWITCH OR WITH A COVER.
2. ALL BUTTONS SHALL FUNCTION AS ON/OFF CONTROL FOR SPECIFIED SCENE.
3. NIGHT LIGHTS ARE ALWAYS ON AT 100%, AND ARE NOT CONTROLLED BY LOCAL MULTI-SCENE CONTROLLERS.

1

2 **MULTI-SCENE LIGHTING CONTROL STATIONS**
NTS

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TITLE:
E6.03 - ELECTRICAL DETAILS

ESK-7

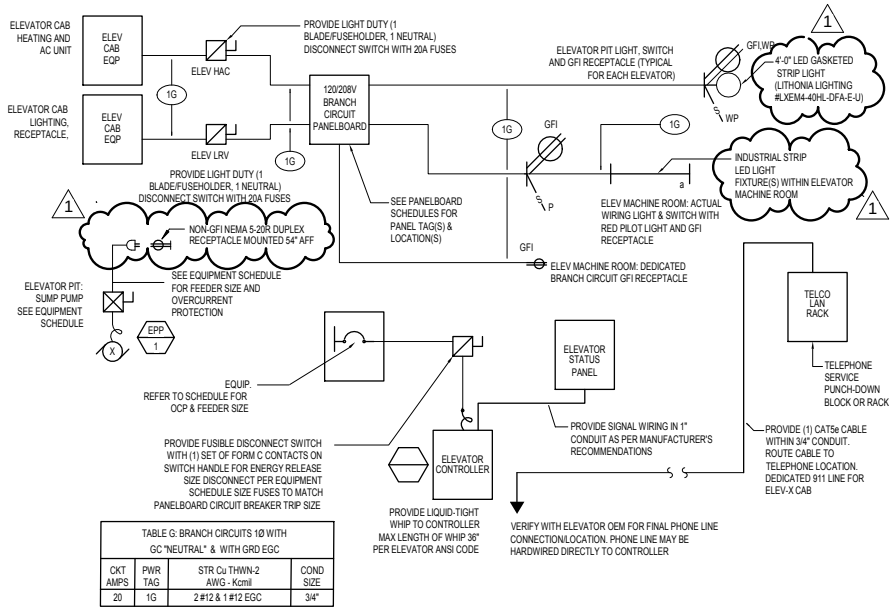

TABLE G: BRANCH CIRCUITS 1Ø WITH GC "NEUTRAL" & WITH GRD EGC			
CKT AMPS	PWR TAG	STR Cu THWN-2 AWG - Kcmil	COND SIZE
20	1G	2 #12 & 1 #12 EGC	3/4"

ELEVATOR GENERAL NOTES AND REQUIREMENTS:

1. PROVIDE A FUSED DISCONNECT SWITCH OR CIRCUIT BREAKER CAPABLE OF BEING LOCKED IN THE OPEN POSITION FOR EACH ELEVATOR PER THE NATIONAL ELECTRICAL CODE (ANSI-NFPA 70) WITH FEEDER OR BRANCH WIRING TO THE CONTROLLER (NEC 620-51, 620-61(D), AND 620-62 MUST BE PROVIDED. FUSES ARE TO BE CURRENT LIMITING CLASS RK1 OR EQUIVALENT. CIRCUIT BREAKERS ARE TO HAVE CURRENT LIMITING CHARACTERISTICS EQUIVALENT TO CLASS RK1 FUSES. FUSES OR CIRCUIT BREAKERS ARE TO BE TIME DELAY TO COVER THE FULL LOAD UP ACCELERATING CURRENT AS LISTED PER THE ELEVATOR MANUFACTURER'S POWER SUPPLY FORM.
2. WHEN A MACHINE ROOM IS USED AND WHERE PRACTICAL, DISCONNECTS SHALL BE LOCATED ADJACENT TO THE DOOR OF THE MACHINE ROOM ENCLOSURE. WHEN A MACHINE SPACE IS USED, DISCONNECTS OR CIRCUIT BREAKERS SHALL BE LOCATED BEHIND THE DOOR OF THE MACHINE SPACE PER OTIS LAYOUT. BRANCH CIRCUIT WIRING TO EACH CONTROLLER (NEC 620-53) MUST BE PROVIDED.
3. FOR MACHINE ROOM APPLICATIONS, A CONVENIENCE OUTLET AND A SUITABLE LIGHT, OF NOT LESS THAN 200 LUX (19FC) AS MEASURED AT FLOOR LEVEL MUST BE PROVIDED IN THE MACHINE ROOM WITH A LIGHT SWITCH LOCATED WITHIN 18" (456 MM) OF LOCK JAMB SIDE OF MACHINE ROOM DOOR.
4. FOR MACHINE SPACE APPLICATIONS A CONVENIENCE OUTLET LOCATED INSIDE THE MACHINE SPACE DOOR AND A SUITABLE LIGHT LOCATED OUTSIDE THE MACHINE SPACE DOOR ON THE LOCK JAMB SIDE, OF NOT LESS THAN 200 LUX (19FC) AS MEASURED AT FLOOR LEVEL MUST BE PROVIDED PER OTIS LAYOUT. THE MACHINE SPACE LIGHT CIRCUIT SHALL BE A DEDICATED CIRCUIT SEPARATE FROM OTHER LIGHTING CIRCUITS. (NEC 620-23). A CONVENIENCE OUTLET AND LIGHT FIXTURE OF NOT LESS THAN 100 LUX (10FC) AS MEASURED AT THE PIT FLOOR LEVEL MUST BE IN THE PIT WITH A LIGHT SWITCH LOCATED ADJACENT TO THE PIT ACCESS DOOR (NEC 620-24). THE LIGHT BULB(S) SHALL BE EXTERNALLY GUARDED TO PREVENT CONTACT AND ACCIDENTAL BREAKAGE.
5. FOR ELEVATORS WITH AN INTRA BUILDING INTERCOM] PROVIDE A SEPARATE 120 VOLT, 15 AMPERE, SINGLE PHASE POWER SUPPLY WITH FUSED SPST DISCONNECT SWITCH OR CIRCUIT BREAKER LOCATED AS REQUIRED FOR INTERCOMMUNICATING SYSTEM POWER SUPPLY. CIRCUIT TO BE ARRANGED FOR FEEDING FROM THE BUILDING EMERGENCY LIGHTING SUPPLY IF PROVIDED. CONDUIT AND WIRING FOR REMOTELY LOCATED INTERCOMMUNICATING STATIONS MUST BE PROVIDED.
6. FOR ELEVATORS WITH A BATTERY POWERED EMERGENCY RETURN UNIT (ERU)] PROVIDE THE DISCONNECTING MEANS REQUIRED BY THE NATIONAL ELECTRICAL CODE (NEC) WITH AN AUXILIARY CONTACT AND WIRING TO THE CONTROLLER. THE AUXILIARY CONTACT IS TO BE POSITIVELY OPEN WHEN THE MAIN DISCONNECTING MEANS IS OPEN. THE AUXILIARY CONTACT SHALL CAUSE THE ERU POWER SOURCE TO BE DISCONNECTED FROM ITS LOAD WHEN THE DISCONNECTING MEANS IS IN THE OPEN POSITION. SIZE OF MAIN CONTACTS TO SUIT ELEVATOR POWER CHARACTERISTICS.
7. ADDITIONAL ERU REQUIREMENT: HEAT SENSORS SHALL BE PROVIDED TO AUTOMATICALLY DISCONNECT THE MAINLINE POWER SUPPLY PRIOR TO THE APPLICATION OF WATER FROM SPRINKLERS SHALL BE PROVIDED WITH A NORMALLY CLOSED CONTACT WITH WIRING FROM THE SENSING DEVICE TO A CONTROLLER DESIGNATED BY THE ELEVATOR MANUFACTURER. THE NORMALLY CLOSED CONTACT SHALL BE CLOSED WHEN THE HEAT SENSOR IS NOT ACTIVATED AND SHALL BE OPEN WHEN THE HEAT SENSOR IS ACTIVATED.

