

ADDENDUM NO. 4

DATE: 01/27/23

PROJECT:

McKinley/ Fowler Elementary School- Increment 1
Fresno, CA
CUSD Bid No.: 2922

OWNER:

Clovis Unified School District
1450 E. Herndon Ave.
Clovis, CA 93611

ARCHITECT:

DARDEN ARCHITECTS, INC.
Attention: Andrew Corral/ Mike Fennacy
6790 N. West Avenue
Fresno, California 93711
T. (559) 448-8051
F. (559) 446-1765

DARDEN PROJECT NO. 2116
DSA File Nos. 10-48
DSA APPL. NO. 02-120543

It will be the responsibility of the General Contractor to submit the information contained in this addendum to all its subcontractors and suppliers. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

The following additions, deletions, and revisions to the SHEETS and Project Manual are hereby made and do become a part of these Contract Documents.

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INDEX OF ADDENDA TRANSMITTED HEREWITH

PROJECT MANUAL:

BIDDING AND CONTRACT REQUIREMENTS:

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SHEETS:

CHANGES TO SHEETS:

CIVILAD4-C01
ARCHITECTURAL AD4-A01
ELECTRICALAD4-E01

ATTACHMENTS:

DOCUMENTS OR SPECIFICATIONS:

SHEETS:

ARCHITECTURALAD4-AX01.
ELECTRICAL AD4-EX01.

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PROJECT MANUAL:

BIDDING AND CONTRACT REQUIREMENTS:

CHANGES TO CONDITIONS OF THE CONTRACT:

AD4-CCC01 Refer to the Owner Controlled Insurance Program (OCIP) and add the following:

1. *The Builder's Risk insurance is not part of the OCIP but is part of the Owner Provided Insurance Policies. In the event of a loss, claim or occurrence which requires Contractor to satisfy any portion of the deductible(s) set forth in the Builder's Risk policy (the "**Builder's Risk Deductible**") and which arises out of or is any way connected with the Work, Contractor shall pay a contribution toward such Builder's Risk Deductible in an amount not to exceed \$5,000 per occurrence. Owner to be responsible for deductibles contributions, greater than \$5,000 that may exist under Owner's Builder's Risk Policy.*

SPECIFICATIONS:

CHANGES TO SPECIFICATIONS:

AD4-SP01 Refer to Specification Section 01 11 13- SUMMARY OF WORK:

1. Remove and Replace the BID PACKAGES document with the attached as indicated with an AD-4 in the upper right-hand corner.

AD4-SP02 Add to Specification Section 05 12 00- STEEL AND FABRICATIONS:

2. Add Specification Section 05 12 00- STEEL AND FABRICATIONS as indicated with AD4 in the upper right-hand corner.

AD4-SP03 Add to Specification Section 07 40 00- METAL PANELS:

1. Add Specification Section 07 40 00- METAL PANELS as indicated with AD4 in the upper right-hand corner.

AD4-SP04 Refer to Specification Section 31 12 00- PAVEMENT:

1. Slurry Seal and Seal Coating the newly placed Pavement will not be required, omit all language related to this requirement.

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SHEETS:

CHANGES TO SHEETS:

CIVIL:

AD4-C01 Refer to Sheet SD/C205- GRADING AND DRAINAGE PLAN:

1. Refer to Section C-C, Concrete masonry Wall along the future development is within the scope of this project. It will not be installed by the developer.

ARCHITECTURAL:

AD4-A01 Refer to Sheet SD/A302- SITE DETAILS:

1. Remove Sheet SD/A302- SITE DETAILS and replace with attached Sheet AD4-AX01.

ELECTRICAL:

AD4-E01 Refer to Sheet SD/E201- SITE ELECTRICAL- POWER AND LOW VOLTAGE PLAN-NORTH:

1. Remove Sheet SD/E201- SITE ELECTRICAL- POWER AND LOW VOLTAGE PLAN-NORTH and replace with attached Sheet AD4-EX01.

NOTE: All Electrical Equipment indicated will be provided in the Increment #2 Bid Package

END OF ADDENDUM NO. 4

**INCREMENT NO. 1
BID PACKAGES**

Bid Package #	Bid Package Description	Contractor License Requirement (, = or)
CES-01	EARTHWORK, CONCRETE, & CMU	A, B, C-8, C-12
CES-02	SITE UTILITIES PLUMBING : DOMESTIC, SANITARY, STORM, FIRE, & GAS (ADDENDA #2)	A, C-36
CES-03	SITE ELECTRICAL & LOW VOLTAGE	C-10
CES-04	LANDSCAPE	C-27



FOWLER MCKINLEY ELEMENTARY SCHOOL

CES-01 EARTHWORK, SITE CONCRETE, & CMU

Section 01 57 23 Storm Water Pollution Prevention Plan

~~Section 01 71 23 Field Engineering~~ (ADDENDA #2)

Section 03 11 01 Concrete Formwork

Section 03 15 14 Drilled Anchors

Section 03 20 00 Reinforcement

Section 03 30 00 Cast-In-Place Concrete

Section 04 22 00 Concrete Masonry Units (CMU)

Section 07 14 16 Fluid-Applied Waterproofing (ADDENDA #4)

Section 07 92 00 Sealants

Section 08 70 00 Hardware

Section 08 70 00.01 Hardware schedule

Section 10 05 00 Miscellaneous Specialties (Stair Striping)

Section 10 14 53 Road and Parking Signage

Section 10 75 00 Flagpoles

Section 11 68 13 Play Equipment

Section 12 93 13 Bicycle Racks

Section 31 00 00 Offsite Development

Section 31 10 00 Site Clearing

Section 31 11 00 Clearing and Demolition

Section 31 20 00 Earthwork

Section 31 22 00 22 Soil Materials (ADDENDA #2)

Section 31 23 00 33 Trench Excavation and Backfill (ADDENDA #2)

~~Section 31 31 00 Soil Treatment~~ (ADDENDA #3)

Section 32 12 00 Pavement

Section 32 12 16 Soil Sterilization (Weed Control)

Section 32 18 16 Playground Surfacing (ADDENDA #2)

Section 32 19 19 Ornamental Metal

Section 32 31 13 Chain Link

CES-02 SITE UTILITIES PLUMBING: DOMESTIC, SANITARY, STORM, FIRE, & GAS (ADDENDA #2)

Section 03 30 00 Cast in place Concrete (As applicable to storm, sewer, manholes, thrust blocks, etc.)

Section 21 05 23 General Duty Valves for Fire Protection

Section 21 05 53 Identification for Fire Protection

Section 21 11 00 Facility Fire Suppression Water Service Piping

Section 21 11 19 Fire Department Connections

Section 22 00 00 General Plumbing Provisions (Gas, Water, Fire Water, Storm, Sewer)

Section 22 00 50 Plumbing (Gas, Water, Fire Water, Storm, Sewer)

Section 23 01 00 General Mechanical Provisions (As Applicable)

Section 31 23 33 Trench Excavation and Backfill

~~Section 32 84 00 Landscape Irrigation System (For Backflow Preventor and installation)~~ (ADDENDA #2)

Section 33 12 00 Water Utilities

Section 33 30 00 Site Sewer Systems

Section 33 40 00 Storm Drainage

**CES-03 SITE ELECTRICAL & LOW VOLTAGE (ADDENDA #2)**

- Section 03 15 14 Drilled Anchors
- Section 03 30 00 Cast in place Concrete (As applicable to slurry, and light pole bases, and grouting)
- Section 26 05 00 Common Work Results for Electrical
- Section 26 05 26 Grounding
- Section 26 05 53 Electrical Identification
- Section 26 20 00 Low Voltage Electrical Transmission
- Section 27 00 00 Telecommunication Systems
- Section 27 05 28 Communications Infrastructure System
- Section 27 10 00 Structured Cabling System

CES-04 LANDSCAPE

- Section 03 15 14 Drilled Anchors
- Section 32 84 00 Landscape Irrigation System
- Section 32 90 00 Landscape Construction

SUMMARY OF WORK FOR FOWLER MCKINLEY ELEMENTARY SCHOOL

PART 1 – GENERAL

As the Construction Manager (CM) for this project, David A Bush, Inc. (CM) reserves the right to publish Contractor Information Memos (CIM) prior to bid modifying the contract documents, as necessary. Please acknowledge all CIM on your proposal.

The following bidding instructions shall be adhered to by ALL BIDDERS and all bids shall include cost and time to incorporate all of the instructions noted below.

Please note this is a CM Multiple Prime project with all trades contracted to Clovis Unified School District as in a normal lump sum public works contract. All normal aspects of school construction will apply. All Prime Contracts shall be on the District's form which is included in the Contract Documents. Failure to adhere to these contract requirements and instructions may be grounds for rejection of proposal.

1. All bidders must submit proposals on the form provided in the contract documents.
2. All prime contractors will be responsible for paying the non-refundable fees associated with the use of the Architects project CAD files. Fees, forms, and limitations can be found in the project specifications, 01 33 00.
3. In all cases where the plans and specifications are unclear or conflicting it shall be the responsibility of those submitting a bid to EITHER provide a proposal which includes the greater scope or most expensive option or choice at the time of bid OR provide a timely pre-bid RFI that addresses the question in detail.
4. All salvaged items shall be relocated per the contract documents direction and in the absence of direction to the Owners main yard.
5. Any and all miscellaneous or incidental materials or work normally provided by industry standard shall be provided by the Prime Contractor for their Bid Package.
6. Each Prime Contractor shall be responsible for the Safe performance of all of their work and adhere to all safety requirements required by the contract documents and by law.
7. Proposals will be evaluated first on their conformance to the contract documents as a complete bid. Proposals may be rejected as non-responsive if determined to be inconsistent with the bid documents requirements.
8. All Prime Contractors shall provide insurance in a form and limits as required by the contract documents. Prime Contractors shall require their Subcontractors of every tier to carry insurance in a form and limits as required by the contract documents.
9. If a tentative project construction schedule is published prior to bid, it shall become part of the contract documents.
10. If a RFI LOG and/or responses are published prior to bid it shall become part of the contract documents.
11. If a soils report is published prior to bid it shall become part of the contract documents with limitations as stated therein.
12. If a SWPPP is published prior to bid it shall become part of the project and each Prime Contractor, whose work is affected by the implementation shall be responsible for that cost.
13. Each Prime Contractor shall be responsible for locating roof jacks for their scope of work.
14. Any repairs (if required, due to damage by a Prime Contractor) to existing finishes such as plaster, sheetrock, paint, or concrete must be done between natural breaks such as corner to corner or score line to score line.

15. All Prime Contractors shall provide a contact cell phone number to the Construction Manager for contact.
16. Fire watch, if required, shall be provided by the Electrical Bid Package Prime Contractor.

1.01 SUMMARY

A. General: Construction of BASE BID and Alternate portions of the work for this project, **Clovis Unified School District, Elementary School #35, Increment 1 and 2**. BASE BID and Alternate portions of the work is defined as all material, labor, equipment, and services necessary to do all work shown on the drawings and called for in the Specifications. The following specific trade requirements shall not be excluded from their proposal. Exclusion of any required scope specified shall be grounds for rejection. The scope of work for each trade shall remain as required by the Contract Documents. The specific list of scope herein shall be minimum and shall not limit the scope of that trade where required otherwise.

General Summary of the Project

The following information applies to all Bid Packages and shall be reviewed carefully for inclusion in each bid. Following are critical logistics related to the Project:

1. Hazardous Abatement is required if Hazardous Abatement Report is included in Contract Documents.
2. All work for the project will be performed during the hours of 7:00 a.m. to 3:30 p.m.
3. Submittals and material procurement shall begin immediately upon award or letter of intent from the CM.
4. Material procurement is critical and shall be diligently pursued to meet the contract schedule.
5. Prime Contractors shall review the project completely prior to bidding the work.
6. Coordination of work during the preconstruction period is equally as critical to resolving all issues prior to the start of work. Prime Contractor shall review the project, coordinate, and question any issues to allow resolution prior to the start of work.

In addition to the work noted in each package, the following will apply and become a part of the contract with each respective Prime Contractor.

Contract

All successful bidders will be required to enter into a Prime Contract Agreement with Clovis Unified School District.

Contractor Information Memos

All Addendums and Contractor Information Memo's issued during bidding will be incorporated into the Contract Documents by reference. Submission of proposal shall acknowledge that Prime Contractor has reviewed and accepts these documents as part of the Contract Documents.

Submittals and Material Procurement

1. Submittals and material procurement shall begin immediately upon award or letter of intent from the District.
2. Material procurement is critical and shall be diligently pursued to meet the contract schedule.
3. Substitutions must be noted in each bid with all costs for the specified product included in the bid and the substitution cost noted separately.

Alternates

Additive Alternates for the work are as follows. Please provide a base bid for the project then list all alternates:

1. As shown in the plans and specifications and clarified in any Addendum.

Crew Sizes

Given the tight schedule for the project, it will be necessary to have larger than normal crew sizes to meet the schedule. This is inclusive of all trades. All Prime Contractors shall review the schedule and confirm that they can crew the project accordingly prior to submitting a bid. Include with each bid minimum and maximum crew sizes projected for the project.

Schedule

1. Prime Contractors shall review the project and schedule completely prior to bidding the work.
2. Prime Contractor will be required to provide a schedule and crew sizing showing how the work will be accomplished within the given time frame.

State Agency Requirements

1. Work under each contract shall comply with the Storm Water Pollution Prevention Plan (SWPPP) standards and as set forth in the Contract Documents.
2. All work under each contract shall comply with San Joaquin Air Pollution Control District standards. Provide dust control for own work.
3. All work shall comply with OSHA requirements.

Access Plan

If an access and site logistics plan is included in the Contract Documents, access and restriction shall be enforced as a part of the project. Please advise of any questions regarding the plan prior to bid.

Site Logistics, Work and Coordination (applies to each Prime Contractor):

1. Fingerprinting will be required as called for in the contract documents when contact with students may occur.
2. Review and verify all existing conditions.
3. Power will be provided to within 100'-0" of all buildings. Each Prime will be required to provide all necessary temporary utility distribution from services provided.
4. All Prime Contractors shall attend coordination meetings and provide coordination drawings for underground and above ceiling work for work related to its Bid Package and scope for coordination of utilities, openings and other areas that require interface between trades. Coordinate all drawings with the drawings of this bid package. Note conflicts and provide potential solutions to the CM for Architect review. Coordination and drawing approval must occur prior to excavation and/or overhead work. Prime Contractors shall attend a pre-installation meeting prior to the start of its work onsite. All Prime contractors shall be available for pre-installation meetings of other Bid Packages for coordination of related work.
5. Only company vehicles are allowed onsite. Personal vehicles will not be allowed on-site except for in identified locations shown in contract documents. Prime Contractor to make provisions for transport or tool distribution needs.
6. Lunch and breaks shall be at designated areas. No other areas will be allowed.
7. Protect all work, new and existing from damage until acceptance by owner.

8. Storage areas will be confined to the areas designated by CM. Staging areas around the building shall be coordinated with the CM.
9. Provide written request for information through the CM for layout information from related Bid Packages for all rough-in, embedded items, openings, and block-outs, etc.
10. Request and review all associated shop drawings for coordination and layout purposes prior to installation of related materials.
11. Furnish and install all trims, escutcheons, and sealant for own work abutting other materials.
12. Furnish and install protection of all roofing for own work.
13. Furnish and install all physical layout for own work.
14. There will be one wash out area as designated by the CM. Each Prime Contractor will be responsible for removal from the site of all debris and spoils generated by their scope. All spoils are to be moved to the dedicated location on site.
15. Coordinate all work with mechanical, plumbing, fire sprinkler, and electrical Bid Packages for shut down of services as needed. 48-hour notice is required prior to all shut down activities.
16. Review as-builts and underground locator survey and pothole utilities prior to starting work.
17. All Bid Packages are responsible for cleaning of the street, due to tracking out excess dirt or mud, should the preventative measures set in place in accordance with the SWPPP and Dust Control Plans fail to stop all spoils from escaping the site.
18. Secure all ladders and lifts each evening.
19. Provide caution tape and/or barriers for open area work and traffic control.
20. Protect all work, new and existing, from damage until acceptance by owner.
21. Provide water and shade for own crews.
22. Furnish access to roof for own work. Ladders are to be removed and secured at the end of each shift.
23. Provide fall protection for own work in own Bid Package unless specifically noted otherwise in each Bid Package.
24. Provide caution tape and/or barriers for open area work and traffic control. In accordance with all applicable Federal, State, Local, and District standards.
25. Provide layout and coordinate all demolition and ceiling removal required for your scope of work.
26. Coordinate extent of all demolition with related Prime Contractors prior to starting work.
27. Patch Fireproofing at all utilities for own work.
28. Protect all countertops as required by each trade.
29. Furnish and install fire stop for all required through penetrations for own work.
30. Core penetrations through walls as required for installation of own work and patch as noted on the plans.
31. Furnish and install all access doors necessary to provide access to work included in your respective scope of work.
32. Any deviation from the contract documents resulting in additional design will be at the cost of the Prime Contractor responsible for the additional design, as well as any associated cost for delay of schedule.
33. Each Prime Contractor is to provide all equipment and manpower as necessary to offload all materials required to complete their respective scope of work.
34. Monthly payment applications will not be approved if as-builts are not up to date.
35. Adequate manpower is required by Prime Contractor to maintain the posted construction schedule.
36. Prime Contractor consents to execute District's Prime Contractor Agreement as provided in the Contract documents, without modification.

37. Furnish daily cleanup of all debris generated by your respective scope of work. Prime Contractor must abide by the Waste Management Specification.
38. Water Hydrants are located in development around site. Prime Contractors are responsible for own water meters for construction water needs throughout the project. Methods of delivery and use of water for the work of each trade are the responsibility of the Prime contractor.
39. Coordinate all work to provide access to buildings for other trades as scheduled. Provide a breakout schedule of where and when work will be performed that has been coordinated with other activities in the schedule for other trades.
40. Furnish and install own floor protection (i.e., tarps, plastic, plywood, etc.)
41. Furnish and install covers at all holes in elevated decks created by your work in which debris may fall to the level below, per CAL OSHA regulations.
42. All construction equipment shall meet the requirements of the SJVAPCD ISR report (Air Impact Assessment – AIA) under the Construction Clean Fleet Summary. This shall include reporting requirement as defined within the Monitoring and Reporting Schedule within the ISR for this project.