1 CBC ELEVATOR ANCILLARY POWER/CONTROL WIRING DIAGRAM (LARGE)
SCALE:NTS

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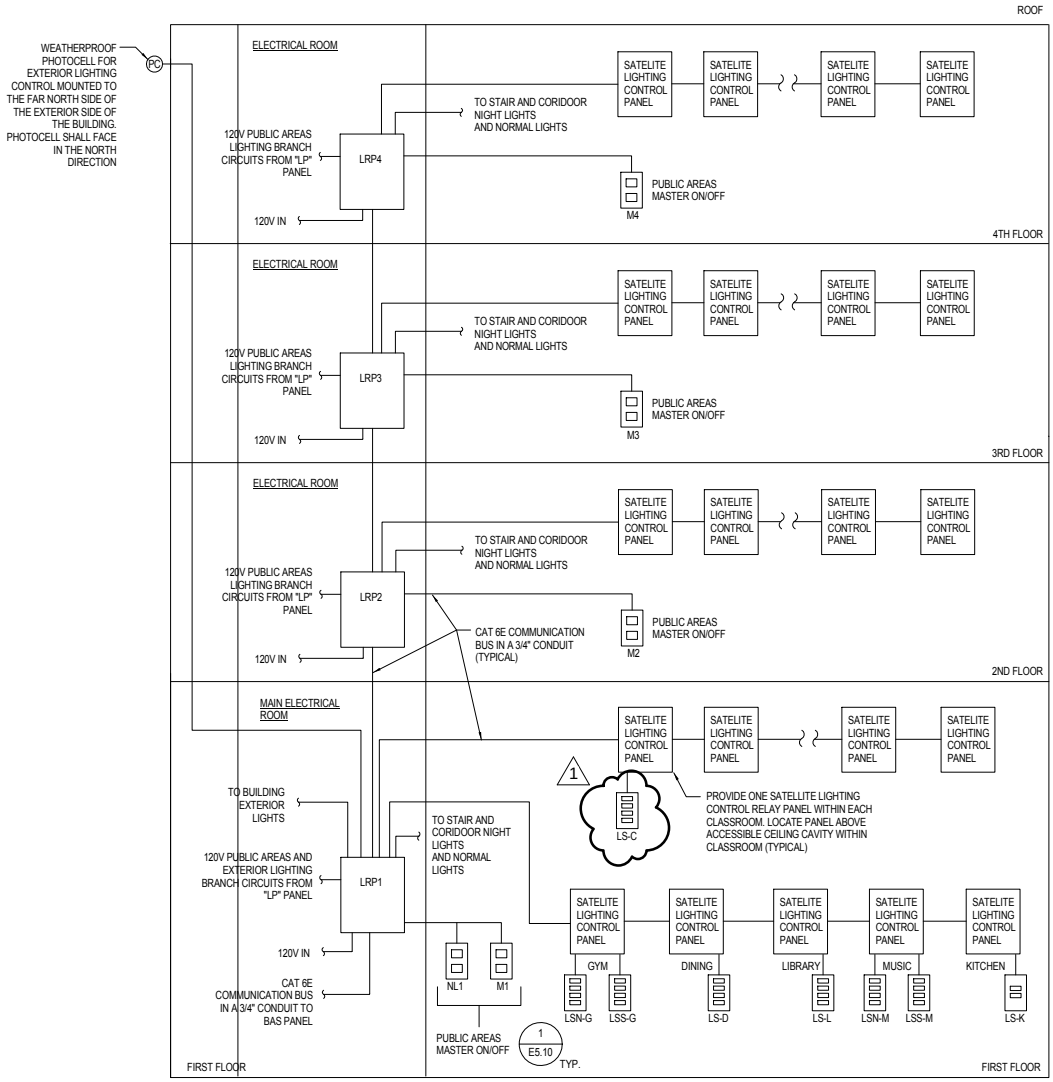
TITLE:
E6.04 - ELECTRICAL DETAILS

ESK-8



3 **LIGHTING CONTROL SYSTEM RISER DIAGRAM**
NTS

LIGHTING CONTROL SYSTEM GENERAL NOTES:

1. THIS RISER DIAGRAM IS TO PROVIDE A GENERAL CONCEPT OF THE LIGHTING CONTROL SYSTEM AND IS DIAGRAMMATIC IN NATURE. DIAGRAM DOES NOT REFLECT ALL DEVICES, CONTROL PANELS, AND INTERFACE REQUIRED. REFER TO PLANS FOR SWITCH QUANTITIES.
2. THIS LIGHTING CONTROL SYSTEM DESIGN IS BASED OFF OF LEVITON CONTROLS "GREENMAX" SYSTEM. OTHER MANUFACTURERS AS SPECIFIED IN SPECIFICATION SECTION 260923.1 ARE ACCEPTABLE ALTERNATES IF THEY PROVIDE THE SAME TYPE OF DISTRIBUTIVE CONTROL AND FUNCTIONALITY.
3. PROVIDE ALL LINE VOLTAGE WIRING, LOW VOLTAGE WIRING AND CONDUIT FOR A COMPLETE CODE COMPLIANT AND OPERATIONAL SYSTEM.
4. PROVIDE 20 AMP, 120LT, 1-PH POWER FROM CONSTANT NON-CONTROLLED CIRCUIT FROM THE NEAREST LIGHTING PANEL FOR EACH LIGHTING RELAY PANEL.
5. FEEDS TO BATTERY UNITS AND EXIT SIGNS SHALL NOT PASS THROUGH THE RELAY PANELS.
6. PUBLIC AREAS MASTER ON/OFF CONTROL STATIONS (M1, M2, M3 AND M4) DESCRIPTION: "SWEEP OFF" - TIME CLOCK AT EACH RESPECTIVE LIGHTING RELAY CONTROL PANEL FOR PUBLIC AREAS (STAIR AND CORRIDOR NORMAL LIGHTS) SHALL BE PRIMARILY A "SWEEP OFF" FUNCTION AT THE END OF THE DAY (9 PM). LOCAL MASTER SWITCHES AT EACH FLOOR SHALL FUNCTION AS "OVERRIDE" SWITCHES AFTER 9 PM AND SHALL TURN LIGHTS BACK ON AFTER SWEEP FOR A MAXIMUM OF TWO HOURS, AT WHICH POINT, THEY SHALL SWEEP BACK OFF AGAIN UNTIL START OF THE DAY THE NEXT MORNING (5 AM).
7. PUBLIC AREAS MASTER ON/OFF CONTROL STATION "NL1" DESCRIPTION: ON/OFF CONTROL OF ALL (STAIR AND CORRIDOR) NITE LIGHTS THROUGHOUT THE BUILDING.
8. ALL EXTERIOR LIGHTS SHALL BE PROGRAMMED FOR PHOTOCELL ON AT DUSK, TIMECLOCK OFF AT 11 PM.
9. ALL LIGHTING RELAY CONTROL PANELS SHALL BE PROVIDED WITH A TOTAL OF TWELVE, 20 AMP, SINGLE-POLE RELAY MODULES AND SHALL BE CONNECTED TO THE BUILDING AUTOMATION SYSTEM FOR MONITORING PURPOSES ONLY.
6. ALL LIGHTING RELAY PANELS INCLUDING SATELLITE LIGHTING RELAY PANELS SHALL BE PROVIDED WITH A DIGITAL, NETWORKED PROGRAMMABLE ASTRONOMIC TIMECLOCK. LIGHTING RELAY CONTROL PANEL "LRP-1" SHALL BE PROVIDED WITH A MASTER DIGITAL PROGRAMMABLE ASTRONOMIC TIMECLOCK AND SHALL BE CAPABLE OF PROGRAMMING ALL LIGHTING RELAY PANELS AND SATELLITE LIGHTING RELAY PANELS. LIGHTING CONTROL SYSTEM SHALL BE IN ACCORDANCE WITH ASHRAE 90.1 - 2013.
7. ALL CEILING AND WALL MOUNTED VACANCY SENSORS WITHIN CLASSROOMS, OFFICES, DINING, STORAGE ROOMS, SHALL SHUT LIGHTS OFF AFTER 15 MINUTE DELAY.
8. ALL LIGHTING FIXTURES IN BANKED RESTROOMS SHALL BE CONTROLLED VIA CEILING MOUNTED OCCUPANCY SENSORS AND PROGRAMMED FOR AUTO-ON, AUTO OFF AFTER 15 MINUTE TIME DELAY.

1

LIGHTING CONTROLLER NOTES:

ALL LIGHTING CONTROL PROGRAMMING AND TIME SCHEDULES SHALL BE CONFIRMED WITH CPS IN FIELD TO MEET CPS REQUIREMENTS. BELOW IS A GUIDELINE FOR PROGRAMMING:

1. CLASSROOM CONTROLLER "LS-C" DESCRIPTION
   A. FULL ON - ALL LIGHTS ON AT FULL
   B. MEDIUM - ALL LIGHTS DIMMED TO 50%
   C. LOW - ALL LIGHTS DIMMED TO 30%
   D. A/V MODE - FRONT ROW OFF (SMARTBOARD WALL) AND ROOM LIGHTS DIMMED PER CPS
2. GYM CONTROLLER "LS-G" DESCRIPTION
   A. FULL ON - ALL LIGHTS ON AT 100%
   B. NORTH: - ON/OFF CONTROL OF NORTH SIDE OF GYM
   C. SOUTH: - ON/OFF CONTROL OF SOUTH SIDE OF GYM
   D. LOW - ALL LIGHTS DIMMED TO 30%
3. DINING ROOM CONTROLLER "LS-D" DESCRIPTION
   A. FULL ON - ALL LIGHTS ON AT FULL
   B. MEDIUM - ALL LIGHTS DIMMED TO 50%
   C. LOW - ALL LIGHTS DIMMED TO 30%
   D. A/V MODE - FRONT ROW OFF (PROJECTOR WALL) AND ROOM LIGHTS DIMMED PER CPS
4. LIBRARY CONTROLLER "LS-L" DESCRIPTION
   A. FULL ON - ALL LIGHTS ON AT FULL
   B. STACK 1: - ON/OFF CONTROL OF NORTH STACKS
   C. STACK 2: - ON/OFF CONTROL OF SOUTH STACKS
   D. READING: - ON/OFF CONTROL OF READING AREA
5. MUSIC ROOM CONTROLLER "LS-M" DESCRIPTION
   A. FULL ON - ALL LIGHTS ON AT FULL
   B. MEDIUM - ALL LIGHTS DIMMED TO 50%
   C. LOW - ALL LIGHTS DIMMED TO 30%
   D. A/V MODE - FRONT ROW OFF (SMARTBOARD WALL) AND ROOM LIGHTS DIMMED PER CPS.
6. KITCHEN/SERVERY CONTROLLER "LS-K" DESCRIPTION
   A. KITCHEN AREA FULL ON - ALL LIGHTS ON AT FULL
   B. SERVERY AREA FULL ON - ALL LIGHTS ON AT FULL
7. PULL-IN ROOM LIGHTING CONTROL DESCRIPTION
   A. 50% CONTROL OF LIGHTS - FOR EACH MANUAL CONTROL STATION LOCATION, ONE MANUAL TOGGLE SWITCH TO CONTROL ONE LIGHT FIXTURE, THE OTHER MANUAL TOGGLE SWITCH TO CONTROL THE OTHER LIGHT FIXTURE. CEILING MOUNTED VACANCY SENSOR TO SHUT LIGHTS OFF AFTER 15 MINUTE DELAY.