General Items to be Provided by the CM

1. Toilet and hand wash facilities.
2. Temporary site fencing.

Drawings and Specifications

Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 00 Bidding and Contract Requirements, and Division 01 General Requirements, apply to the work of each Bid Package. The work under each Bid Package shall include the furnishing and installation of all material, equipment, procedures, methods, items, and labor as required to complete the work described in each Bid Package. The work shall be completed as shown on the Drawings and Specified in any and all applicable Specification Sections.

Completion of Work

The work of each Bid Package must be completed according to the construction schedule included with the Contract Documents.

Note: The term “provide” means to “furnish and install, complete and ready for the intended use.”

The work includes, but is not limited to, the items numerically listed in each Bid Package and in accordance with the applicable Drawings and Specification Section(s). Provide all work specified within each Bid Package and applicable Specification Section(s) with the exception of items listed as “work by others.”

While the ways, means, and methods will be the responsibility of the Prime Contractor, the items in the Bid Package Summary of Work are presented for construction clarifications.

General Items – All Prime Contractors

Furnish and install all work specifically required throughout the project documents to complete the work of this Prime Contractor that specifically includes, but is not limited to the following:

Specification Sections

Division 01

Division 00

Refer to additional related specifications sections for work specifically included in this bid package noted below.

1.03 WORK UNDER OTHER CONTRACTS:

A. General Requirements:

1. Work under separate contracts may occur throughout the duration of the project. The work being installed under separate contracts will occur adjacent to the Contract project site including offsite work.
2. Prime Contractor shall be responsible for coordinating access to and from the site throughout the duration of the project. Access points to and from the site may vary, based upon timing and duration of separate contracts.
3. Prime Contractor shall cooperate and coordinate all work under this Contract with all work under separate contracts.
4. Should the Prime Contractor damage and/or otherwise alter work installed under separate contracts, Prime Contractor shall be responsible for the correction/repair of work installed under separate contracts.
5. Prior to the installation of the Work, coordinate the work installed or to be installed by separate contracts relative to own work.

B. Separate Contracts by Owner:

1. Coordinate as awarded.

C. Separate Contracts by Others:

1. Adjacent Properties: Residential.

D. Phasing:

1. Phasing is projected to be as shown on the Bid Schedule. However, the owner reserves the right to revise start times pending the review and award of bids.

1.04 BID PACKAGE'S DUTIES:

A. Except as specifically noted, provide, and pay for:

1. Labor, material, and equipment. **All bid packages will be required to provide full time, qualified, knowledgeable supervision for their self-performed, and sub contracted labor. See General Conditions for Contractors specification 00 07 00, and specifics of Article 4 in this reference. (ADDENDA #2)**
2. Tools, construction equipment and machinery
3. Other facilities and services necessary for proper execution and completion of Work.
4. Water: See Specification Section – TEMPORARY FACILITIES AND CONTROLS.

B. Pay legally required sales, consumer and use taxes.

C. Give required notices.

D. Comply with codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities which bear on performance of Work.

1. Prime Contractor shall certify in writing that no materials containing Asbestos are incorporated in the work, in accordance with the Asbestos Hazard Emergency Regulations Act.

E. Promptly submit written notice to CM of observed variance of Contract Documents from legal requirements.

1. Appropriate modifications to Contract Documents will adjust necessary changes.
 2. Assume responsibility for work known to be contrary to such requirements and without written notice to Architect of observed variance.
- F. Enforce strict discipline and good order among employees. Do not employ on Work:
1. Unfit persons.
 2. Persons not skilled in assigned task.
- G. Provide material, equipment, and manpower to meet Construction Schedule provided in Contract Documents.
- H. All Prime Contractors will be responsible for paying the non-refundable fees associated with the use of the Architects project CAD files. Fees, forms, and limitations can be found in the project specifications, 01 33 00.

1.05 BID PACKAGE USE OF PREMISES:

- A. Confine operations at sites to areas permitted by:
1. Laws.
 2. Ordinances.
 3. Permits.
 4. Contract Documents.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Do not load structure with weight that will endanger structure.
- D. Assume full responsibility for protection and safekeeping of Prime Contractor's and Owner's material stored on premises and keep the site and building secure at all times.
- E. Obtain and pay for use of additional storage or Work areas needed for operations.
- F. Limit use of site for work and storage.

End of Section

CES-01 – EARTHWORK, SITE CONCRETE & CMU

~~Survey~~, Earthwork, Grading, Paving, Soil Treatment, Site Concrete, Rebar, Misc. Specialties (Stair Stripping), Flag Pole, CMU, Fencing, Playground Equipment, Site Furnishings. (ADDENDA #2)

Furnish and install all work specifically required throughout the project documents to complete the work of this bid package that specifically includes, but is not limited to the following:

Specification Sections

Refer to additional related specifications sections for work specifically included in this bid package noted below.

Division 00

Division 01

Section 01 57 23 Storm Water Pollution Prevention Plan

~~Section 01 71 23 Field Engineering (ADDENDA #2)~~

Section 03 11 01 Concrete Formwork

Section 03 15 14 Drilled Anchors

Section 03 20 00 Reinforcement

Section 03 30 00 Cast-In-Place Concrete

Section 04 22 00 Concrete Masonry Units (CMU)

Section 07 14 16 Fluid-Applied Waterproofing (ADDENDA #4)

Section 07 92 00 Sealants

Section 08 70 00 Hardware

Section 08 70 00.01 Hardware schedule

Section 10 05 00 Miscellaneous Specialties (Stair Striping)

Section 10 14 53 Road and Parking Signage

Section 10 75 00 Flagpoles

Section 11 68 13 Play Equipment

Section 12 93 13 Bicycle Racks

Section 31 00 00 Offsite Development

Section 31 10 00 Site Clearing

Section 31 11 00 Clearing and Demolition

Section 31 20 00 Earthwork

Section 31 22 00 ~~22~~ Soil Materials (ADDENDA #2)

Section 31 23 00 ~~33~~ Trench Excavation and Backfill (ADDENDA #2)

~~Section 31 31 00 Soil Treatment (ADDENDA #3)~~

Section 32 12 00 Pavement

Section 32 12 16 Soil Sterilization (Weed Control)

Section 32 18 16 Playground Surfacing (ADDENDA #2)

Section 32 19 19 Ornamental Metal

Section 32 31 13 Chain Link

General Items

1. See General Notes at the beginning of the Summary of Work Specification Section for other items to be included in this Bid Package.
2. Furnish and install all layout for own work from survey provided. Prime Contractor will be responsible for all additional layout not performed by the survey contractor. Prime Contractors

- are responsible for protection of all requested survey. Any needed re-staking of already provided points will be subject to deductive change order.
3. Provide all backfill of excavations to original sub-grade for work included in this bid package.
 4. Obtain all permits required to perform the work specified in the bid package. CM will submit the Dust Control plan to the Air Board. Prime Contractor will be responsible for all other permits required to perform the work identified. Prime Contractor will be responsible for dust control for their own work.
 5. Provide daily cleanup to keep site clean and orderly.
 6. Protect identified improvements to remain on civil plan sheets.
 7. Should the Prime Contractor damage and/or otherwise alter work installed under separate contracts, Prime Contractor shall be responsible for the correction/repair of work installed under separate contracts.
 8. Prime Contractor is required to attend all coordination meetings as required by CM
 9. Phasing is projected to be as shown on the Bid Schedule. However, the Construction Manager reserves the right to revise the schedule, as necessary.
 10. Promptly submit written notice to CM of observed variance of Contract Documents from legal requirements.
 - a. Appropriate modifications to Contract Documents will adjust necessary changes.
 - b. Assume responsibility for work known to be contrary to such requirements and without written notice to Architect of observed variance.
 11. Provide material, equipment, mobilizations, and manpower to meet Construction Schedule provided in Contract Documents.
 12. Each bid package is responsible for dewatering as it pertains to their scope of work.
 13. Provide trenching plan and permits for excavations over 5' per OSHA requirements to the Construction Manager.
 14. Each Prime Contractor is to provide all equipment and manpower as necessary to offload all materials required to complete their respective scope of work.
 15. Monthly pay apps will not be approved if as-builts are not updated monthly.
 16. Furnish clean up daily and off-haul of all debris generated by this contract. Prime Contractor must abide by the Waste Management specification. This includes, but is not limited to, providing recycling tags for each haul off removed from the project site.
 17. Provide daily cleanup to keep site clean and orderly.
 18. There will be one wash out area as designated by CM. Bid package will be responsible for removal from the site of all construction debris generated by Prime Contractor's work. Extra spoils to be stockpiled at the direction of CM.
 19. All construction equipment shall meet the requirements of the SJVAPCD ISR Report (Air Impact Assessment- AIA) under the Construction Fleet Summary. This shall include reporting requirements as defined within the Monitoring and Reporting Schedule within the ISR for this project.
 20. This contract is to provide temporary power for own work until such time as building temporary power is established.

Coordination with Other Trades

1. This Prime Contractor will be responsible for the initial setup of SWPPP BMP's, as shown in the SWPPP plan drawings, including but not limited to, silt fencing, track outs and fiber rolls surrounding existing drain inlets.

2. Allow for two additional mobilizations for movement or relocation of track outs as required during construction.
3. Hold all turf areas down 2" at concrete walks and mow strips for turf, 1" at planters.
4. Location for trades to stockpile their spoils will be established with CM, and this CES-01 Prime Contractor.
5. Any survey requests require a minimum of 48-hour notice.
6. Coordinate dimensions with other related Prime Contractors of all equipment and housekeeping pads. Pad sizes shall be provided by other Prime Contractors and physically laid out and installed by this contract.
7. Coordinate installation of all sleeves for work passing through concrete work with respective Prime Contractors prior to excavation.
8. Electrical and site utility Prime Contractors shall furnish and install all concrete required for installation of thrust blocks, manholes, vaults, boxes, underground structures for work related to their contract. This contract shall furnish and install all other concrete shown including aprons mow strips and collars.
9. Install and coordinate block-outs at the site concrete to facilitate installation of fine grading by Earthwork Prime contractor and to protect concrete until fine grading is complete. Complete site concrete block-outs once fine grading is complete. Backfill and fine grade once block-outs have been poured.
10. Install and physically layout all embedded items (as provided by other Prime Contractors), holes, sleeves and block outs in concrete as shown in the contract documents, related shop drawings or provided written layout. Coordinate locations with related Prime Contractors prior to installation.
11. Provide layout drawings for all site concrete joints for approval prior to installation of site concrete.
12. Review as-builts prior to starting work.

Furnish and Install Items

SURVEY (ADDENDA #2)

- ~~1. Provide adequate move-ins for each section of work as listed on the attached Preliminary Construction Schedule.~~
- ~~2. Establish a minimum of three permanent horizontal and vertical control points on the site, remote from the building area referenced to data established by survey control points.~~
- ~~3. Provide all project surveying, marking to include all new utilities, storm, fire, sewer, electrical pads for power, pumps, controls, etc. Provide staking for all site grading, curbs, site concrete, building pads, building grid lines, column, and anchor bolt verification.~~
- ~~4. Provide review of all grades and slopes to confirm they flow to drain and are in accordance with ADA code.~~
- ~~5. Provide staking for over excavation of building pads.~~
- ~~6. Provide staking of building corner grids, for building pads, for rough grading.~~
- ~~7. Provide staking of parking lot curbs with 3' off set.~~
- ~~8. Provide elevation certifications per contract documents.~~

9. ~~Staking for underground utilities.~~
10. ~~Provide staking of all electrical vaults and boxes horizontal and vertical.~~
11. ~~Provide staking of all storm drain lines and drain inlets, drain boxes, and trench drains, sewer lines and cleanouts (100'), domestic water, fire water, gas lines, and vaults (as required for excavation and installation horizontal and vertical) at the site.~~
12. ~~Provide staking of all valve locations. (Fire, Water, Gas, and back flow preventors)~~
13. ~~Provide staking for all site lighting.~~
14. ~~Provide staking of all irrigation main lines.~~
15. ~~Provide staking for all concrete walks, curbs, gutters, signs, walls, fencing, etc.~~
16. ~~Provide staking for building corners.~~
17. ~~Provide survey for every building grid line at building pad, reference points and radiuses as required.~~
18. ~~Certify Building Pads.~~
19. ~~Provide cut sheets and reference drawings for all staked items.~~
20. ~~Certify site grades when site concrete and landscaping is complete.~~
21. ~~Stake all planters, and steps.~~
22. ~~Stake for flagpole~~
23. ~~Stake play structure areas. Play structure layout to be provided from district, survey to be included in this package.~~
24. ~~Stake for basketball, tetherball, and volleyball equipment~~
25. ~~Staking of chain link and ornamental fences and gates.~~
26. ~~Stake for all backstop fencing and drinking fountains.~~
27. ~~Staking of fence mow strips – horizontal and vertical.~~
28. ~~Stake for all CMU.~~

DEMOLITION – SITE CLEARING

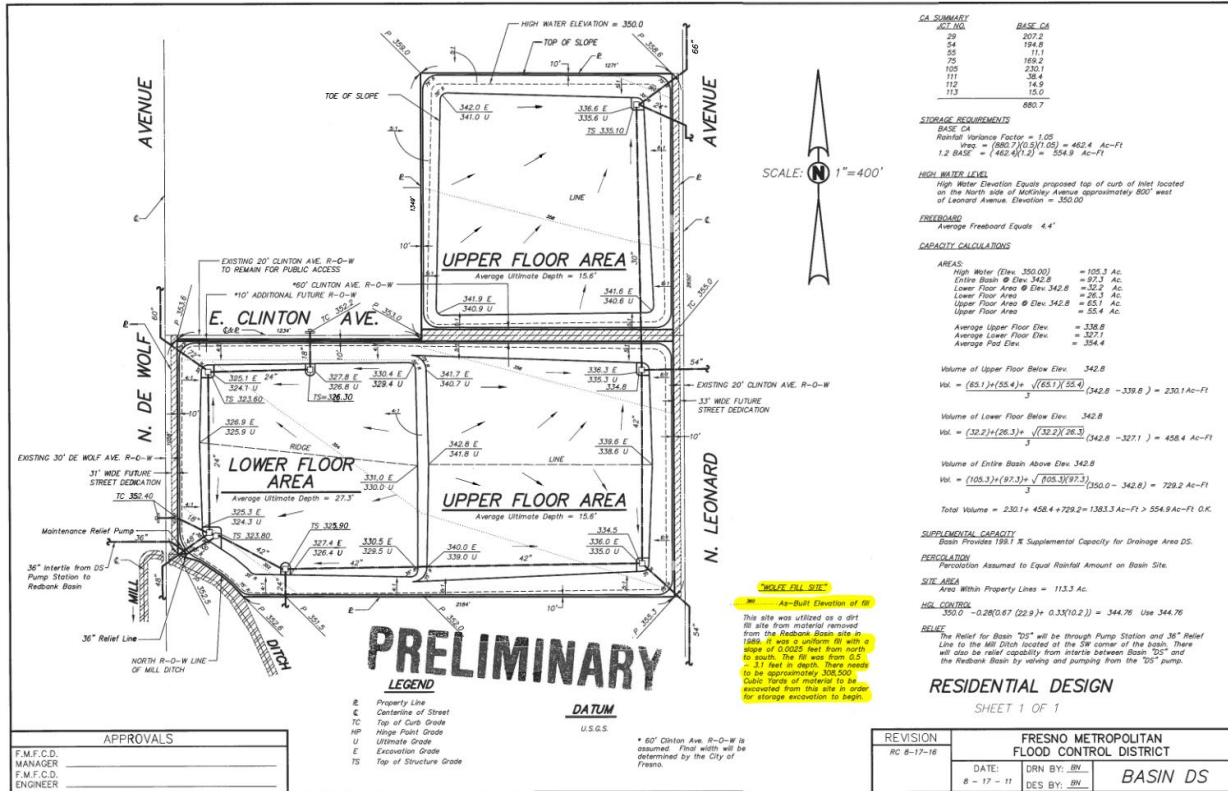
1. Provide all cut, demolition, removal, and off-haul of all items noted to be removed as shown on contract documents.
2. For site clearing and demolition follow recommendations as outlined within the soils report prepared by RMA Geoscience included in the project documents, in association with the contract documents.
3. Investigate and remove the existing 3" steel post that stands approx. 100 feet south of Weldon, and 300 feet east of Fowler. It is believed to be an abandoned fence post.
4. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.