1

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E4.02 - LIGHTING CONTROL RISER DIAGRAM

ESK-9

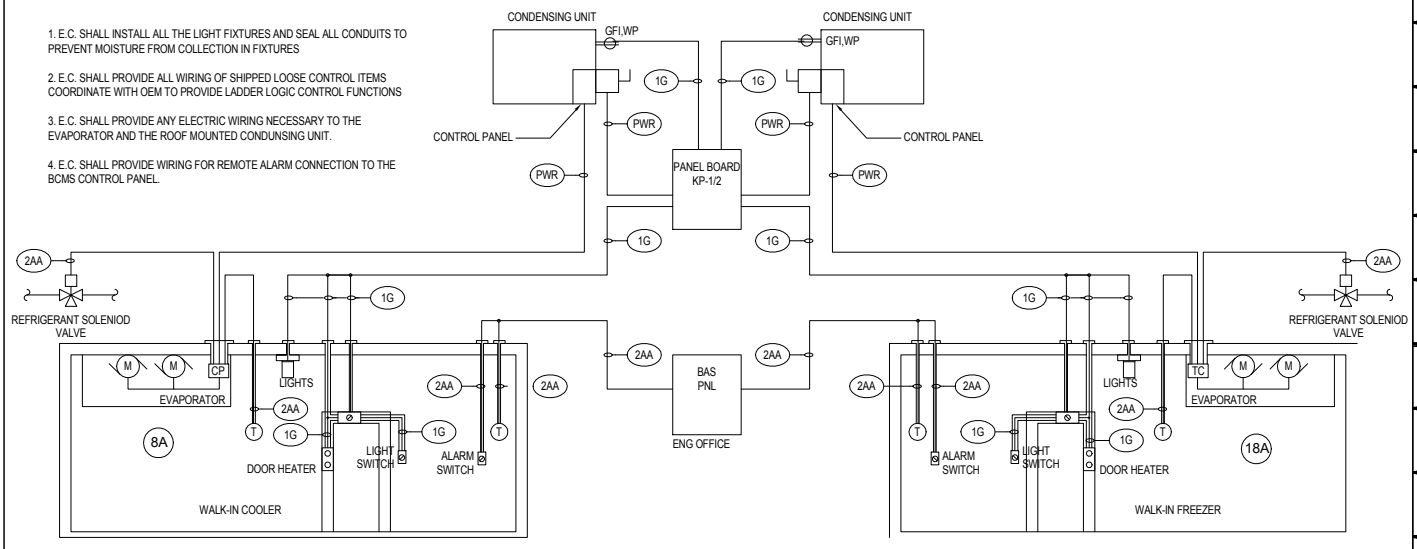
1

1. E.C. SHALL INSTALL ALL THE LIGHT FIXTURES AND SEAL ALL CONDUITS TO PREVENT MOISTURE FROM COLLECTION IN FIXTURES

2. E.C. SHALL PROVIDE ALL WIRING OF SHIPPED LOOSE CONTROL ITEMS COORDINATE WITH OEM TO PROVIDE LADDER LOGIC CONTROL FUNCTIONS