EARTHWORK AND GRADING

1. Grade all earthwork to within +/-0.05' from a planned elevation.
2. Furnish and install all cut and fill necessary to perform work. Sand to be furnished and installed by the concrete bid package at the buildings only. ~~Import soil will be provided to the site by the owner's separate contract.~~ All other materials shall be provided by this bid package. **(ADDENDA #2)**
3. **Clarification: This will be an "Import" project. This bid package will provide and incorporate approximately 35,000 cu yds of soil to the site. The material will be obtained from the CUSD Terry Bradley Ed Center ponding basin, located between DeWolf and Leonard Ave, at East Clinton Ave, where the soils has been previously tested for toxicity and suitability. Provide a per cubic yard Schedule of Values for these import soils, should additional soils, or a reduction of soils be**

required, other than the estimated 35,000 cu yds. Provide for All loading, hauling, street cleaning, dust controls, or traffic managements required will be provided under this CES-01 Earthwork and Grading bid package. Prior to starting this scope, there will be a required coordination meeting with CES-01 contractor, CUSD, RMA, and Bush Construction to discuss plan, routing, and execution. (ADDENDA #2)

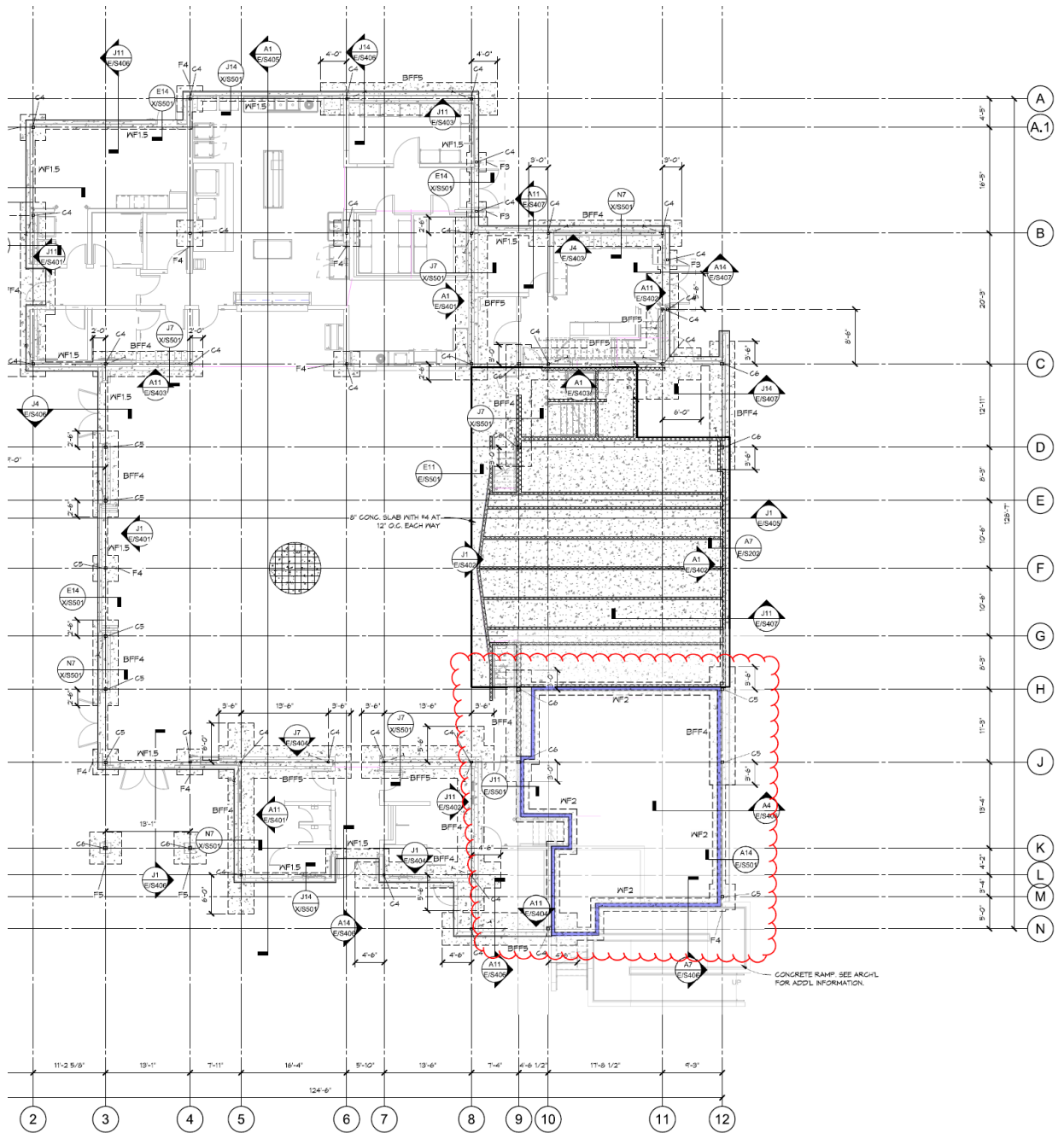
4. All areas of planters, or turf are to have a minimum top layer of 1' from existing native soil. (ADDENDA #2)
5. Furnish and install all DG where shown. (ADDENDA #2)



6. Furnish and install all grading of the site on separate move-ins (as scheduled by the CM) to accommodate the site concrete and mow strips installation. Coordinate backfill and final fine grading activities to eliminate damage to new site concrete. **Consult, and coordinate all elevations with the Landscape bid package where applicable. (ADDENDA #2)**
7. Furnish and install over excavations and building pads. (ADDENDA #2)
8. Specific to building E, from grid lines H to N, and 9 to 12, the slab is 3'-7" higher than the overall building slab. The earthwork Prime Contractor will build this up as required, then cut the material back to allow adequate work space for the structural concrete **bid package to install** footings, pour footings, build formwork, pour walls, strip, clean, and install fluid applied waterproofing. Once cured, the earthwork Prime Contractor will return to backfill and compact up against new walls and fine grade in preparation for elevated slab pour. See plan detail at end of this section for additional reference. (ADDENDA #2)
9. Furnish and install temporary ag base roadway on site for construction use, including base at laydown area. After the threat of rain, towards the end of the project, the base will need to be scrapped off, final grading established per plans, and the base is to be hauled off under this contract

bid package. (See temporary access and yard plan for extent) **CLARIFICATION: The depth of the ag base may vary but must be thick enough to hold up during the rains and site traffic. If repairs need to be made to maintain an adequate roadway, it will be performed under this bid package. Spray on dust control/soil stabilizer will also be a suitable alternative for the roadways but may require more frequent maintenance and product applications. (ADDENDA #2)**

10. Maintain and protect building pads to within tolerance, elevation, moisture, weed free and compaction until accepted/received by the concrete contractor as noted in the schedule. **(ADDENDA #2)**
11. Furnish and install all soil Sterilization as per the contract documents. **(ADDENDA #2)**
12. Furnish and install backfill of mow strips, walks, curb, curb & gutter, planter, and turf areas. **(ADDENDA #2)**
13. Furnish, install, and maintain traffic control for work included in this bid package. **(ADDENDA #2)**
14. Furnish and install engineered shoring at all locations as required. **(ADDENDA #2)**
15. For excavation, backfill and compaction efforts, follow recommendations as outlined within the soils report prepared by RMA Geoscience included in the project documents, in association with the contract documents. **(ADDENDA #2)**
16. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage. **(ADDENDA #2)**
17. Furnish and install all SWPPP items as outlined in the SWPPP plan and in spec section 01 50 00. **CLARIFICATION: SWPPP installation is to be at and within the perimeter of the project site. All "Off Site" SWPPP to and along the west side of Fowler, and south of McKinley will be bid separately. (ADDENDA #2)**
18. This package is responsible for setup and implementation of SWPPP plan. This package is also responsible for monitoring, documentation, reporting, teardown and final cleanup of SWPPP items at completion of the project. **(ADDENDA #2)**



PAVING

1. Furnish and install all **On Site** paving base rock as identified on plans, including but not limited to under parking areas, basketball courts and drives. **CLARIFICATION: All grading, paving associated with the Off-Site improvements will be furnished and installed with that bid package. (ADDENDA #2)**
2. Furnish and install all compacted base rock as identified in contract documents.
3. Furnish and install parking bumpers and wheel stops where shown.
4. Furnish and install parking striping and/or accessible symbols as shown on contract documents.
5. Furnish and install all parking and road signage as indicated in contract documents, including

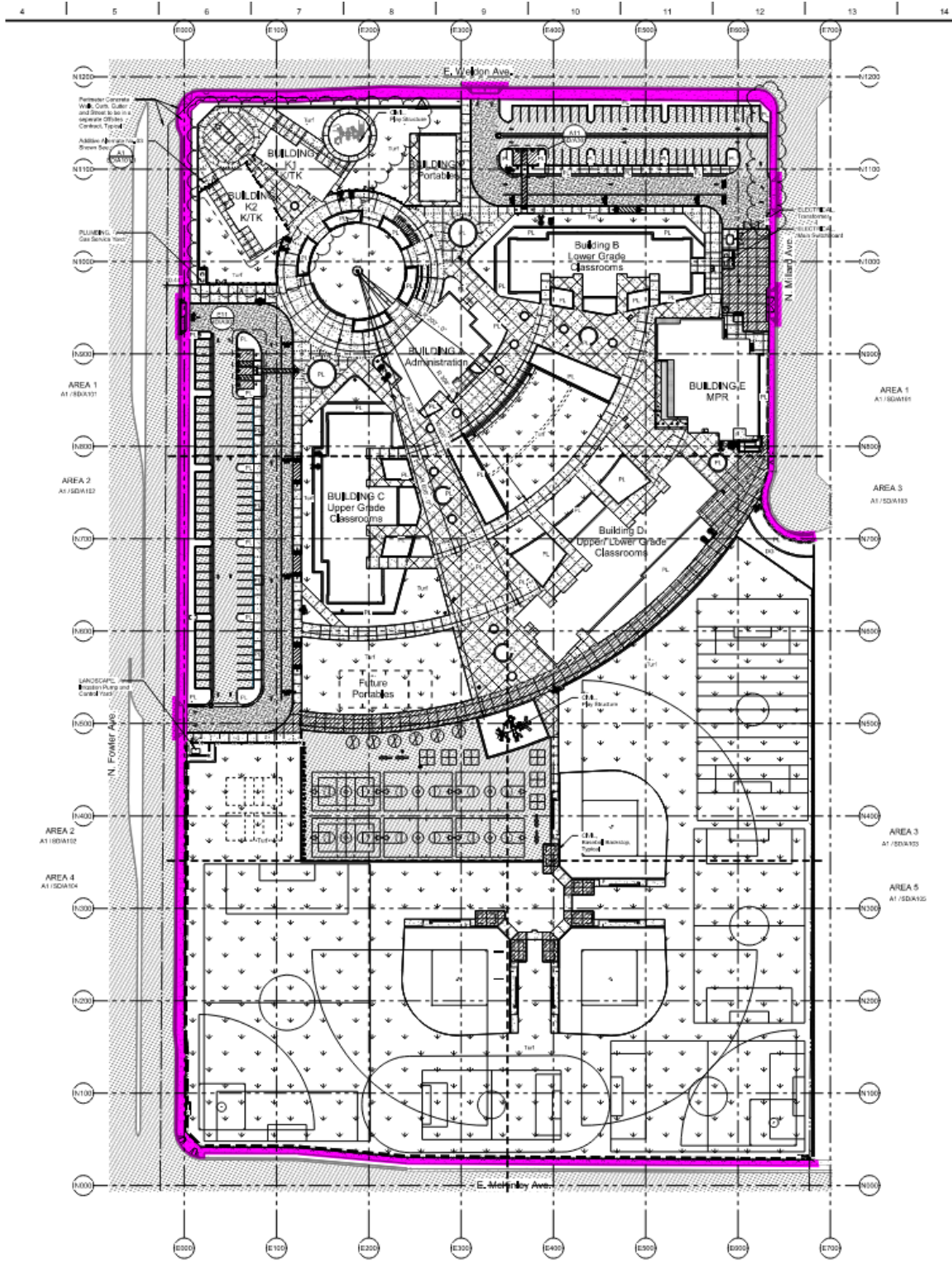
concrete at posts where indicated.

6. Furnish and install all asphalt paving and patch backs.
7. All parking areas are to be scheduled for two separate mobilizations, as the first 1 ½" lift will be placed, and the areas utilized for parking and staging during construction. At a later scheduled time in the project, this package will clean, prep, install tack, remobilize, and place the final finish section of the parking lots and entrance access points.
8. Furnish and install all slurry seal.
9. Furnish and install all play court striping as indicated in the contract documents.
10. Furnish and install pressure treated/redwood 2x4 header form at asphalt edge where unsupported unless noted otherwise.
11. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.

SITE CONCRETE

1. Furnish and install all site concrete, including but not limited to, flatwork, curbs, curb and gutter, planter curbs, planter walls, gutters, valley gutters, mow strips, seat walls, all CMU footings (Site & Maintenance Yard), and amphitheater walls. **Clarification of scope limits of work boundaries. See attached sketch at the end of this section. (ADDENDA #2)**
2. Furnish and install all reinforcing as required for all site concrete per contract documents. Including but not limited to CMU footings, seat walls, fire lane, etc.
3. Furnish and install rebar caps per OSHA for all rebar associated with this contract's scope of work, installed by the reinforcement contractor. Furnish and install concrete stake caps associated with this contract's scope of work. Maintaining of Caps is the responsibility of this Prime Contractor. Safety walks at end of day required to ensure caps are in place, and any missing caps replaced.
4. Furnish any and all excavation necessary for work included in this contract.
5. Furnish and install all mow strips in site and around buildings, including at chain link, and ornamental fencing.
6. Furnish and install all sealants at all site concrete. This includes all sealant where site concrete abuts all buildings and structural concrete or CMU.
7. Furnish and install amphitheater steps, with reinforcing and stair nosing. (N1/SD/A302 & P11/SD/A302)
8. Install bollards (a.k.a. drinking fountain rails - furnished by others) in concrete footing. (J7/X/A531)
9. Furnish and install all parking and walkway accessible concrete ramps per contract documents.
10. Furnish and install all truncated domes.
11. Furnish and install all play access and play access perimeter curbs (B/SD/X107, C/SD/X107)
12. Install steel anchor plates, steel keeper plates and welded straps at thickened concrete walk at cane bolt locations. (N13/SD/A402) – Steel anchor plates, keeper plates and welded straps to be provided by fencing contractor F.O.B.
13. Install Flagpole in concrete base with reinforcing – see detail (A1/SD/A301)
14. Furnish and Install Concrete Monument Sign with reinforcing, V groove, chamfer, etc. Refer to details
15. Furnish and install footings and sleeves/inserts for volleyball, tetherball, and basketball posts.
16. Furnish and install footings and sleeves/inserts for bicycle racks and any hand railing. Rails and racks to be supplied by others. Note: Bike racks provided by this bid package, Bike Lockers are owner furnished, owner installed.
17. Furnish and install fibrous expansion joint, and sealant where required.
18. Install three sets of handrails at amphitheater.

19. Furnish and install concrete for all site housekeeping pads. Including but not limited to, transformer, and electrical pads. Coordinate dimensions and layout with Prime Contractors.
20. Furnish and install concrete for all irrigation equipment/devices. Including, but not limited to, backflow pad, and booster pump pad. Coordinate dimensions and layout with site plumber and site landscape Prime Contractors.
21. Physically layout and install all block outs, openings, backing, etc. from written layout provided by other Prime Contractors for installation of their work.
22. This contract is to provide temporary power for own work until such time as building temporary power is established.
23. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.
24. Install steel angles, and vent grating at portables, as supplied by Struct Steel bid package. See P/a101
25. **CLARIFICATION: The perimeter sidewalks, including all drive access approaches are to be furnished and installed by the "Off-Site" bid package as highlighted site sketch below. Sidewalks will pour to the CMU, and chain link fence mow strip poured within this CES-01 bid package. (ADDENDA #2)**
26. Furnish and install removable bollards for vehicular access per plans. (ADDENDA #2)



FENCING

1. Furnish and install all chain link fences, gates, and hardware, including those embedded or attached to CMU. **Include new padlocks as noted in Addendum 2 site drawings. (ADDENDA #3)**
2. Furnish and install all backstop fencing including any horizontal backboards
3. Furnish and install all ornamental iron fence, gates, and hardware, including those embedded or attached to CMU.
4. Provide Steel Anchor Plate, Steel Welded Straps and Steel Keeper plate F.O.B. jobsite (N13/SD/A402) for placement with site concrete.
5. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.

CONCRETE MASONRY UNIT (CMU)

1. Provide and install all CMU block walls as identified in contract documents.
2. Furnish and install all rebar associated and shown to be installed in CMU, with exception of the rebar which is to be installed with the CMU footings.
3. Provide and install all smooth dowels, or other reinforcement and expansion components associated with CMU installation.
4. Coordinate and confirm reinforcement layout in footings with concrete contractor.
5. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.

PLAY EQUIPMENT AND SITE FURNISHINGS

1. Play Structures are Owner Furnished, Owner Supplied (Kindergarten Structure & Upper Grades Structure)
2. Bike lockers are Owner Furnished, Owner Supplied.
3. Provide and install all playfield and court equipment as shown in contract documents. Including, but not limited to; basketball backboards (single & double), volleyball posts, volleyball nets, tether balls and tetherball posts, dugout benches etc. Furnish all sleeves as required for proper installation of equipment.
4. Provide and install EPDM wearing surface and SBR Rubber over concrete at play structure basins.
5. Provide and install loose engineered wood fiber at play structure basins.
6. Furnish and install bicycle racks per contract documents (six total).
7. Furnish and install flagpole per detail A1/SD/A301.
8. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.

9. Furnish and install all drainage fabric, felt, and drainage matrix material, to storm drain pipe stub, that will be coordinated and provided by the site utilities contractor. (ADDENDA #2)

FOB Items

Installation of FOB Items

Note: Coordinate all deliveries to jobsite with CM. Prime Contractor to Unload, inventory, store and notify CM of any deficiencies for all items delivered to the jobsite FOB.

1. Install all items embedded in concrete provided FOB Jobsite by other Prime Contractors from written layout provided by those Prime Contractors.
2. Install all bolt templates provided by other trades.
3. Install angle iron embeds at rolling gates.

End of Bid Package

CES-02 SITE UTILITIES PLUMBING: DOMESTIC, SANITARY, STORM, FIRE, & GAS (ADDENDA #2)

Furnish and install all work specifically required throughout the project documents to complete the work of this bid package that specifically includes, but is not limited to the following:

Specification Sections

Division 00

Division 01

Section 03 30 00 Cast in place Concrete (As applicable to storm, sewer, manholes, thrust blocks, etc.)