3. E.C. SHALL PROVIDE ANY ELECTRIC WIRING NECESSARY TO THE EVAPORATOR AND THE ROOF MOUNTED CONDUNSING UNIT.

4. E.C. SHALL PROVIDE WIRING FOR REMOTE ALARM CONNECTION TO THE BCMS CONTROL PANEL.



3 KITCHEN WALK-IN COOLER WALK-IN FREEZER CIRCUIT INTERFACE
NTS

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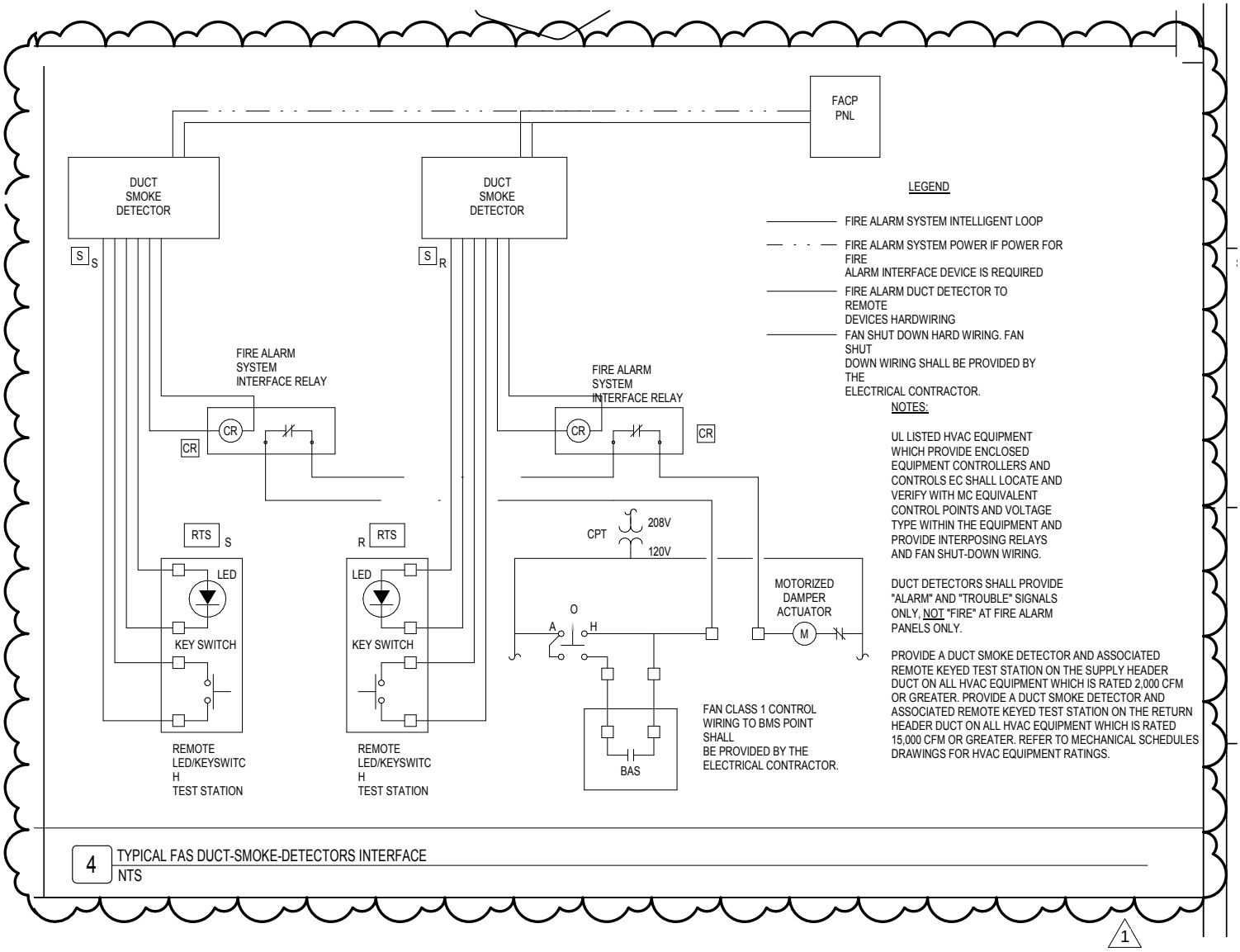
E6.03 - ELECTRICAL DETAILS

ESK-10



4 TYPICAL FAS DUCT-SMOKE-DETECTORS INTERFACE
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1

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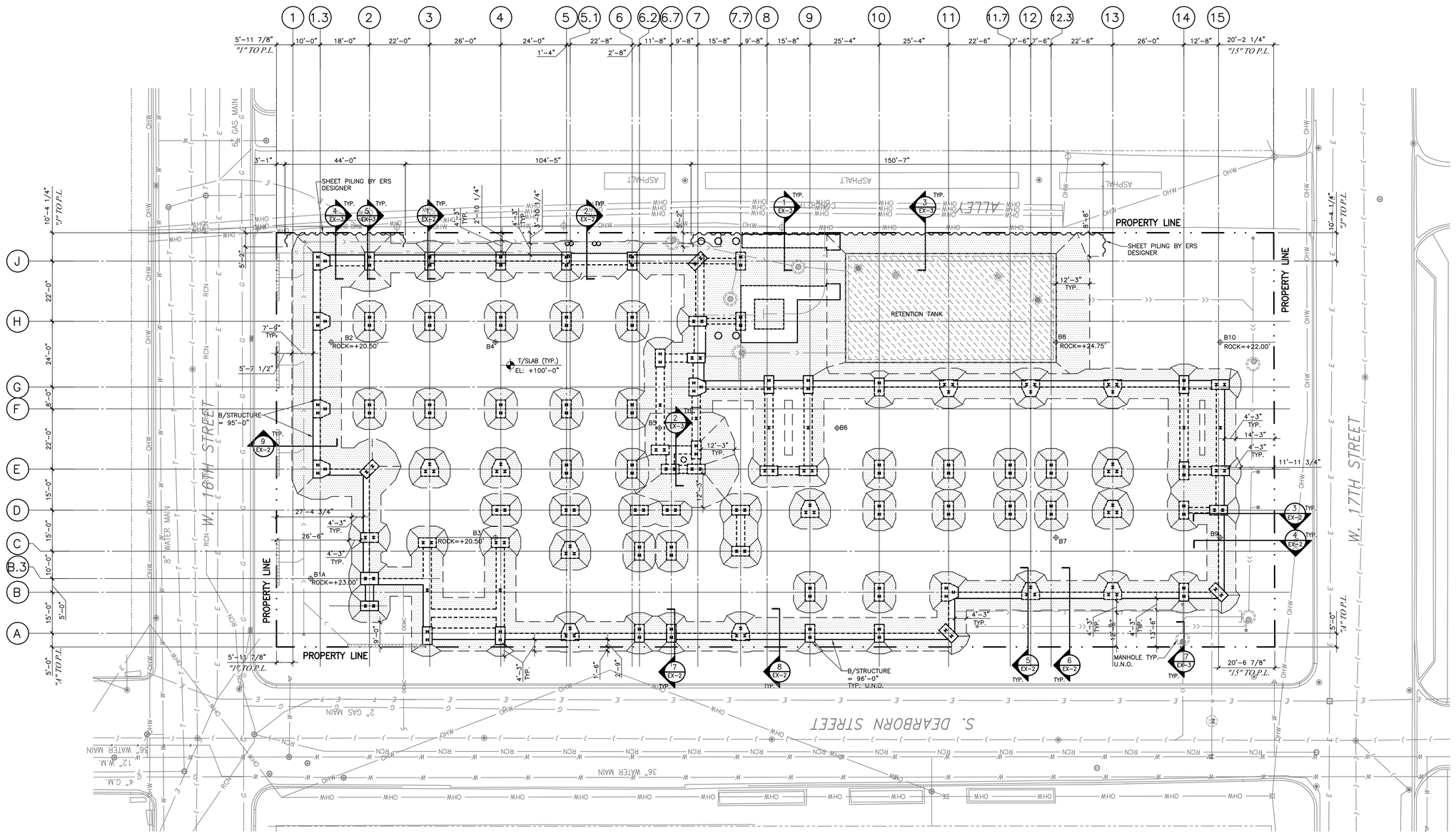
ESK-11

+100'-0" ARCH. = +13.30' C.C.D.