Section 21 05 23 General Duty Valves for Fire Protection

Section 21 05 53 Identification for Fire Protection

Section 21 11 00 Facility Fire Suppression Water Service Piping

Section 21 11 19 Fire Department Connections

Section 22 00 00 General Plumbing Provisions (Gas, Water, Fire Water, Storm, Sewer)

Section 22 00 50 Plumbing (Gas, Water, Fire Water, Storm, Sewer)

Section 23 01 00 General Mechanical Provisions (As Applicable)

Section 31 23 33 Trench Excavation and Backfill

~~Section 32 84 00 Landscape Irrigation System (For Backflow Preventor and installation) (ADDENDA #2)~~

Section 33 12 00 Water Utilities

Section 33 30 00 Site Sewer Systems

Section 33 40 00 Storm Drainage

Refer to additional related specifications sections for work specifically included in this bid package noted below.

General Items

1. See General Notes at the beginning of the Summary of Work Specification Section for other items to be included in this Bid Package.
2. Furnish and install all layout for own work from survey provided. Prime Contractor will be responsible for all additional layout not performed by the survey contractor. Prime Contractors are responsible for protection of all requested survey. Any needed re-staking of already provided points will be subject to deductive change order.
3. Provide all backfill of excavations to original sub-grade for work included in this bid package.
4. Obtain all permits required to perform the work specified in the bid package. CM will submit the Dust Control plan to the Air Board. Prime Contractor will be responsible for all other permits required to perform the work identified. Prime Contractor will be responsible for dust control for their own work.
5. Provide daily cleanup to keep site clean and orderly.
6. Protect identified improvements to remain on civil plan sheets.
7. Should the Prime Contractor damage and/or otherwise alter work installed under separate contracts, Prime Contractor shall be responsible for the correction/repair of work installed under separate contracts.
8. Prime Contractor is required to attend all coordination meetings as required by CM
9. Phasing is projected to be as shown on the Bid Schedule. However, the Construction Manager reserves the right to revise the schedule, as necessary.

10. Promptly submit written notice to CM of observed variance of Contract Documents from legal requirements.
 - a. Appropriate modifications to Contract Documents will adjust necessary changes.
 - b. Assume responsibility for work known to be contrary to such requirements and without written notice to Architect of observed variance.
11. Provide material, equipment, mobilizations, and manpower to meet Construction Schedule provided in Contract Documents.
12. Each bid package is responsible for dewatering as it pertains to their scope of work.
13. Provide trenching plan and permits for excavations over 5' per OSHA requirements to the Construction Manager.
14. Each Prime Contractor is to provide all equipment and manpower as necessary to offload all materials required to complete their respective scope of work.
15. Monthly pay apps will not be approved if as-builts are not updated monthly.
16. Furnish clean up daily and off-haul of all debris generated by this contract. Prime Contractor must abide by the Waste Management specification. This includes, but is not limited to, providing recycling tags for each haul off removed from the project site.
17. Provide daily cleanup to keep site clean and orderly.
18. There will be one wash out area as designated by CM. Bid package will be responsible for removal from the site of all construction debris generated by Prime Contractor's work. Extra spoils to be stockpiled at the direction of CM.
19. All construction equipment shall meet the requirements of the SJVAPCD ISR Report (Air Impact Assessment- AIA) under the Construction Fleet Summary. This shall include reporting requirements as defined within the Monitoring and Reporting Schedule within the ISR for this project.
20. This contract is to provide temporary power for own work until such time as building temporary power is established.

Coordination with Other Trades

1. Provide coordination drawings for underground work related to this bid package. Coordinate all drawings (Plumbing, Electrical, site, Off Site, and Landscape) with the drawings of this bid package. Note conflicts and provide potential solutions to the architect for review. Coordination must occur prior to excavation and/or installation of the work. Attend all coordination meetings required to coordinate all underground.
2. Coordinate routing of underground utilities miss foundations.
3. Coordinate alignment of all utilities between plumbing and civil drawings prior to excavation.
4. All underground utilities (Gas/DCW/Fire) are to be a minimum of 3' below finish grade.
5. ~~Coordinate the installation of the backflow preventer shown in the Landscape drawings, identified on L/403, L/306, and specifications, as supplied and installed under this, Site Plumbing bid package, for alignment and further connections to the booster pump to be installed by the Irrigation Prime Contractor. (ADDENDA #2)~~

Furnish and Install Items

1. Furnish and install all site utilities and fixtures complete. Water, Fire, Sewer, Storm.
2. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.

3. Provide all backfill of excavations to original subgrade for work included in this bid package.
4. Stockpile extra spoils from excavations in location to be determined by CM
5. Furnish and install all attachment of all equipment related to this scope of work.
6. Furnish and install all excavation for own work.
7. Furnish and install all concrete required for installation of thrust blocks, manholes, vaults, boxes, underground structures, mow strips and collars for work related to this bid package.
8. Furnish and install asphalt patch back related to own work as required.
9. Adjust all utility boxes to finish grade.
10. Clean and disinfect all site piping required for this project to subsequent point of connection.
11. Furnish and install all piping required to accommodate new work.
12. Furnish, install, and maintain traffic control for work included in this package.
13. Furnish and install all site fire water, sewer systems, storm systems, domestic water & gas.
- 14. Furnish and install all dry wells, drainage, water and drinking fountains. Clarification: see G/SD/X102 from Addendum 2 drawings for dry well at ball fields. (ADDENDA #3)**
15. Furnish and install all site trench drains and piping (If shown)
16. Furnish and install all site Fire, all fire line piping, and stub in to building per plans to above finished floor with a capped flanged fitting, as the POC for the fire sprinkler contractor. Furnish and install all site check valves, Christy vaults, PIV's, FDC's, Hydrants, Backflow Preventors, and Bollards per plans at fire equipment per plans. **CLARIFICATION: See note # 6 on site plans, and J7/SD/A302 (ADDENDA #3)**
17. Furnish and install all site domestic water complete, ~~including all from POC at back flow preventors, check valves, SOV's, etc. to within 5' of buildings. (ADDENDA #2)~~
18. F&I complete storm to within 5'.
19. F&I complete gas to within 5' of where pressure regulators are shown for each building.
- ~~20. Furnish and install all offsite connections to water, sewer, storm, and gas, including water and backflow preventor for irrigation. Extend irrigation pipe 5' beyond back flow. See Detail 25/SD/L403. (ADDENDA #2)~~

FOB Items

1. None

Installation of FOB Items

Note: Coordinate all deliveries to jobsite with CM. Prime Contractor to Unload, inventory, store and notify CM of any deficiencies for all items delivered to the jobsite FOB.

1. Not Applicable.

End of Bid package

CES-03 SITE ELECTRICAL & LOW VOLTAGE (ADDENDA #2)

Furnish and install all work specifically required throughout the project documents to complete the work of this bid package that specifically includes, but is not limited to the following:

Specification Sections

Refer to additional related specifications sections for work specifically included in this bid package noted below.

Division 00

Division 01

Section 03 15 14 Drilled Anchors

Section 03 30 00 Cast in place Concrete (As applicable to slurry, and light pole bases, and grouting)

Section 26 05 00 Common Work Results for Electrical

Section 26 05 26 Grounding

Section 26 05 53 Electrical Identification

Section 26 20 00 Low Voltage Electrical Transmission

Section 27 00 00 Telecommunication Systems

Section 27 05 28 Communications Infrastructure System

Section 27 10 00 Structured Cabling System

General Items

1. See General Notes at the beginning of the Summary of Work Specification Section for other items to be included in this Bid Package.
2. Furnish and install all layout for own work from survey provided. Prime Contractor will be responsible for all additional layout not performed by the survey contractor. Prime Contractors are responsible for protection of all requested survey. Any needed re-staking of already provided points will be subject to deductive change order.
3. Provide all backfill of excavations to original sub-grade for work included in this bid package.
4. Obtain all permits required to perform the work specified in the bid package. CM will submit the Dust Control plan to the Air Board. Prime Contractor will be responsible for all other permits required to perform the work identified. Prime Contractor will be responsible for dust control for their own work.
5. Provide daily cleanup to keep site clean and orderly.
6. Protect identified improvements to remain on civil plan sheets.
7. Should the Prime Contractor damage and/or otherwise alter work installed under separate contracts, Prime Contractor shall be responsible for the correction/repair of work installed under separate contracts.
8. Prime Contractor is required to attend all coordination meetings as required by CM
9. Phasing is projected to be as shown on the Bid Schedule. However, the Construction Manager reserves the right to revise the schedule, as necessary.
10. Promptly submit written notice to CM of observed variance of Contract Documents from legal requirements.
 - a. Appropriate modifications to Contract Documents will adjust necessary changes.
 - b. Assume responsibility for work known to be contrary to such requirements and without written notice to Architect of observed variance.
11. Provide material, equipment, mobilizations, and manpower to meet Construction Schedule provided in Contract Documents.

12. Each bid package is responsible for dewatering as it pertains to their scope of work.
13. Provide trenching plan and permits for excavations over 5' per OSHA requirements to the Construction Manager.
14. Each Prime Contractor is to provide all equipment and manpower as necessary to offload all materials required to complete their respective scope of work.
15. Monthly pay apps will not be approved if as-builts are not updated monthly.
16. Furnish clean up daily and off-haul of all debris generated by this contract. Prime Contractor must abide by the Waste Management specification. This includes, but is not limited to, providing recycling tags for each haul off removed from the project site.
17. Provide daily cleanup to keep site clean and orderly.
18. There will be one wash out area as designated by CM. Bid package will be responsible for removal from the site of all construction debris generated by Prime Contractor's work. Extra spoils to be stockpiled at the direction of CM.
19. All construction equipment shall meet the requirements of the SJVAPCD ISR Report (Air Impact Assessment- AIA) under the Construction Fleet Summary. This shall include reporting requirements as defined within the Monitoring and Reporting Schedule within the ISR for this project.
20. This contract is to provide temporary power for own work until such time as building temporary power is established.

Coordination with Other Trades

1. Provide coordination drawings for underground work for work related to this bid package. Coordination must occur prior to excavation and/or installation of the work. Attend all coordination meetings required to coordinate all underground.
2. Coordinate all work to provide access to buildings for other trades as scheduled. Provide an underground utility schedule of where and when piping operations will be performed.
3. Coordinate location of UG utilities to be out of angle of repose of foundations.
4. Poured in place housekeeping and equipment pads to be supplied by concrete team. Precast housekeeping and equipment pads to be supplied and installed by this package
5. Review as-builts and pothole existing utilities prior to starting work.
6. Verify continuity of electrical and low voltage conduits for work in this contract.
- ~~7. This contract will provide all PG&E electrical requirements as outlined in the off-site connection to/for PG&E Rule 16, rule 20 drawings. This Prime Contractor will run all conduits, proof, and mandrel all conduits for the new PG&E feeders from the POC, to the transformer, then to the Switchgear. (ADDENDA #2)~~
- ~~8. Coordinate all meetings with PG&E, obtain permits, and provide all services required to facilitate and install the main power distribution on to the site. (ADDENDA #2)~~
9. Provide shop drawings for equipment layout in electrical rooms & yards to confirm that dimensions are adequate prior to rough in and pouring of footings and curbs.
- ~~10. Provide short circuit study as applicable to the installation of the main switchgear and transformer. (ADDENDA #2)~~
11. Coordinate all underground utilities to miss foundation.
- ~~12. Coordinate with PG&E, ATT, and Comcast for service requirements to the site. (ADDENDA #2)~~
13. Provide Safe off of all electrical equipment as required for trade work.
14. Provide an underground utility schedule of where and when piping operations will be Installed.

Furnish and Install Items

CLARIFICATION:

Several pieces of equipment were added in the electrical drawing revisions that were included in Addendum # 3, and are not to be furnished or installed within this bid package. The conduit, Christy's/ underground pathways for these items are to be included in this bid package. Mini Substation, PV disconnect, Transformer, IDF, and back stop PA will all be provided and installed with the Inc 2 electrical bid package, with the exception of the Owner Supplied Switchgear, that will be installed under this CES-03 package, and previously addressed. (ADDENDA #4)

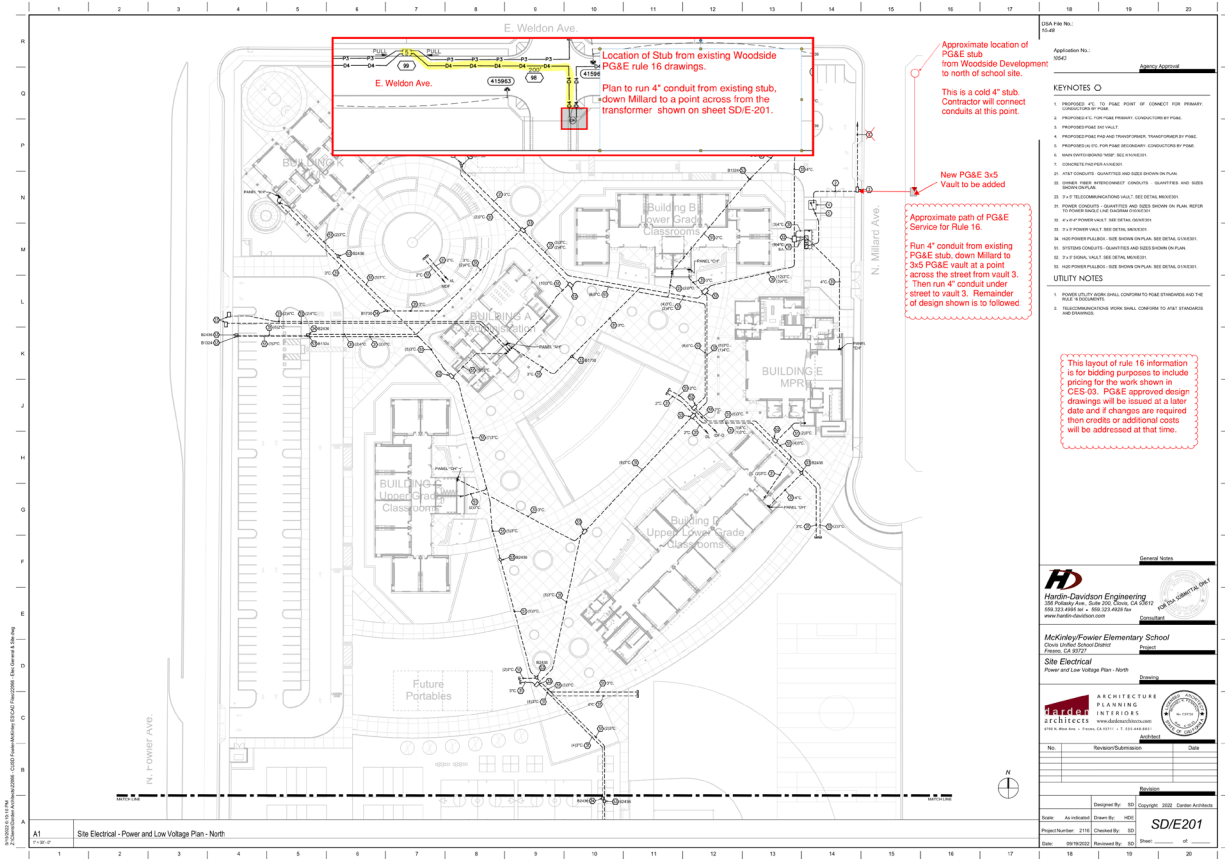
1. Furnish and install all site utilities conduit and infrastructure complete for all Power, Data, Fire Alarm, Security, Irrigation line voltage (pumps/time clocks), and EMS. **See SD/M101 from Addendum 2 for EMS site conduit clarification. (ADDENDA #3).** All conduits are to be brought to within 10' of the buildings. All stopping points are to be flagged, swing tied if possible, and recorded on the As-Builts for Increment 2 continuation. Conduits are to stop within 5' of pumps and time clocks if specific layout cannot be determined during the time of installation., and 5' for fire sprinkler components where alarm is required. **CLARIFICATION: This includes power conduit for "Coach control switches", as described in the Landscape plans. Building electrical contractor will provide and install the housing, wiring, receptacle. (ADDENDA #2)**
2. Site lighting conduit is to stop approximately 5' from the flagpole, all light pole bases, and first light of radiused (T-2's) at the concrete monument wall. **Clarifications: 1. The in-ground T-2 lighting was removed from the site at the flag pole area. Disregard reference. 2. Addendum 3 added lights at the CMU service yard. Install conduits to the footing alignment where each light is shown. Inc 2 electrician will coordinate and install the continuation conduit up in CMU. (ADDENDA #4)**
3. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.
4. Furnish and install physical layouts for all deepened foundations at utilities prior to excavation.
5. All excavation spoils to be deposited at one location on site as determined by CM.
6. Furnish and install all sleeves for work passing through masonry and concrete work. Coordinate with respective bid packages.
7. Provide all backfill of excavations to original subgrade for work included in this bid package.
8. Furnish and install fire stopping and fire caulking of own penetrations for own work.
9. Furnish and install pull strings/rope in all empty or future conduits.
10. Furnish and install all concrete required for installation of vaults, boxes, underground structures for work related to this bid package.
11. Furnish and install all site conduit required for Owner furnished equipment hook up as required.
12. Furnish and install all rough-in for all equipment of other bid packages as required by the related specification sections and drawings. Connect and or stub as described.
13. Furnish and install all conduit and sleeves for future low voltage and telecommunications wiring. Install fire stopping as required.
14. Furnish and install all attachment of all equipment related to this scope of work.
15. Furnish and install all supports and bracing required for electrical work.

16. Furnish and install all identification and lettering called for in the contract documents related to the work of this bid package.
17. Adjust all electrical and low voltage boxes in new landscape and concrete areas as needed.
18. Furnish and install all physical layout for your own work.
19. Furnish and install all site conduits, including vaults and boxes for all electrical and low voltage systems.
20. Provide all power/Breaker testing for own work.
21. Chase and prove all electrical site pathways as required to complete work.
22. Furnish and install electrical equipment, ~~switchgear~~, conduit, pre cast pads required for the utility provider (Rule 16 and similar for site power connections). **Switchgear will be Owner Furnished, Contractor Installed. (ADDENDA #2)**
23. Furnish and install all site rough-in conduit for all equipment of other trade as required by the related specification sections and drawings. Connect and or stub as described.
24. Furnish and install all site lighting conduits including vaults / boxes. Bring all conduits to within 5' of light pole locations and buildings. Cap and flag each end, (swing tie if possible) for subsequent connection by the building electrical contractor. Coordinate the location of the conduit at the building end to the point of entry established by the building electrician.
25. Furnish and install disconnects and associated supports as applicable to increment 1.
26. Furnish and install sealant system as required to provide watertight condition at devices mounted on masonry units.
27. Furnish and install PG&E, ATT, and Comcast conduit ~~wiring~~ for onsite as shown on the drawings. **(ADDENDA #2)**
28. Furnish and install all colored concrete cap over all required duct banks.
29. Furnish and install conduits for all landscape equipment such as controllers, pumps, etc. as required by the landscape drawings.
30. Furnish and install all backfill of excavations to original subgrade for work included in this contract.
31. Provide Dust Control for own work.
32. This contract will adhere to guidelines for all work per the requirements of the Dust Control Plan and SWPPP Plan.
33. All construction equipment shall meet the requirements of the SJVAPCD ISR Report (Air Impact Assessment- AIA) under the Construction Fleet Summary. This shall include reporting requirements as defined within the Monitoring and Reporting Schedule within the ISR for this Project.
- ~~34. Furnish and install all work relating to all PG&E rule drawings, off-site plans and equipment complete. Electrical Prime Contractor to pull cable for PG&E work, however final connections to be made by PG&E (ADDENDA #2)~~
35. Electrical Prime Contractor responsible for any and all patch back and finishing for any trenching made in roadways, for work performed under this bid package.
36. All excavation spoils to be deposited at one location on site as determined by CM.
37. Furnish and install all sleeves for work passing through masonry and concrete work. Coordinate with respective bid packages.
38. Provide all backfill of excavations to original subgrade for work included in this bid package.
39. Furnish and install drilling of holes for work performed in this bid package.
40. Furnish and install pull strings/rope in all empty or future conduits.
41. Furnish and install all concrete required for installation of vaults, boxes, underground structures for work related to this bid package.

42. Furnish and install all conduit and sleeves for future low voltage and telecommunications wiring. Install fire stopping as required.
43. Furnish and install all attachment of all equipment related to this scope of work.
44. Furnish and install all identification and lettering called for in the contract documents related to the work of this bid package.
45. Furnish and install all physical layout for your own work. Same as 18
- ~~46. Chase and prove all electrical off-site pathways as required to complete work. (ADDENDA #2)~~
- ~~47. Furnish and install disconnects and associated supports. (ADDENDA #2)~~
- ~~48. Furnish and install PG&E, ATT, Comcast, and Vast conduit / wiring for onsite and off-site as shown on the drawings. (ADDENDA #2)~~
49. This contract shall be responsible for holes at metal deck for installation of hanger wires for own work.

For Rule 16, and associated PG&E work. (ADDENDA #2)

1. This contract will provide all PG&E electrical requirements as outlined for connection to/for PG&E Rule 16 work in conjunction with the project drawings. This Prime Contractor will run all conduits, proof, and mandrel all conduits for the new PG&E feeders from the POC shown in the attached marked up site plan for reference, then to the transformer, then to the Switchgear. (ADDENDA #2)
2. Coordinate all meetings with PG&E, obtain permits, and provide all services required to facilitate and install the main power distribution on to the site. (ADDENDA #2)
3. Furnish and install all work relating to PG&E rule drawings, off-site plans of existing conduit pathway, to connect to new conduit and vault on site, and leading to the switchgear. (ADDENDA #2)
4. Furnish and install all excavations, and patch back to road crossing. CLARIFICATION: Millard street is not currently paved, nor have the sidewalks been installed on either side. The curbs and gutters are already installed. If damaged during installation, these repairs would also be included in this package responsibility. (ADDENDA #2)



FOB Items

Installation of FOB Items

Note: Coordinate all deliveries to jobsite with CM. Prime Contractor to Unload, inventory, store and notify CM of any deficiencies for all items delivered to the jobsite FOB.

End of Bid package

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Furnish and install all work specifically required throughout the project documents to complete the work of this bid package that specifically includes, but is not limited to the following:

Specification Sections

Division 00

Division 01

Section 03 15 14 Drilled Anchors

Section 32 84 00 Landscape Irrigation System

Section 32 90 00 Landscape Construction

Refer to additional related specifications sections for work specifically included in this bid package noted below.

General Items

1. See General Notes at the beginning of the Summary of Work Specification Section for other items to be included in this Bid Package.
2. Furnish and install all layout for own work from survey provided. Prime Contractor will be responsible for all additional layout not performed by the survey contractor. Prime Contractors are responsible for protection of all requested survey. Any needed re-staking of already provided points will be subject to deductive change order.
3. Provide all backfill of excavations to original sub-grade for work included in this bid package.
4. Obtain all permits required to perform the work specified in the bid package. CM will submit the Dust Control plan to the Air Board. Prime Contractor will be responsible for all other permits required to perform the work identified. Prime Contractor will be responsible for dust control for their own work.
5. Provide daily cleanup to keep site clean and orderly.
6. Protect identified improvements to remain on civil plan sheets.
7. Should the Prime Contractor damage and/or otherwise alter work installed under separate contracts, Prime Contractor shall be responsible for the correction/repair of work installed under separate contracts.
8. Prime Contractor is required to attend all coordination meetings as required by CM
9. Phasing is projected to be as shown on the Bid Schedule. However, the Construction Manager reserves the right to revise the schedule, as necessary.
10. Promptly submit written notice to CM of observed variance of Contract Documents from legal requirements.
 - a. Appropriate modifications to Contract Documents will adjust necessary changes.
 - b. Assume responsibility for work known to be contrary to such requirements and without written notice to Architect of observed variance.
11. Provide material, equipment, mobilizations, and manpower to meet Construction Schedule provided in Contract Documents.
12. Each bid package is responsible for dewatering as it pertains to their scope of work.
13. Provide trenching plan and permits for excavations over 5' per OSHA requirements to the Construction Manager.
14. Each Prime Contractor is to provide all equipment and manpower as necessary to offload all materials required to complete their respective scope of work.
15. Monthly pay apps will not be approved if as-builts are not updated monthly.

16. Furnish clean up daily and off-haul of all debris generated by this contract. Prime Contractor must abide by the Waste Management specification. This includes, but is not limited to, providing recycling tags for each haul off removed from the project site.
17. Provide daily cleanup to keep site clean and orderly.
18. There will be one wash out area as designated by CM. Bid package will be responsible for removal from the site of all construction debris generated by Prime Contractor's work. Extra spoils to be stockpiled at the direction of CM.
19. All construction equipment shall meet the requirements of the SJVAPCD ISR Report (Air Impact Assessment- AIA) under the Construction Fleet Summary. This shall include reporting requirements as defined within the Monitoring and Reporting Schedule within the ISR for this project.
20. This contract is to provide temporary power for own work until such time as building temporary power is established.

Coordination with Other Trades

1. Coordinate sleeve installations with site concrete.
2. Coordinate pump location, house pad, layout and elevation with electrical, plumbing, and concrete packages.
3. Coordinate all valve boxes, quick connects, with concrete, planters, and elevations.

Furnish and Install Items

1. Furnish and install all irrigation and landscaping complete. Connect to existing power, wiring and controls where required at existing landscape areas.
2. Make provisions to obtain water for own work. Dust control, excavations, backfills, compactions, etc. There are fire hydrants on two sides of the project. Make necessary arrangements with the city of Fresno to acquire a meter and pay for own water usages until such time that the site water has been installed and approved for site usage.
3. Provide and install new irrigation, controls, wiring, pumps, pre manufactured concrete pads, etc. for own work. Main power supply and connection to pumps or equipment (Line voltage), will be supplied by the electrical Prime Contractor.
4. Furnish and install all thrust blocks for own work.
5. Furnish and install grading and top soil.
6. Provide water test of turf and planter areas prior to planting to confirm proper drainage and coverage.
7. Furnish and install all irrigation sleeves.
8. Furnish and install backfill all planters.
9. Furnish and install all fine grading of planter areas prior to planting.
10. Furnish and install all irrigation pipe system from POC at main backflow preventor, installed by the site plumbing Prime Contractor per spec.
11. Furnish and install irrigation pump(s), controls, secondary backflow preventer if applicable, valves, etc. associated with the irrigation system, complete ready for electrical connection where applicable.
12. Furnish and install all new irrigation and drip irrigation complete.

13. Furnish and install all new planter dressings, bark, mulches, and all landscape materials.
CLARIFICATION: This Landscape package will be responsible to supply and install all materials as noted within the landscape plans, including screened infield top soil materials, DG, sod, Stolens, Mulches, etc. unless specifically noted otherwise. (ADDENDA #2)
- ~~14. Furnish and install all specialty play bark at play structure yards. (ADDENDA #2)~~
15. Furnish and install all baseball bases and pitching blocks per plans.
16. Furnish and provide weed control and clean up of grasses/weeds for the project site, and associated off site locations for the duration of the project, until such time that the district takes possession and acceptance of the new facility.
17. **This Landscape contractor is responsible for all the final elevations of Turf, infields, including pitchers mounds, DG, planters, tree wells, and mulches. Coordinate subgrades with Earthwork Contractor, as they will be responsible for the subgrades. (ADDENDA #2)**
18. **Furnish and install all coaches boxes/switches as shown in the Landscape plans, including valves, conduit, control wiring and connections. Coordinate locations with the Site electrical contractor for AC power conduit. Building electrical contractor to install wiring, housing for controller, and receptacle. (ADDENDA #2)**

FOB Items

1. Provide remote controllers and extra materials to the district through close out procedures with CM Construction Management process

Installation of FOB Items

Note: Coordinate all deliveries to jobsite with CM. Prime Contractor to Unload, inventory, store and notify CM of any deficiencies for all items delivered to the jobsite FOB.

End of Bid package

SECTION 051200 – STEEL AND FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Provide all material, labor, equipment and services necessary to completely install all Steel and Fabrications, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:

1. ALL DIVISION 00 SPECIFICATION SECTIONS.
2. ALL DIVISION 01 SPECIFICATION SECTIONS.
3. 03 11 01 CONCRETE FORMWORK
4. 03 15 14 DRILLED ANCHORS
5. 03 20 00 REINFORCEMENT
6. 03 30 00 CAST-IN-PLACE CONCRETE (Grouting of Bearing Plate)
7. 04 22 00 CONCRETE MASONRY UNITS
8. 05 30 00 METAL DECK
9. 06 10 00 ROUGH CARPENTRY
10. 06 41 23 MODULAR CASEWORK
11. 07 21 00 INSULATION
12. 07 40 00 METAL PANELS
13. 07 53 16 ELASTOMERIC MEMBRANE ROOFING
14. 07 60 00 SHEET METAL
15. 07 72 00 ROOF ACCESSORIES
16. 08 11 00 METAL DOORS AND FRAMES
17. 08 33 00 COILING DOORS
18. 08 41 00 STOREFRONTS
19. 08 70 00 HARDWARE
20. 09 22 16 METAL FRAMING
21. 09 50 00 ACOUSTICAL CEILINGS
22. 09 67 23 RESINOUS FLOORING
23. 09 91 00 PAINTING
24. 10 05 00 MISCELLANEOUS SPECIALTIES
25. 10 11 00 VISUAL DISPLAY BOARDS
26. 10 44 00 FIRE PROTECTION SPECIALTIES
27. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.
28. ALL SPECIFICATION SECTIONS IN THE SITE AND INFRASTRUCTURE SUBGROUP.

1.2 REFERENCES

A. Standards:

1. In accordance with Specification Section – REGULATORY REQUIREMENTS and the following standards:

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- a. AISC: American Institute of Steel Construction "Specification for Design, Fabrication and Erection of Structural Steel buildings" and "Code of Standard Practice for Steel Buildings and Bridges" and "Recommended Procedure for Identification of High Strength Steels During Fabrication."
 - 1) NOTE: All connections shall be designed by the Structural Engineer and approved by DSA/SSS.
 - 2) NOTE: All connections shall be as shown in the Contract Document drawings.
 - 3) AISC: "Architecturally Exposed Structural Steel" 2016 AISC "Code of Buildings and Bridges," Section 10.
 - 4) AISC: "Specification for Structural Joists using ASTM A 325 or ASTM A 490 Bolts."
 - 5) AISC: "Specification for Structural Steel Buildings" using the AISC 360-16.
 - 6) AISC 341 Seismic Provisions.
- b. ANSI: American National Standards Institute:
 - 1) ANSI B18.22.1 "Plain Washers."
 - 2) ANSI B18.22.1 "Beveled Washers."
- c. ASTM: American Society for Testing and Materials.
 - 1) ASTM A 123: Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
 - 2) ASTM A 153: Standard Specification for Zinc (Hot-Dip) on Iron and Steel Hardware.
 - 3) ASTM A 385: Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
 - 4) ASTM A 780: Standard Specification for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- d. AWS: American Welding Society "Structural Welding Code."
 - 1) AWS D1.1 "Structural Welding Code."
 - 2) AWS D1.8 "Structural Welding Code - Seismic Supplement."
 - 3) AWS A2.4 "Standard Symbols for Welding, Brazing, and Nondestructive Examination."
- e. ICC: International Code Council
- f. NAAMM: National Association of Architectural Metal Manufacturers
 - 1) Metal Stairs Manual
 - 2) Pipe Rail Manual.
- g. RCSC: Research Council on Structural Connections, "Specification for Structural Joints Using High-Strength Bolts."
- h. SSPC: The Society for Protective Coatings.
 - 1) SSPC-SP 1 "Solvent Cleaning."
 - 2) SSPC-SP 2 "Hand Tool Cleaning."
 - 3) SSPC-SP 3 "Power Tool Cleaning."
 - 4) SSPC-SP 6 "Commercial Blast Cleaning."
 - 5) SSPC-SP 7 "Brush-Off Blast Cleaning."

1.3 DEFINITIONS

A. Welding Definitions:

- 1. CVN Charpy V-Notch (Testing Procedure).
- 2. FCAW Flux Core Arc Welding.
- 3. FCAW-G Flux Core Arc Welding-Gas Shielded.
- 4. FCAW-SS Flux Core Arc Welding-Self Shielded.
- 5. G-MAW Gas Metal Arc Welding.

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- 6. SMAW Shielded Metal Arc Welding.
- 7. SAW Submerged Arc Welding.

1.4 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:

- 1. Product Data.
 - 1) Submit Load Indicating Device information as indicated in Part 3 of this Specification Section, and include Laboratory Test Reports and other data to show compliance with Specification (include Specified Standards).
 - 2) Include certified copies of mill reports covering chemical and physical properties of each type of steel.
 - 3) Submit primer paint system. Obtain certification from the project's Painting Contractor and Paint Manufacturer that primer paint system is compatible with proposed painting systems for this project.
- 2. Shop Drawings.
 - a. The Contract Drawings represent the spatial relationship as conceived by the Architect.
 - 1) The production of the structural steel Shop Drawings may require the employment and utilization of a 3-dimensional structural steel fabrication layout program to achieve the exact relationship of all intersecting members.
 - 2) Building sections and details represent interpretations of these relationships and the dimensions shown shall not be relied upon for accuracy and fit, but the Contractor / Structural Steel Fabricator shall verify them and double-check them for accuracy and fit.
 - 3) Any significant variations shall be submitted to the Architect and Structural Engineer for review and approval, of which the conditions may or may not require DSA/SSS review and approval.
 - 4) "Fit-Up" means and methods are the sole responsibility of the Contractor.
 - b. Provide all information necessary for the fabrication of component parts. Indicate size and weight of members, type and location of shop and field connections, size and extent of all welds, and welding sequence when required.
 - c. Include details of cuts, connections, camber, holes and other pertinent data. Include welds by Standard AWS Symbols, and show size, length and type of each weld.
 - d. Provide sections, drawings, templates and directions for installation of anchor bolts and other anchors.
 - e. Dimension requirements of structural steel for manufactured items, such as Mechanical Equipment, Dock Levelers, etc. All of these items shall be coordinated and provided by the General Contractor. The General Contractor shall also coordinate and provide dimensions to locate Structural Steel for Window Washing supports such as davits, tie-backs, etc.
- 3. Samples.
 - a. Provide material samples cut and machined for testing without charge to the Owner.
- 4. Quality Assurance/Control Submittals.
 - a. Test Reports:
 - 1) Submit mill analysis and test reports for each heat, in accordance with ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use," certifying conformity with the Specifications. Steel shall be identifiable in the fabricating shop.

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- 2) Submit test reports for each lot of high strength bolts in accordance with ASTM F 3125 "Standard Specification For High Strength Structural Bolts And Assemblies, Steel And Alloy Steel, Heat Treated, Inch Dimensions 120 Ksi And 150 Ksi Minimum Tensile Strength, And Metric Dimensions 830 MPa And 1040 MPa Minimum Tensile Strength" for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength."
 - 3) Submit Welding Procedure Specification (WPS) to the Structural Engineer for review prior to use.
 - a) For WPS's that have been qualified by test, the supporting Procedure Qualification Record (PQR) shall be submitted to the Structural Engineer for review prior to use.
 - 4) Submit to the Structural Engineer for approval, a step by step welding sequence for the field welding of each type of connection.
 - 5) Submit to the Structural Engineer a quality control plan that addresses all inspection issues, including in process and final inspection that are addressed in AWS D1.1.
- b. Certificates:
- 1) Submit current valid certificate issued by an independent testing agency for all welders, welding operators, and tack welders.
 - 2) Certification of Welder's Qualifications: Welders that will make welds in restricted access, such as, but not limited to, the bottom flange-to-column welds through a cope hole or access hole in the beam web, shall be qualified by the Contractor using the same welding procedure as will be used for production and a mock-up assembly that simulates the construction configuration.
 - 3) Provide Certified Mill Test Report Sheets in accordance with ASTM A123 "Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products," certified at the plant after galvanizing, but prior to shipment.
5. Closeout Submittals:
- a. Project Record Documents in accordance with Specification Section - PROJECT DOCUMENTS.
 - b. Warranty.