A EXCAVATION PLAN

SCALE: 1/16"=1'-0"

N

⊕ INDICATES BORING LOACTION PER GEOTECH

	PRECAST DETENTION VAULT
C	STORM SEWER
C	SANITARY SEWER
CC	COMBINED SEWER
CC	PERFORATED PIPE
W	WATER SERVICE
E	ELECTRIC SERVICE
G	GAS SERVICE
T	TELEPHONE SERVICE
	OEMC SERVICE
	TRENCH DRAIN (TD)
	WATER TAPPING VALVE (TV)
	WATER LINE VALVE (WLV)
	CATCH BASIN (CB)
	MANHOLE (MH)
	ACCESS RISER (OGR) OPEN GRATE
	ACCESS RISER (CGR) CLOSED GRATE
	AREA DRAIN (AD)
	CLEAN OUT (CO)
	RESTRICTOR (REST)
UHT	UPPER HALF TRAP

UTILITY LEGEND

NOTES REGARDING DRAWINGS ERS/ EX-1, ERS/EX-2, ERS/ EX-3: DRAWINGS INCLUDE A PRELIMINARY EARTH RETAINING SYSTEM DESIGN FOR OUC COORDINATION ONLY. CONTRACTOR SHALL:

- REVIEW RELATIVE TO FULL SCOPE OF WORK TO BE PERFORMED;
- MODIFY AS NECESSARY TO ENSURE THAT EARTH RETENTION SYSTEM ACCOMMODATES FULL SCOPE OF WORK, AND THAT ALL WORK IS FULLY COORDINATED WITH THE CONTRACTOR'S INTENDED MEANS, METHODS, AND SEQUENCING;
- PROVIDE ENGINEERING CALCULATIONS, STAMPED AND SEALED BY A GEOTECHNICAL ENGINEER LICENSED IN THE STATE OF ILLINOIS;
- SUBMIT DRAWINGS AND CALCULATIONS FOR FINAL DEPT. OF BUILDINGS AND OUC REVIEW AND APPROVAL.

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CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

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ASSOCIATE ARCHITECT:
URBAN WORKS

STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

CIVIL ENGINEERS OF RECORD:
TERRA ENGINEERING

FOODSERVICE CONSULTANT:
EDGE ASSOCIATES

ACOUSTICAL CONSULTANT:
SHINER + ASSOCIATES

THEATER CONSULTANT:
BILL CONNER ASSOCIATES LLC

ISSUANCE

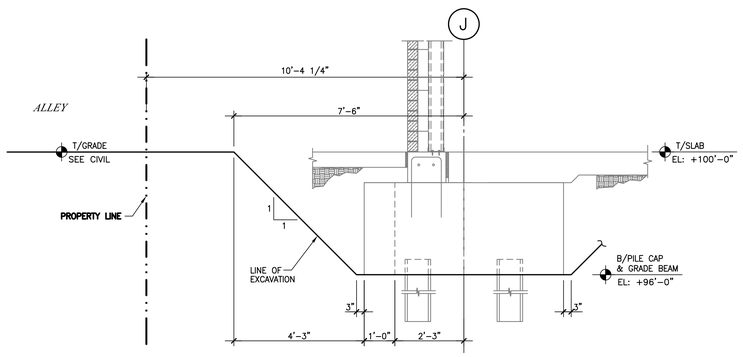
MARK	DESCRIPTION	DATE
	ISSUE FOR BID	06.02.17
1	ADDENDUM 1	06.21.17

PROJECT NAME: SOUTH LOOP ELEMENTARY SCHOOL
PBC CONTRACT NO: 05035
SMNG-A PROJECT NO: 1620

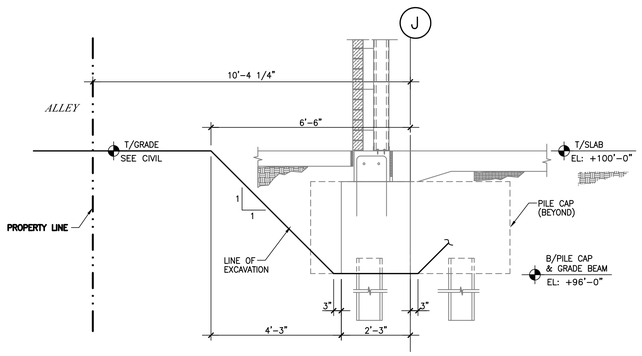
TITLE
EXCAVATION PLAN

SHEET
ERS/EX-1

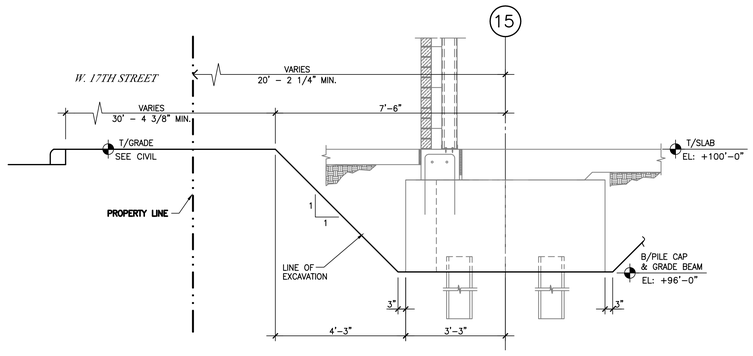
+100'-0" ARCH. = +13.30' C.C.D.



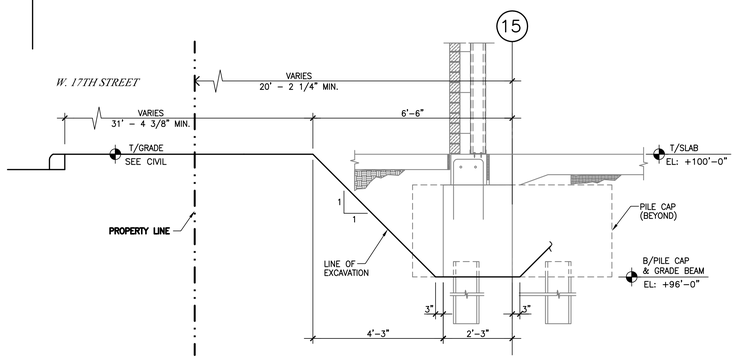
1 SECTION AT GRID – J (AT PILE CAP)
SCALE: 1/2"=1'-0"