1.5 **QUALITY ASSURANCE**A. **Qualifications:**

1. **Installer Qualifications:**
 - a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this Project.
 - b. Welders shall be recently qualified by Test as prescribed in AWS "Structural Welding Code" for the type of welding to be performed.
 - 1) All welders, welding operators, and tack welders shall be qualified with the largest diameter electrode(s) to be used on the work by test and hold a current valid certificate issued by an independent testing agency, to perform the type of welds required by the work; including the process, position, and thickness of materials used (AWS D1.1: Clauses 3 & 4 Sections).
 - 2) In addition to meeting the requirements of AWS, welders that will make welds with restricted access, such as, but not limited to, the flange to column welds through a cope hole or access hole in the beam web, or where access to the bottom of a groove is restricted by the presence of a column flange, shall be qualified by the Contractor using the same welding procedure as will be used for production and a mock-up assembly that simulates the construction configuration.

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- 3) All welders on the project shall be capable of understanding and following the requirements of the written WPS.
 - 4) Each welder employed on the project shall understand all the requirements of this welding specification before welding on the project.
 - 5) The written WPS shall be available to the welder, welding supervisor, and all inspectors.
 - 6) Provide weld procedures for both pre-qualified welds and special welds to be submitted to the Owner's Testing laboratory and the Architect. Procedures shall be provided for both shop & field welds and shall be provided prior to commencing welding operations.
2. Manufacturer/Supplier Qualifications:
 - a. Structural Steel firm experienced in successfully producing/supply capacity to produce/supply required units without causing delay in the Work.
 - b. Provide documentation that the Hot-Dipped Galvanizer is a member in good association with the AGA (American Galvanizers Association).
 3. Metal Stair Qualifications:
 - a. For all surfaces exposed to view, use materials, that are smooth and free of surface blemishes including pitting, seam marks, rolled trade names and roughness.
 - b. All loading conditions resulting in eccentricities or torsion to beams and/or columns shall be resolved by the Installation of stiffeners and diagonal struts designed, supplied, and installed by the stair supplier.
 - c. Take field measurements prior to preparation of shop drawings and fabrication; do not delay job progress; allow for trimming and fitting where necessary.
 - d. Concrete for treads and landings shall attain a minimum strength of 3,000 psi in 28 days.
 - e. Metal stairs and intermediate landings:
 - 1) Stair pans and risers shall be a minimum of 10 gage material. Actual gage as required by design.
 - 2) Stringer and member sizes indicated on drawings shall be the minimum sizes allowed. Flat plate stringers are not acceptable substitutions.
- B. Regulatory Requirements:
1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
 - a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.
- C. Mockups:
1. A typical mockup of welded connections shall be provided prior to shop fabrication.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Product Handling:
1. Store materials to permit easy access for inspection and identification. Keep steel members off the ground using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

1.7 SCHEDULING

- A. Schedule the Work so that there will be no excessive inspection time. At all times that an inspector is required, sufficient work shall be laid out and adequate personnel supplied so that the Inspector's time will be used to full advantage. If inspection costs become excessive because of poor shop procedure, such excess costs will be paid for by the Owner, but deducted from the Contract Price. Poor procedures will be determined upon review of Inspection and/or Testing Reports. The rate for charging the excess costs will be as follows:
1. Minimum of three (3) certified welders are used, Owner will pay 100 percent.
 2. Only two (2) certified welders are used, Contractor will be charged 1/3 of the Inspection cost.
 3. Only one (1) certified welder is used, the Contractor will be charged 2/3 of the inspection cost.

1.8 WARRANTY

- A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.
- B. Manufacturer's Warranty:
1. In accordance with manufacturer's written standard warranty:
 - a. Warranty Period One (1) Year.
- C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES
 - a. Warranty Period One (1) Year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Specified Steel Bar Grating product manufacturer, or approved equivalent:
 - a. McNICHOLS COMPANY:
 - 1) "Welded bar grating" #GW-150A."
 - 2) "Welded bar grating" #GW-200-2."
 - 3) "Sunscreen" Welded bar grating #GW-250."
 2. Specified Aluminum Bar Grating product manufacturer, or approved equivalent:
 - a. IKG BORDEN "I-Bar IB."
 3. Specified Metal Panel product manufacturer, or approved equivalent:
 - a. McNICHOLS COMPANY:
 - 1) "Perforated Panels":
 - a) Polished Carbon Steel.
 - b) Stainless Steel.

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- 2) "Solid Panels":
 - a) Continuous Sheet.
 - b) Cylindrical "Can" Shape.
 4. Specified Galvanized Steel Wire Cloth product manufacturer, or approved equivalent:
 - a. McNICHOLS COMPANY:
 - 1) Plain Weave, 1" square opening.
 - 2) Woven Weave, 1" square opening.
 5. Specified Plastic Steel Putty product manufacturer, or approved equivalent:
 - a. DEVCON Plastic Steel Putty A.
 6. Specified primer paint product manufacturer, or approved equivalent:
 - a. PPG PAINTS, INC.
 7. Specified galvanized repair paint product manufacturer, or approved equivalent:
 - a. AERVOE INDUSTRIES, INC.
 - 1) Zinc Rich Galvanize #1141.
- B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

- A. Steel:
1. Structural Shapes, Plates, and Bars: Shall be made in accordance with ASTM A 36, "Specifications for Carbon Structural Steel."
 - a. ASTM A 572, "Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel," Grade 50.
 - b. ASTM A 992, "Standard Specification for Steel for Structural Shapes for use in Building Framing" Grade 50.
 2. Pipe: Shall be in accordance with "Specifications for Welded and Seamless Steel Pipe," ASTM A 53 "Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless," Grade B.
 - a. Finish: Type E, for concealed conditions, Black, except where indicated on the drawings to be galvanized.
 - b. Finish: Type S, for visually exposed conditions, Black, except where indicated on the drawings to be galvanized.
 3. Structural Tubes:
 - a. Cold-Formed tubing: Shall be in accordance with ASTM A 500 "Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes," Grade B.
 - b. Hot-Formed tubing: Shall be in accordance with ASTM A 501 "Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing."
 - c. All HSS sections (round and square) shall have their material certifications reviewed by the special inspector.
 - 1) The special inspector shall verify that all seam welds are fused in accordance with ASTM A 500 "Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes," Grade B.
 - 2) The special inspector shall, as a minimum, visually inspect the exterior of all seam welds.
- B. Light Gage Cold Formed Shapes: In accordance with the following, unless otherwise noted on the Structural Engineer's Drawings:

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1. ASTM A 653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process," such as "Zee" purlins, angles bent plated, etc.
 2. ASTM A 1011 "Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability."
- C. Bar Grating: Shall be primed for field finish painting, overall sizes as indicated on the drawings.
1. "Welded bar grating" as manufactured by McNICHOLS COMPANY, or approved equivalent.
 - a. Model Number: #GW-150A.
 - 1) Use Type "C" galvanized steel fasteners.
 - 2) Fill all grind marks, pits and pockets on exposed faces in the body putty, sand smooth and prep for finish.
 - 3) Miter cut all corners and angle connections. Remove all slag, grind all welds smooth, and on flat surfaces, grind flush with flat surface.
 - b. Model Number: #GW-200-2.
 - 1) Use Type "CB" galvanized-steel grate fasteners.
 - c. "Sunscreen":
 - 1) Model: #GW-250.
 - 2) 17.4 lbs/sq.ft. Heavy Duty Galvanized Steel.
 - 3) Cut to fit with Type "CB" galvanized steel grate fasteners.
 2. Aluminum Bar Grating:
 - a. Provide "I-Bar IB" configuration by IKG BORDEN, or approved equivalent, material to be 6063 aluminum alloy, weight 4.0 lbs./sq. ft.
 - 1) Depth of bearing bar to be 2-1/2 inch spaced on 1-3/16 inch centers, Standard panel width to be 13-5/16 inches.
 - 2) The cross bar is to be spaced on 4inch centers.
 - 3) The bearing bar shall be punched to receive the cross bar.
 - 4) Notching, slotting, or cutting the top or bottom flanges of the bearing bars to receive cross bars will not be permitted.
 - 5) Cross bars shall be secured to the main bearing bars by a swaging process to prevent turning, twisting or coming loose.
 - 6) Ends of cross bars to be trimmed flush with outside face of bearing bars.
 - 7) Trimming will be made in such a manner as to prevent destruction of swagged lock on bearing bar.
- D. Panels:
1. Perforated Panels (Type 1):
 - a. Manufacturer: McNICHOLS COMPANY.
 - b. Quantity: Continuous Sheet with no joints.
 - c. Material: Stainless Steel, Type 304, #4 Finish.
 - d. Thickness: 18 Gage.
 - e. Width and Length: See Drawings.
 - f. Perforation: 3/32" dia. With 1/4 inch staggered center, 11% open area.
 - g. Panel Ends and Edges: 1" margin at perimeter with hemmed edges.
 - h. Panel Fasteners:
 - 1) Manufacturer: HAFELE.
 - 2) Sleeve Nut: 1/4-20 JCN Nut Screw, 267.10.617.
 - 3) Material: Nickel Plated Steel.
 - 4) Width and Length: 17 mm x 19 mm.
 - 5) Threaded Stud: Match Sleeve Nut Threading.

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- 6) Spacer Tube: Stainless Steel, to fit over Sleeve Nut (9 mm).
 - 2. Perforated Panels (Type 2):
 - a. Manufacturer: McNICHOLS COMPANY.
 - b. Quantity: Continuous Sheet with no joints, curved to profile on drawings.
 - c. Material: Carbon Steel, polished, clear light oil finish, unprimed.
 - d. Thickness: 22 Gage.
 - e. Width and Length: 48" x 120".
 - f. Perforation: 5/32" dia. With 7/32 inch staggered centers, 46% open area.
 - g. Panel Ends and Edges: 1" margin at perimeter with hemmed edges.
 - 3. Non-Perforated Solid Panels (Type 3):
 - a. Manufacturer: McNICHOLS COMPANY.
 - b. Quantity: Continuous Sheet with no joints.
 - c. Material: Stainless Steel, Type 304, #8 Finish.
 - d. Thickness: 18 Gage.
 - e. Width and Length: See Drawings.
 - 4. Non-Perforated Solid Panels (Type 4):
 - a. Manufacturer: McNICHOLS COMPANY.
 - b. Quantity: Formed Cylindrical "Can" shape, with smooth welded edges.
 - 1) See drawings – no burrs or sharp edges allowed.
 - c. Material: Stainless Steel, Type 304, #4 Finish.
 - d. Thickness: 18 Gage.
 - e. Width and Length: See Drawings.
- E. Wire Cloth: Galvanized Steel as manufactured by McNICHOLS COMPANY:
- 1. Plain Weave, 1" square opening
 - a. (1" x 1") x 0.135 inch diameter (ID Gage).
 - 2. Woven Weave, 1" square opening
 - a. (1" x 1") x 0.135 inch diameter (ID Gage).
- F. Plastic Steel Putty:
- 1. Manufacturer: DEVCON.
 - 2. Material: Plastic Steel Putty "A".

2.3 COMPONENTS

- A. Fasteners shall be in accordance with the following, unless otherwise noted on the Structural Engineer's Drawings:
- 1. Anchor Bolts:
 - a. All anchor bolts cast in concrete or masonry shall be headed bolts with cut threads conforming to:
 - 1) ASTM F 1554 "Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength."
 - 2. Machine Bolts:
 - a. ASTM A 307 "Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength."
 - 3. Direct Tension Indicators:
 - a. Provide in accordance with ASTM F 959 "Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners," type as required.

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- 1) Use on all bolts for ASTM F 3125 "Standard Specification For High Strength Structural Bolts And Assemblies, Steel And Alloy Steel, Heat Treated, Inch Dimensions 120 Ksi And 150 Ksi Minimum Tensile Strength, And Metric Dimensions 830 MPa And 1040 MPa Minimum Tensile Strength."
4. High Strength Bolts, Nuts and Washers: Install in accordance with requirements for ASTM F3125 "Standard Specification For High Strength Structural Bolts And Assemblies, Steel And Alloy Steel, Heat Treated, Inch Dimensions 120 Ksi And 150 Ksi Minimum Tensile Strength, And Metric Dimensions 830 MPa And 1040 MPa Minimum Tensile Strength" slip critical and snug tight conditions as indicated on drawings. Install high strength bolts with snug tight type connections with threads included in shear plane except as otherwise noted. Install hardened washers in conformance with AISC Specifications.
 - a. Bolt Geometry: Bolt dimensions shall conform to the current requirements of the American National Standards Institute for Heavy Hex Structural Bolts, ANSI Standard B18.2.1. The length of bolts shall be such that the end of the bolt will be flush with or outside the face of the nut when properly installed.
 - b. Provide hexagonal heads and nuts for all connections per ASTM A 563 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process," Appendix Table X1.1.
 - c. Nut Specifications: Nuts shall conform to the current chemical and mechanical requirements of the American Society for Testing and Materials Standard Specification for Carbon and Alloy Steel Nuts, ASTM A 563 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process," Appendix Table X1.1 Provide grade A Heavy Hex nuts for ASTM A 36 threaded rods. Use grade C, Heavy Hex nuts for ASTM A 572 "Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel" Grade 50 and ASTM A 588 "Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 Mpa) Minimum Yield Point to 4-inc (100-mm) Thick" threaded rod.
 - d. Washers: Flat circular washers and square or rectangular beveled washers shall conform to the current requirements of the American Society for Testing and Materials Standard Specification for Hardened Steel Washers, ASTM F 436 "Standard Specification for Hardened Steel Washers."
 - e. Tension Control Fastener System:
 - 1) LOHR, LEJEUNE, NUCOR FASTENER, CORDOVA BOLT, INC., or approved equivalent.
5. Stud-Type Shear Connectors: ASTM A 108 "Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality" Grade 1015 or 1020 Cold-finished carbon steel with dimensions complying with AISC Specifications.
6. Power Driven Fasteners: Tempered steel pins with special corrosive resistant plating or coating. Pins shall have guide washers to accurately control penetration. Fastening shall be accomplished by low-velocity piston-driven power activated tool. Pins and tool shall be as manufactured by Hilti Fastening Systems.
7. Filler Metal and Welding Flux in accordance with AWS D1.1 Clause 5 "Fabrication Section", and AISC 360, Section A3.5, and shall meet a CVN Impact Energy of 20 ft-lbs at minus 20 Degrees F.
 - a. FCAW A5.20 or A5.29 E7XT-X.
 - b. G-MAW A5.18 or A5.28 E70S-X.
 - c. SAW A5.17 or A5.23 E7X-EXXX.
 - d. SMAW A5.1 or A5.5 E70XX Low Carbon.
8. Turnbuckles:
 - a. ASTM F 1145, "Standard Specification for Turnbuckles, Swaged, Welded, Forged."

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- b. The supplier shall provide turnbuckles manufactured from the same production lot.
- c. The manufacturer shall provide test reports indicating the safe load of the turnbuckles using a safety factor of 5.
- d. Turnbuckles shall be in compliance with ASTM F 606 "Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, and Rivets."

2.4 FABRICATION

- A. Shop Assembly:
 - 1. Fabricate in accordance with AISC Spec and AISC Code unless otherwise indicated on Drawings or Specifications.
 - a. Mechanically curve specific Structural members as indicated on the drawings in accordance with AISC requirements and tolerances.
 - 2. Fabricate all structural steel members and fittings.
 - 3. Fabricate all miscellaneous metal fabrications scheduled in Part 3 of this Specification Section.
 - 4. Architecturally Exposed Structural Steel and "Exposed to View" Metal Fabrications:
 - a. Comply with AISC - "Architecturally Exposed Structural Steel" 2010 AISC "Code of Buildings and Bridges," Section 10.
 - b. At all exposed joints, continuous fill with Plastic Steel Putty. Sand smooth and uniform and ready to receive finishes.
 - 1) Clean all areas to have smooth seams with manufacturers recommended cleaner.
 - 2) Place Steel Putty and cure.
 - c. Also, refer to drawings.
- B. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with the AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated to provide the flattest floor possible. The contractor shall coordinate member tolerances with finishes.
 - 1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 - 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
 - 3. Columns:
 - a. All columns and beams shall adhere to Section M2.7 of the referenced "Specification for Structural Steel for Buildings" which states that completed members shall be free of twists, bends, and open joints.
- C. Connections: Weld or bolt shop connections, as indicated. Bolt field connections, except where welded connections or other connections are indicated.
- D. Unless noted otherwise, make holes 1/16 inches larger than the nominal bolt diameter.
 - 1. For anchor bolts, the hole diameter may not exceed the sizes indicated in CBC Section 2204A.4, nor what is specified on the drawings.

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- E. Welding, Shop and Field: Weld by shielded arc method, submerged arc method, flux cored arc method, or other method approved by AWS. Perform welding in accordance with AWS Code. All welders, both manual and automatic, shall be certified in accordance with AWS "Standard Qualification Procedure" for the Work to be performed. See paragraph "welding" herein, for detailed requirements. If sizes of fillet welds are not shown on drawings, use AWS minimum weld size but not less than 3/16 inch fillet welds.
- F. Bolt Holes for Other Work: Provide holes required for securing other work to structural steel framing.
1. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.
 2. Cut, drill or punch holes perpendicular to metal surfaces and remove all burrs. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
- G. AISC Heavy Section shapes and built up members shall meet the requirements for joints in AISC Sections J1.5, J1.6, J2.7 and M2.2.
- H. High Strength Bolts:
1. Installation and Tightening:
 - a. Handling and Storage of Fasteners: Fasteners shall be protected from dirt and moisture at the job site.
 - 1) Only as many fasteners as are anticipated to be installed and tightened during a work shift shall be taken from protective storage.
 - 2) Fasteners not used shall be returned to protected storage at the end of the shift.
 - 3) Fasteners shall not be cleaned of lubricant that is present in as-delivered condition.
 - b. Tension Calibrator: A tension measuring device shall be required at all job sites where bolts in slip-critical joints are being installed and tightened.
 - 1) The tension measuring device shall be used to confirm:
 - a) The suitability to satisfy the requirements of AISC for the complete fastener assembly, including lubrication if required to be used in the work,
 - b) Calibration of wrenches, if applicable, and
 - c) The understanding and proper use by the bolting crew of the method to be used.
 - 2) The frequency of confirmation testing, the number of tests to be performed and the test procedure shall be as specified in 1.d. below, as applicable.
 - a) The accuracy of the tension-measuring device shall be confirmed through calibration by an approved testing agency at least annually.
 - c. Joint Assembly and Tightening of Shear/Bearing Connections: Bolts in connections not within the slip-critical category shall be installed in properly aligned holes, but need only be tightened to the snug tight condition.
 - 1) The snug tight condition is defined as the tightness that exists when all plies in a joint are in firm contact.
 - 2) This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench.
 - 3) If a slotted hole occurs in an outer ply, a flat hardened washer or common plate washer shall be installed over the slot.
 - d. Joint Assembly and Tightening of Connections Requiring Full Pre-tensioning. Slip-critical connections shall be installed in properly aligned holes and tightened by one of the following methods.

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- 1) Turn-of-nut Tightening: When turn-of-nut tightening is used, hardened washers are not required except as specified in the AISC.
 - a) A representative sample of not less than three bolts and nuts of each diameter, length and grade to be used in the work shall be checked at the start of work in a device capable of indicating bolt tension.
 - b) The test shall demonstrate that the method of estimating the snug-tight condition and controlling turns from snug tight to be used by the bolting crews develops a tension not less than five percent greater than the tension required for slip-critical connections.
- 2) Installation of Alternate Design Bolts: A representative sample of not less than three bolts of each diameter, length and grade shall be checked at the job site in a device capable of indicating bolt tension.
 - a) The test assembly shall include flat-hardened washers, if required in the actual connection, arranged as in the actual connections to be tensioned.
 - b) The calibration test shall demonstrate that each bolt develops a tension not less than five percent greater than the tension required by AISC.
 - c) Manufacturer's installation procedure shall be followed for installation of bolts in the calibration device and in all connections.
 - d) When alternate design features of the fasteners involve an irreversible mechanism such as yield or twist-off of an element, bolts shall be installed in all holes of the connection and initially brought to a snug tight condition.
 - e) All fasteners shall then be tightened, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened fasteners prior to final twist-off or yielding of the control or indicator element of the individual fasteners.
 - f) In some cases, proper tensioning of the bolts may require more than a single cycle of systematic tightening.
- e. Mark bolts that have been completely tightened with an identifying symbol.
 - 1) Final tightening of high strength bolts in webs of beam to column moment connections shall be performed after completion of flange welding.

I. Welding - General:

1. General: Quality of materials and design and fabrication of all welded connections shall conform to AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Building," AWS "Code for Welding in Building Construction," AWS "Structural Welding Code - Seismic Supplement," and requirements of this section.
 - a. Location and type of all welds shall be as shown. Make no other welded splices, except those shown on drawings, without prior approval of the architect.
2. Automatic Welding: Use electrode wire and flux for automatic and semi-automatic welding acceptable to Architect. All methods, sequences, qualification and procedures, including preheating, and post heating if necessary, shall be detailed in writing and submitted to the architect for review.
3. Qualification of Welders:
 - a. Structural steel welding: Manual and automatic welds for structural steel construction shall be made only by operators who have been previously qualified by tests, as prescribed in AWS D1.1 and D1.8 to perform type of work required.
 - b. Welders shall be checked by the welding inspector. Those not doing satisfactory work may be removed, and may be required to pass qualification tests again. All qualification testing shall be at the Contractor's expense.

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- c. Only welders whose weld procedures and pre-qualification by testing that have passed shall be considered qualified for such welds.
 4. Control cooling process after weld is completed by either step down post heat or thermal blankets as determined by procedures and prequalification.
 5. Box columns and built-up members shall have ultrasonic testing before and after welding.
 6. Flame cut surfaces shall be ground to remove contaminated steel layer to provide welds proper fusion without impurities.
 7. Preparation of surface: Surfaces to be welded shall be free of loose scale, slag, rust, grease, paint and any other foreign material.
 8. Welding equipment: Welding equipment to be used in each case shall be acceptable to welding inspector. Use equipment with suitable devices to regulate speed and manually adjust operating amperage and voltage. The amperage capacity shall be sufficient to overcome line drop, and to give adequate welding heat.
 9. Remove runoff tabs and grind surfaces smooth where the tabs would interfere with fireproofing and architectural finishes.
 10. End-welded studs:
 - a. Automatic end-welded studs: Automatically end-weld in accordance with the manufacturer's written recommendations in such a manner as to provide complete fusion between the end of the stud and the plates. There shall be no porosity or evidence of lack of fusion between the welded end of the stud and the plate. The stud shall decrease in length during welding approximately 1/8 inch for 5/8 inch, and 3/16 inch for 3/4 inch diameter. Stud sizes indicated on drawings represent the finish stud height.
 - b. Fillet-end welded studs: Studs may be welded using prequalified FCAW, GMAW, or SMAW processes provided the requirements of the AWS D1.1 Clause 7 "Stud Welding" are met as well as any other pertinent requirements of D1.1.
 11. Provide mill camber as shown on the construction documents within AISC tolerance. Place mill tolerance upward for all beams specified no camber.
- J. Railing Systems (Guard Rails, Hand Rails, Stair Rails): Assemble railing systems in shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation. Use connections that maintain structural value of joined pieces.
1. Form changes in direction of railing members as follows:
 - a. By bending (unless otherwise indicated by the contract documents).
 2. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
 3. Welded Connections: Fabricate railing systems and handrails for connecting members by welding. For connections made during fabrication, weld corners and seams continuously to comply with the following:
 - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - b. Obtain fusion without undercut or overlap.
 - c. Remove welding flux immediately.
 - d. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
 4. Nonwelded Connections: Fabricate railing systems and handrails by connecting members with railing manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

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- a. Fabricate splice joints for field connection using epoxy structural adhesive where this represents manufacturer's standard splicing method.
 5. Brackets, Flanges, Fittings, and Anchors: Provide manufacturer's standard hand rail brackets, miscellaneous brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.
 6. Provide inserts and other anchorage devices to connect handrails and railing systems to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.
 7. For railing posts set in concrete, provide preset sleeves of steel not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, and steel plate forming bottom closure.
 8. For removable railing posts, fabricate slip-fit sockets from steel tube whose inside diameter is sized for a close fit with posts and to limit deflection of post without lateral load, measured at top, to not more than 1/12 of post height. Provide socket covers designed and fabricated to resist being dislodged.
 - a. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.
 9. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
 10. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing work.
 11. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.
 12. Provide weep holes or another means to drain entrapped water in hollow sections of railing members that are exposed to exterior or to moisture from condensation or other sources.
 13. Fabricate joints that will be exposed to weather in a watertight manner.
 14. Close exposed ends of handrail and railing members with prefabricated end fittings.
 15. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of the railing and wall is 1/4 inch or less.
 16. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.
 17. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thickness. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.
- K. Bollards:
1. Fixed:
 - a. Fabricate removable metal bollards from Schedule 80 steel pipe
 - b. Size: 36" Tall not less than 4 inches nominal diameter.
 2. Removable:
 - a. Fabricate removable metal bollards from Schedule 80 steel pipe.
 - b. Size: 36" Tall not less than 4 inches nominal diameter.
 - c. Cap bollards with 1/4-inch thick steel plate.
 - d. Lift Handles: Provide removable bollards with two 1/2 inch diameter U-shaped lift handles, 6 inches long and projecting 2 inches from bollard, located on opposite sides of the bollard.
 - e. Sleeves: Fabricate sleeves for bollard anchorage from steel pipe or tubing with 1/4-inch thick steel plate welded to bottom of sleeve. Sleeve inside diameter shall be 3/4 inch larger than bollard outside diameter. Depth of sleeve shall be not less than 24 inches deep or as indicated on the drawings.

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- f. Galvanize bollard and sleeve after fabrication.

2.5 FINISHES

A. Shop Cleaning:

1. Clean all surfaces of steel. Remove all rust, mill scale, deposits of splatter, slag or flux, oil, dirt, and all other materials.
 - a. Use hand tool, power tool, sandblasting, chemical cleaning, and any other method necessary to provide a smooth, sound surface.
2. Clean contact surfaces of high strength bolt of all burrs and material, which might prevent solid seating of the parts. Steel to receive bolts shall be primer painted except beneath the contact area of slip-critical bolts.

B. Shop Priming:

1. General:
 - a. "Painting of structural steel shall comply with the requirements contained in AISC 360. Painting of open-web steel joist girders shall comply with the requirements of SJI CJ-1.0, SJI JG-1.1, SJI K-1.1 and SJI LH/DLH-1.1. Individual structural members and assembled panels of cold-formed steel construction shall be protected against corrosion in accordance with the requirements contained in AISI S100. Protection of cold-formed steel light-frame construction shall also comply with the requirements contained in AISI S200," per CBC Section 2203A.1.
 - b. Shop prime all steel except the following:
 - 1) Surfaces embedded in concrete, or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2) Contact surfaces for slip-critical (sc) high strength bolts.
 - 3) Surfaces within 2 inches of field welds.
 - 4) Top of structural support members when metal deck is welded to supports.
 - a) Primer is required when metal deck is mechanically attached to structural support members.
 - 5) Surfaces to receive sprayed-fire-resistive materials (applied fireproofing).
 - 6) Surfaces to be galvanized.
2. Priming:
 - a. Immediately after surface preparation, apply primer according to manufacturer's written instructions and at a rate recommended by SSPC to provide minimum film thickness. Use priming methods that results in full coverage of joints, corners, edges and exposed surfaces.
 - 1) Strip paint corners, crevices, bolts, welds and sharp edges.
 - 2) Apply two shop prime coats to areas, which will be inaccessible after assembly or erection.
 - b. Provide PPG PAINTS field primers; or approved equivalent, in accordance with Specification Section - SUBSTITUTION PROCEDURES. Should the Contractor substitute another paint company other than "PPG PAINTS" in Specification Section - PAINTING, then coordination of steel primers with finish coats specified in Specification Section - PAINTING is the Contractor's responsibility.
 - c. Use the following shop painting systems on all normal environment interior steelwork:
 - 1) Surface Preparation: SSPC-SP2 "Hand Tool Cleaning" or SSPC-SP3 "Power Tool Cleaning."
 - 2) Application: Follow coating manufacturer's printed directions.
 - 3) Material: PPG PAINTS MULTI-PRIME 94-258 Primer.
 - 4) Number of Coats: One.

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- 5) Dry Film Thickness: 2.0 mils minimum.
- 6) Volume Solids: 51.0 +/- 1.0% minimum.
- 7) Generic Description: Modified Alkyd Resin Universal Primer.
- d. Use the following shop painting systems on all exterior steelwork and interior steelwork subjected to wet conditions or fumes.
 - 1) Surface Preparation: SSPC-SP6 "Commercial Blast Cleaning."
 - 2) Application: Follow coating manufacturer's printed directions.
 - 3) Material: PPG PAINTS AMERCOAT 68HS Primer.
 - 4) Number of Coats: One.
 - 5) Dry Film Thickness: 5.0 mils minimum.
 - 6) Volume Solids: 78% +/-2%
 - 7) Generic Description: Reinforced Inorganic Zinc-Rich Urethane.

C. Hot-Dip Galvanizing:

1. Zinc coatings on iron and steel products in accordance with ASTM A 123 "Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products."
 - a. Minimum thickness required shall be 3.9 mils.
 - b. All items that will be exposed to view (i.e. security fence, handrails, guard rails, awnings, canopies and shade structures left exposed to view), shall be Hot-Dipped Galvanized in accordance with ASTM A 385, "Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)."
2. Zinc coatings on iron and steel hardware shall be in accordance with ASTM A 153 "Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware."
3. Galvanized repair paint: High-Zinc-Dust-Content, in accordance with SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight paint for re-galvanizing welds and repair painting galvanized steel.

D. Stainless Steel Finishes:

1. Remove tool and die marks and stretch lines or blend into finish.
2. Grind and polish to produce uniform, directionally textured, polished surfaces without cross-scratches. Run grain with long dimension of each piece.
3. Bright Directional Satin Finish No.4, unless otherwise shown on drawings.
4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.6 SOURCE QUALITY CONTROL

A. Fabrication Tolerances:

1. "Architecturally Exposed Structural Steel", all steel for the Custom Steel Fabrications and miscellaneous "Metal Fabrications" that are subject to view are defined as "Exposed-to-View" joints. All joints that are "Exposed to View" shall be in accordance with AISC Code of Standard Practice, Section 10, "Architecturally Exposed Structural Steel."
 - a. All cope, miters and butt cuts in surfaces "Exposed-to-View" are made with uniform gaps of 1/8 inch if shown to be open joints, or in reasonable contact if shown without gap, in accordance with AISC Code of Standard Practice, Section 10.3.4.

B. Tests, Inspection:

1. In accordance with Specification Section – TESTING LABORATORY SERVICES and the following:

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- a. Materials shall be certified, identified and tested in conformance with CBC Table 1705A.2.1. Commercial stock steel shall be identified in accordance with CBC Table 1705A.2.1.
 - b. Complete four-sided inspection of all steel shall be made when required by Architect.
 - c. Tests and inspection of Shop and field welding in accordance with CBC Table 1705A.2.1. Perform shop and field welding only under supervision of welding inspector.
 - 1) Welds shall be in accordance with CBC Table 1705A.2.1.
 - 2) Inspection:
 - a) Welding inspector shall be an AWS Certified Welding Inspector (CWI).
 - d. Tests & Inspection for High Strength Bolts in accordance with CBC Table 1705A.2.1.
2. Testing Laboratory:
 - a. An inspection and testing laboratory will be selected by the Owner for testing and inspection as required by the Contract Documents. The selected laboratory shall conform to the requirements of ASTM E 329 "Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction." Documentary evidence of such conformance shall be submitted to the Owner and the Governing Agency.
 - b. All materials, work, methods and equipment shall be subject to inspection at the mill, fabricating plant and at the building site. Material or workmanship not complying fully with the Contract Documents will not be accepted. The Contractor shall give the Testing Laboratory reasonable notice when ready for inspection and shall supply samples and test pieces and all facilities for inspection without extra charge. The Owner will assume the expense of making the tests and inspection except as otherwise specified in Division 1.
 3. Cost of Testing and Inspection: Costs of testing and inspection of structural steel, except as specified hereunder and in Division 1, will be paid for by the Owner.
 - a. All transportation costs and per diem living costs for inspection at fabricator's plant further than 75 miles from the job site will be back-charged to the Contractor.
 - b. It is assumed that all fabrication will take place in one shop location only. All additional inspection costs will be back-charged to the Contractor.
 - c. All mill tests and costs or re-test of plain materials shall be at the expense of the Contractor.
 - d. Costs of tests required due to Contractor's failure to provide steel identifiable in accordance with the indicated ASTM designation shall be at the expense of the Contractor.
 4. Structural Steel Testing and Inspection:
 - a. If structural steel tests are indicated as required on the structural drawings, one tension and one bend test shall be made for each size of structural shape, plate and for each tube and pipe size. Tests to be made in accordance with requirements of appropriate ASTM designations.
 - b. If structural steel tests are not indicated as required on the structural drawings, then for shapes, plates, bars, pipe and tubing, manufacturer's certified mill test reports and analysis for each heat will be acceptable for steel identifiable in accordance with indicated ASTM designation. Mill test reports shall indicate the physical and chemical properties of all structural steel used. Correlate individual heat numbers with each specified structural section.
 - c. Unidentifiable Steel:
 - 1) For F_y less than or equal to 36.0 ksi: Provide one tension and elongation test and one bend for each 5 tons or fraction thereof for each size.