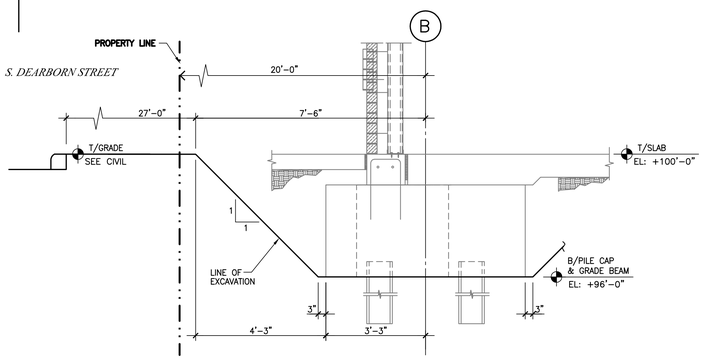
2 SECTIONAT GRID – J (AT GRADE BEAM)
SCALE: 1/2"=1'-0"



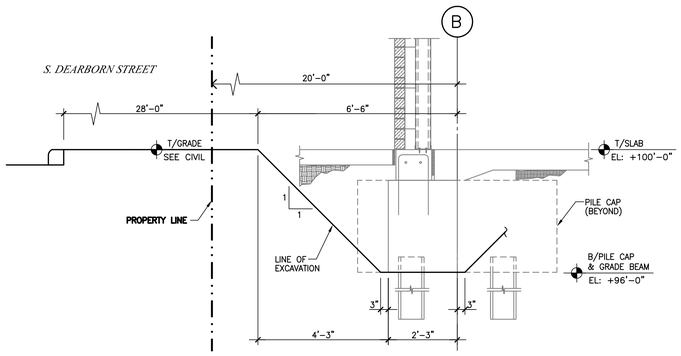
3 SECTION AT GRID – 15 (AT PILE CAP)
SCALE: 1/2"=1'-0"



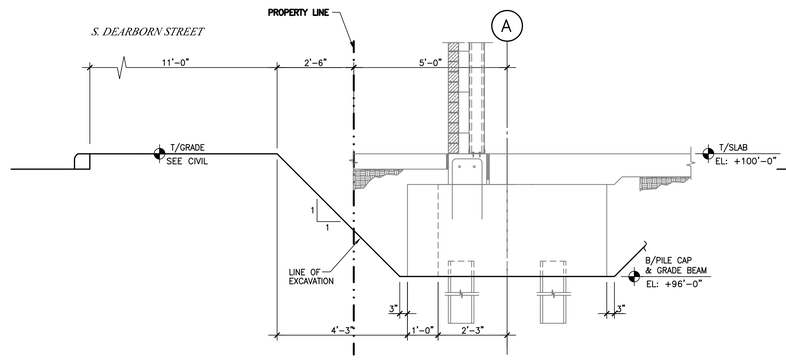
4 SECTION AT GRID – 15 (AT GRADE BEAM)
SCALE: 1/2"=1'-0"



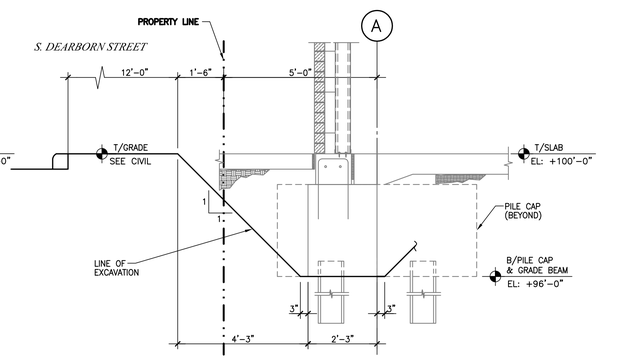
5 SECTION AT GRID – B (AT PILE CAP)
SCALE: 1/2"=1'-0"



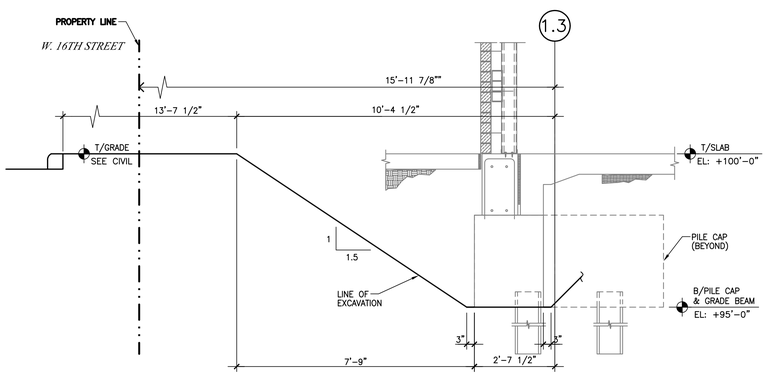
6 SECTION AT GRID – B (AT GRADE BEAM)
SCALE: 1/2"=1'-0"



7 SECTION AT GRID – A (AT PILE CAP)
SCALE: 1/2"=1'-0"



8 SECTION AT GRID – A 9 AT GRADE BEAM)
SCALE: 1/2"=1'-0"



9 SECTION AT GRID – 1.3 (AT GRADE BEAM)
SCALE: 1/2"=1'-0"

NOTES REGARDING DRAWINGS ERS/ EX-1, ERS/EX-2, ERS/ EX-3:
DRAWINGS INCLUDE A PRELIMINARY EARTH RETAINING SYSTEM DESIGN FOR OUC COORDINATION ONLY. CONTRACTOR SHALL:

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- MODIFY AS NECESSARY TO ENSURE THAT EARTH RETENTION SYSTEM ACCOMMODATES FULL SCOPE OF WORK, AND THAT ALL WORK IS FULLY COORDINATED WITH THE CONTRACTOR'S INTENDED MEANS, METHODS, AND SEQUENCING;
- PROVIDE ENGINEERING CALCULATIONS, STAMPED AND SEALED BY A GEOTECHNICAL ENGINEER LICENSED IN THE STATE OF ILLINOIS;
- SUBMIT DRAWINGS AND CALCULATIONS FOR FINAL DEPT. OF BUILDINGS AND OUC REVIEW AND APPROVAL.

SOUTH LOOP ELEMENTARY SCHOOL
1601 SOUTH DEARBORN STREET
CHICAGO, IL 60616

CHICAGO PUBLIC SCHOOLS
CITY OF CHICAGO, MAYOR RAHM EMANUEL

ARCHITECT OF RECORD:
SMNG A LTD.

\pt0.75;ADDRESS: 936 W. HURON STREET
CHICAGO, ILLINOIS 60642
PHONE: 312.829.3355
FAX: 312.829.8187
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ASSOCIATE ARCHITECT:
URBAN WORKS

STRUCTURAL ENGINEERS OF RECORD:
STEARN-JOGLEKAR

MEPFP ENGINEERS OF RECORD:
dbHMS ENGINEERS

LANDSCAPE ARCHITECTS OF RECORD:
TERRA ENGINEERING

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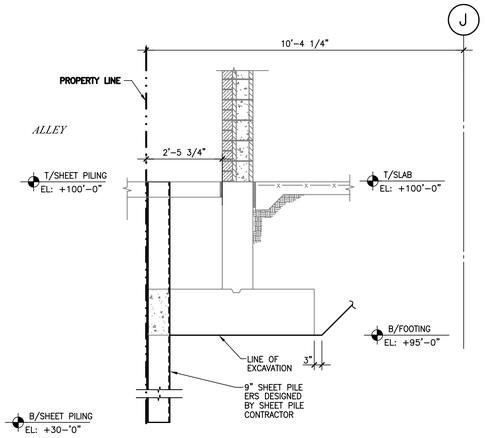
PROJECT NAME: SOUTH LOOP ELEMENTARY SCHOOL
PBC CONTRACT NO: 05035
SMNG-A PROJECT NO: 1620

TITLE
EXCAVATION SECTIONS

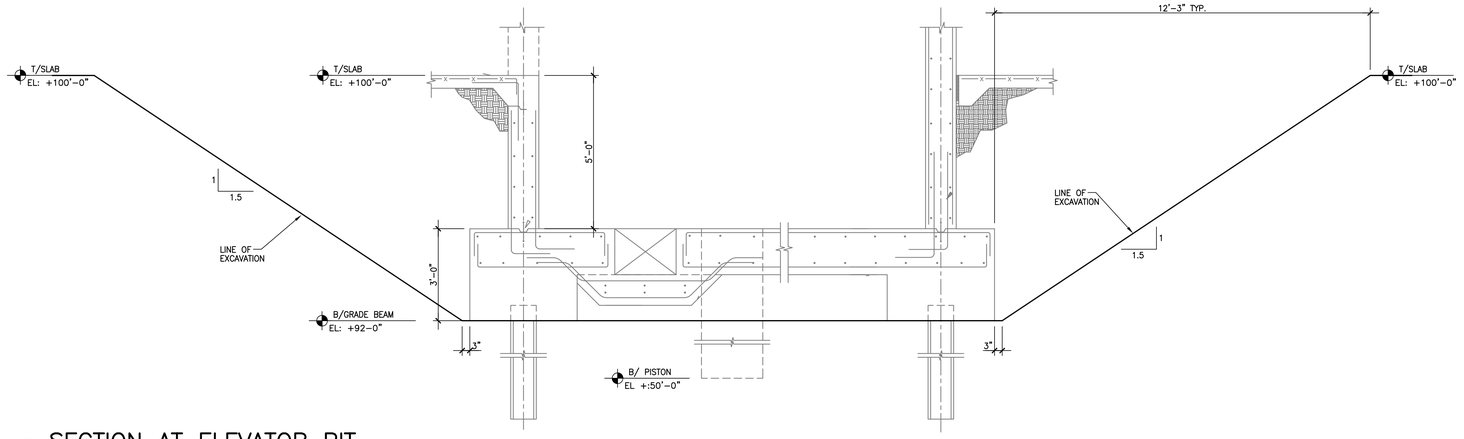
SHEET
ERS/EX-2

+100'-0" ARCH. = +13.30' C.C.D.



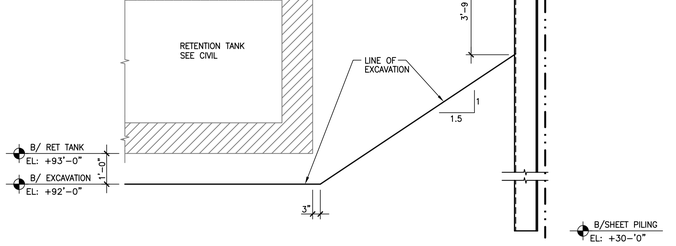
1 SECTION AT WASTE ENCLOSURE SCREEN WALL

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



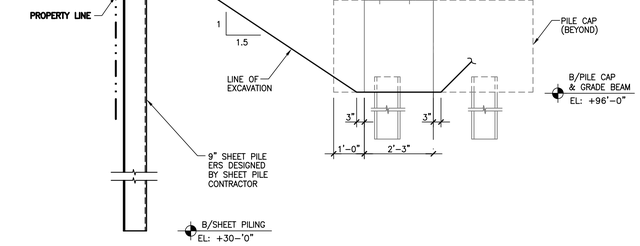
2 SECTION AT ELEVATOR PIT

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



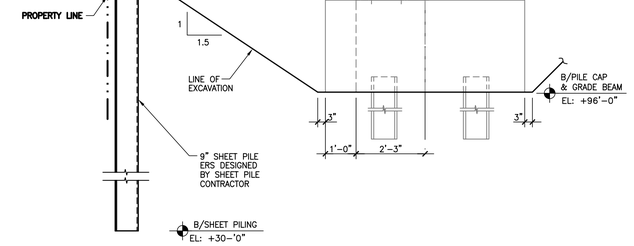
3 SECTION AT RETENTION TANK

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



4 SECTION AT GRID – J NORTH OF 2 (AT BEAM)

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



5 SECTION AT GRID – J NORTH OF 2

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

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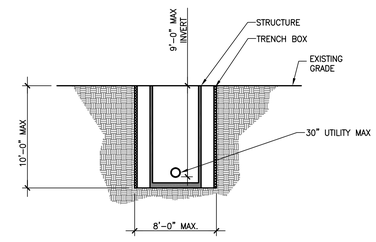

7 TYPICAL TRENCHBOX

NOT TO SCALE

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TITLE
EXCAVATION SECTIONS

SHEET
ERS/EX-3