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- 2) For F_y greater than 36.0 ksi: Provide one tension and elongation test and one bend or flattening for each piece.
- d. Costs of re-tests and additional testing required by the use of unidentifiable steels shall be the Contractor's responsibility. Additional costs of testing incurred by the Owner shall be deducted from the Contract Final Payment.
5. Expansion Anchors: Load test as indicated on the drawings.
6. Welding Inspection:
 - a. If shop or field welding inspection is indicated on the structural drawings, all shop and field welded operations shall be inspected by a qualified welding inspector employed by the Testing Laboratory. Such Inspector shall be a person trained and thoroughly experienced in inspection of welds. The inspector's ability to distinguish between sound and unsound welding will be reliably established.
 - b. The Welding Inspector shall make a systematic record of all welds. This record shall include:
 - 1) Identification marks of welders.
 - 2) List of defective welds.
 - 3) Manner of correction of defects.
 - c. The welding inspector shall check the material, equipment and procedure, as well as the welds. He/she shall also check the ability of the welder. He/she shall furnish the Architect with a report, duly verified by him/her that the welding which is required to be inspected is proper, and has been done in conformity with the Contract Documents, and that he/she has used all means to determine the quality of the welds.
 - d. All full penetration groove welds shall be subject to ultrasonic testing, as per AWS D1.1, Clause 6 "Inspection, Part "C", Ultrasonic Testing of Groove Welds." All defective welds shall be repaired and re-tested with ultrasonic equipment at the Contractor's expense.
 - e. Column Flanges: An area extending 6 inches above and below point where girder flanges area attached shall be inspected. Column flange edges shall be inspected visually, and entire area ultrasonically for lamination, plate discontinuities, and non-metallic inclusions.
 - f. All partial penetration groove welds shall be tested by ultrasonic testing.
 - g. When ultrasonic indications arising from the weld root be interpreted as a weld defect, the Engineer shall be notified. The Engineer may require the removal of backing strip. The backing strip shall be removed at the expense of the Contractor, and if no root defects are visible the weld shall be re-tested. If no defect is indicated on this re-test, and no significant amount of base and weld metal have been removed, no further repair of welding is necessary. If a defect is indicated, it shall be repaired and re-tested at the Contractor's expense.
 - h. The ultrasonic instrumentation will be calibrated by the technician to evaluate the quality of the welds in accordance with AWS D1.1.
 - i. Other methods of inspection, for example, X-ray, gamma ray, magnetic particle, or dye penetrant, may be used on welds if felt necessary by the inspection laboratory, and with the approval of the Engineer.
 - j. Base metal thicker than 1-1/2 inches, when subjected to through thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such weld before and after joint completion.
 - k. End-welded studs shall be sampled, tested, and inspected per the requirements of the Structural Welding Code – Steel D1.1, published by the American Welding Society.
 - l. At the discretion of the Owner's testing agency, the ultrasonic testing frequency may be reduced but may not be less than the following:

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- 1) Initially, all welds requiring ultrasonic testing will be tested at the rate of 100 percent in order to establish the qualifications of each individual welder. If the reject rate is demonstrated to be less than 5 percent of the welds tested for each welder, then the frequency of testing for that welder may be reduced to 25 percent. If the reject rate increases to 5 percent or more, 100 percent testing will be re-established until the rate is reduced to less than 5 percent. The percentage of rejects will be calculated for each welder independently. No reduction is permitted for welds identified in the contract documents as "Demand Critical."
- m. A sampling of at least 40 completed welds will be made for such reduction evaluation. Reject rate is defined as the number of welds containing rejected defects divided by the number of welds completed. For evaluating the reject rate of continuous welds over 3' in length, each 12 linear inch increment of welds, 1 inch or less in thickness, will be considered as one weld. For evaluating the reject rate of continuous welds greater than 1 inch thickness, each 6 linear inches will be considered one weld.
7. High Strength Bolting Tests and Inspection:
 - a. Furnish certified test reports for each lot of bolts in accordance with ASTM F 3125 "Standard Specification For High Strength Structural Bolts And Assemblies, Steel And Alloy Steel, Heat Treated, Inch Dimensions 120 Ksi And 150 Ksi Minimum Tensile Strength, And Metric Dimensions 830 MPa And 1040 MPa Minimum Tensile Strength." Install bolts under the supervision of a qualified inspector in accordance with , Research Council "Specifications for Structural Joints Using High-Strength Bolts" and AISC 341-16 §J7.
 - b. While the work is in progress, the Project Inspector shall determine that the requirements of this Specification are met in the work. The Project Inspector shall observe the calibration procedures and shall monitor the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is properly used to tighten all bolts.
 - 1) In addition to the requirement of the foregoing paragraph, for all connections specified to be slip critical (SC), the Project Inspector shall assure that the specified procedure was followed to achieve the pretension specified in the AISC. The pre-tension shall be verified by the Project Inspector for these bolts.
 - 2) Bolts in connections identified as not being slip-critical nor subject to direct tension need not be inspected for bolt tension other than to ensure that the piles of the connected elements have been brought into snug contact.
- C. Verification of Performance:
 1. Testing Agent shall be a qualified person or Testing Laboratory listed and approved by DSA/SSS and selected by the Architect, and the Owner.
 2. Testing Agent shall make Test and Inspection Reports certifying materials and workmanship to conform with Drawings and Specifications.
 - a. Cost of Testing and Inspection will be paid by Owner unless otherwise specified.
 - b. Cost of cutting and machining test samples shall be paid by Contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

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1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Employ a licensed land surveyor for accurate erection of structural steel.
1. Check elevations of bearing surfaces (concrete or masonry), and locations of anchor bolts and similar devices, before erection work proceeds.
 2. Report discrepancies to Architect.
 3. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with the Architect.
- B. Erect all Structural Steel frame work in accordance with AISC Specifications "Specification for the Design, Fabrication and Erection of Structural Steel for Building," latest edition, and AISC Code unless otherwise indicated on Drawings or Specification.
1. Framing: Carry up framing true and plumb. Provide temporary bracing wherever necessary to support all loads to which the structure may be subjected, including erection equipment and its operation. Leave bracing in place as long as may be required for safety. As erection progresses securely connect the work to take care of all dead load, wind and erection stresses.
 2. Connections:
 - a. Machine Bolts shall be installed with cut washer under nut.
 - b. High Strength Bolts shall be used to assemble structural joints in accordance with AISC "Specification for Structural Joints using bolts for ASTM A 325 "Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength" or ASTM A 490 "Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength," unless otherwise indicated on the drawings.
 - 1) Tighten nuts for Bolts in accordance with CBC Sections 1705A.2.1. Load Indicating Devices shall be pre-approved by the DSA/SSS, and certification by an independent testing laboratory stating that the devices meet AISC Specifications shall be submitted to Project Engineer and DSA/SSS.
 - 2) Manufacturer shall also submit installation procedures prior to incorporation into the work for approval by the Project Engineer.
 - 3) Once approved, manufacturer's installation instructions shall be followed for all conditions. Mark bolts that have been completely tightened with an identifying symbol.
 - 4) Connections shall be slip-critical (SC) type.

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- a) Slip-critical connections, surfaces shall be in accordance with AISC "Specification for Structural Joints Using bolts for ASTM A 325 "Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength" or ASTM A 490 "Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength."
- 5) Contacting surfaces shall be painted, except for friction-type (SC) connections.
- 6) Provide washers in accordance with ASTM A 325 "Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength" or ASTM A 490 "Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength."
- c. Welding: The details of all joints, the technique of welding employed, the appearance and quality of welds made, and the methods used in correcting defective work shall conform to "AISC Specs," "AWS Code," Table 1705A.2.1.
 - 1) All "exposed-to-view" welds will be smooth and flush with no voids showing and still be in conformance with standards referenced herein.
 - 2) All exposed to view butt welds shall be flush as connected members will allow. Minor defects and transitions in metal surfaces shall be filled and sanded out with an approved metal filler prior to painting.
 - 3) Exposed fillet welds are acceptable "as is" provided the surface chevrons are shallow and have no abrupt protrusions.
- 3. Cutting Holes: The use of a cutting torch is permissible only if the metal being cut is not carrying stress during the operation and only with the prior approval of the Architect and DSA/SSS for each specific condition.
- 4. Setting Plates: Set column base plates and leveling plates to correct elevations and temporarily support on steel wedges or shims until the supported members have been plumbed, locked in place and grouted.
- C. Erection Sequence: Erect steel in accordance with special erection sequences where special erection sequences are indicated on the contract documents.
- D. Before and during erection, keep all structural steel clean. Ship, handle and store steel in a manner to avoid injury to members. Steel members showing evidence to rough handling or injury will be rejected.
- E. Mark each member with erection identification corresponding to mark shown on erection drawings. Carefully plan erection of structural steel so that no cutting and removal of material will be necessary. Do not torch burn in the field, unless specifically permitted by Engineer.
- F. Provide sufficient bracing, shoring and guys to effect safe and satisfactory erection. Provide bracing and shoring capable of holding steel work plumb and properly aligned while field connections are being made, and until lateral force resisting elements are deemed by the Architect to be capable of bracing structure. Temporary bracing shall be adequate to resist lateral forces from wind or seismic prior to the completion of the lateral resisting system.
- G. Set bearing and base plates with extreme care. Bring level, to line and grade with leveling plates or by leveling nuts and bolts. Grout solid under plates with a flowable non-shrink grout per Specification Section – CAST-IN-PLACE CONCRETE prior to applying vertical load.
- H. Field Assembly: Set structural framing accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces which will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

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1. Shimming or other adjustments not indicated on drawings shall be approved by the Engineer prior to installation. Level and plumb individual members of the structure within specified AISC tolerances except as noted herein. Column shimming shall be 1/4 inch.
- I. All welds shall be full and clean, and conform to AISC and AWS Specifications.
 - J. Erection Tolerances: Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 1. Individual pieces shall be erected so that the deviation from plumb, level and alignment shall not exceed 1 to 500 plus:
 2. The maximum displacement of the center-line of columns adjacent to elevator shafts, from the established column line, shall not be more than 1 inch at any point from the established column line in the first 20 stories.
 3. In order to provide a true, flat plane for the exterior elevations, install all steel framing at the exterior walls of the building, so that the center lines of such framing does not vary by more than 1 inch for the length of the building.
 - a. Also, install each vertical member on such grids so that its vertical center-line does not vary by more than 1/2 inch from a vertical line for each story and 1 inch for its full height.
 4. Take special care that column base plates are parallel and perpendicular to faces of columns and that bolt holes are accurately placed.
 - K. Hoisting And Bracing:
 1. Provide all hoisting and erecting equipment and power.
 2. Provide and maintain any and all safety railings, toe boards, etc., required for the erection of steel framing and metal decking.
 3. Brace the erected frame in a manner which will assure safety and proper alignment to receive the metal decking and until the concrete slabs have been poured and have set.
 4. Erect building frame true and level. Erect columns in a manner to allow for movement due to welding shrinkage and thermal expansion and contraction of framing. Check for plumb after erection of each level. Maintain structural stability of frame during erection. Provide temporary bracing where necessary to maintain frame stability and to support required loads, including equipment and its operation.

3.4 CONSTRUCTION

- A. Special Techniques:
 1. Architecturally Exposed Structural Steel and "Exposed to View" Metal Fabrications.
 - a. At all exposed joints, continuous fill with Plastic Steel Putty. Sand smooth and uniform and ready to receive finishes.
 - 1) Clean all areas to have smooth seams with manufacturers recommended cleaner.
 - 2) Place Steel Putty and cure.

3.5 REPAIR / RESTORATION

- A. Defective Work shall be immediately replaced with proper work. Such replaced Work and the Testing and Inspection for it shall be at the expense of the Contractor. If defects or damages cannot be corrected in the field, the material shall be returned to the shop or new parts furnished, as the Architect directs, and the Contractor shall pay all costs therefor.

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1. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780 "Practice for Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings."
 2. Primer Coat - On all hot-dip iron or steel that needs repair, provide one primer coat of the following:
 - a. Zinc Rich Galvanize No. 1141 by AERVOE INDUSTRIES, INC., or approved equivalent.
 - b. Provide a smooth-flowing, high-solids compound that provides a fast-drying coating that protects ferrous metals in highly corrosive environments. Coating shall be 97% pure zinc metallic flake, which leaves 94% zinc in the dry film.
 - c. Overall Dry Film Thickness: 2.0 mil.
 3. Finish Coat - On all hot-dip iron or steel that needs repair, provide one finish coat over a properly cured primer coat of the following:
 - a. Zinc Rich Galvanize No. 1141 by AERVOE INDUSTRIES, INC., or approved equivalent.
 - b. Provide a smooth-flowing, high-solids compound that provides a fast-drying coating that protects ferrous metals in highly corrosive environments. Coating shall be 97% pure zinc metallic flake, which leaves 94% zinc in the dry film.
 - c. Overall Dry Film Thickness: 2.0 mil.
- B. Touch-up Primer Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop priming to comply with SSPC-PA1 "Touching Up Shop-Painted Surfaces."
1. Clean and prepare surfaces by SSPC-SP 2 "Hand-Tool Cleaning" or SSPC-SP 3 "Power-Tool Cleaning."

3.6 FIELD QUALITY CONTROL

- A. Site Tests:
1. As required by Regulatory Requirements.
- B. Tests, inspection:
1. As required by Regulatory Requirements.
 2. Schedule inspections and notify the Architect, Project Inspector and any other regulatory agencies of the time at least 48 hours prior to the inspection.
 3. No work shall be without the inspections required by Regulatory Requirements.
 4. Tests and inspection of field welding in accordance with CBC Table 1705A.2.1. Perform field welding only under supervision of welding inspector.
 - a. Welds shall be in accordance with CBC Table 1705A.2.1.
 - b. Inspection shall be in accordance with CBC Table 1705A.2.1.
 - 1) Welding inspector shall be an AWS Certified Welding Inspector (CWI).
- C. Verification of Performance:
1. Certification:
 - a. The Contractor shall engage and pay for a registered Civil Engineer or Licensed Land Surveyor to check the alignment, plumbness, elevation, and overall accuracy of the erected framing at appropriate stages during construction and at completion of erection.
 - b. Civil Engineer or Licensed Land Surveyor shall submit written verification and certification that the entire installation is in accordance with the Contract Documents.

3.7 SCHEDULES

- A. Metal Fabrication Schedule should be used as a guide only and is not considered as a complete list. Refer to Drawings for location and details:
1. Miscellaneous backing members, brackets, and supports for work installed by other trades.
 2. Countertop Bracket
 3. Fence
 4. Gates and Frames
 5. Ladder
 6. Sunscreen
 7. Removable Bollard
 8. Guard Rail
 9. Hand Rail
 10. Handrail Bracket
 11. Stair Rail
 12. Stairs
 13. Fixed Bollard
 14. Canopy
 15. Down Spouts

END OF SECTION

SECTION 074000 – METAL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Provide all material, labor, equipment and services necessary to completely install all materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.
 2. This Section includes:
 - a. Metal Roof Panels (Flat Sloped Roof Panels)
 - b. Metal Wall Panel
- B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
1. ALL DIVISION 00 SPECIFICATION SECTIONS.
 2. ALL DIVISION 01 SPECIFICATION SECTIONS.
 3. 03 11 01 CONCRETE FORMWORK
 4. 03 30 00 CAST-IN-PLACE CONCRETE
 5. 04 21 13 BRICK MASONRY UNITS
 6. 04 21 30 THIN BRICK VENEER
 7. 04 22 00 CONCRETE MASONRY UNITS
 8. 05 12 00 STEEL AND FABRICATIONS
 9. 05 30 00 METAL DECK
 10. 07 21 00 INSULATION
 11. 07 51 13 BUILT-UP ROOFING
 12. 07 60 00 SHEET METAL
 13. 07 72 00 ROOF ACCESSORIES
 14. 07 95 00 EXPANSION JOINTS
 15. 09 22 16 METAL FRAMING
 16. 09 91 00 PAINTING
 17. 11 66 43 SCOREBOARDS
 18. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.
 19. ALL SPECIFICATION SECTIONS IN THE SITE AND INFRASTRUCTURE SUBGROUP.

1.2 REFERENCES

- A. Standards:
1. In accordance with the following Standards:
 - a. AAMA American Architectural Manufacturers Association
 - b. AATCC American Association of Textile Chemists and Colorists
 - c. AISC American Institute of Steel Construction.
 - d. FMG Factory Mutual Guide (Wind Uplift Requirements for FMG 1A- 90 minimum for Metal Roof Panels), or UL Equivalent.
 - e. ICC International Code Council (Formerly ICBO)
 - f. MBMA Metal Building Manufacturers Association, "Metal Roofing Systems Design Manual".
 - g. NAAMM National Association of Architectural Metal Manufacturers.

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- h. SMACNA Sheet Metal and Air Conditioning Contractors National Association.
- i. TAPPI Technical Association of the Pulp and Paper Industry, Inc.
- j. UL Underwriters Laboratories (FMG Equivalent for some manufacturers).

1.3 DEFINITIONS

- A. The following definitions apply to this specification section:
 1. Waterproof: Any material, treatment, or construction that resists flow or penetration of water (Means Illustrated Construction Dictionary, Third Edition, Unabridged)
 2. Weathertight: Generally meaning the ability of the roofing system (including all roof panels, side seams, end laps, roof to wall flashing, ridge flashing, hip flashing, valley flashing, high side eave flashing, rake flashing, expansion joints, curb and penetration flashing, gutters, and wall panels) to prevent water intrusion under normal climatic conditions (including wind and snow conditions) for the area where the project is constructed.
 - a. Also, the word "Weathertightness" is a variation of the word "weathertight" and shall have the same definition applied. (Definition obtained from various manufacturers warranty literature.)

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements: It is the intention of this section and the drawings to form a guide for a complete and operable system. Any items not specifically noted but necessary for a complete and operable system shall be provided under this section.
 1. General: Provide metal panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.
- B. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of roof area when tested according to ASTM E 1680 "Test method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems" at the following test-pressure difference:
 1. Test-Pressure Difference: Negative 1.57 lbf/sq. ft.
 2. Test-Pressure Difference: Positive and negative 1.57 lbf/sq. ft.
 3. Positive Preload Test-Pressure Difference:
 - a. Greater than or equal to 15.0 lbf/sq. ft. and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
 4. Negative Preload Test-Pressure Difference:
 - a. 50 percent of design wind-uplift-pressure difference.
- C. Water Penetration: No water penetration when tested according to ASTM E 1646 "Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference" at the following test-pressure difference:
 1. Test-Pressure Difference: 2.86 lbf/sq. ft. for roof slopes less than or equal to 30 degrees.
 2. Test-Pressure Difference:
 - a. 20 percent of positive design wind pressure, but not less than 6.24 lbf/sq. ft. and not more than 12.0 lbf/sq. ft. for roof slopes steeper than 30 degrees.
 3. Positive Preload Test-Pressure Difference:
 - a. Greater than or equal to 15.0 lbf/sq. ft. and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
 4. Negative Preload Test-Pressure Difference:

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- a. 50 percent of design wind-uplift-pressure difference.
- D. FMG Listing: Provide metal roof panels and component materials that comply with requirements in FMG 4471 as part of a panel roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
1. Fire/Windstorm Classification: Class 1A-90.
 2. Hail Resistance: MH Moderate Hail.
 3. Hail Resistance: SH Severe Hail.
- E. Structural Performance: Provide metal roof panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592 "Test method for Structural Performance of Sheet metal Roof and Siding Systems by Uniform Static Air Pressure Difference".
1. Wind Loads: Determine loads based on the following minimum design wind pressures:
 - a. Uniform pressure as indicated on Drawings.
 2. Deflection Limits: Engineer metal roof panel assemblies to withstand design loads with vertical deflections no greater than 1/180 of the span.
- F. Seismic Performance: Provide metal roof panel assemblies capable of withstanding the effects of earthquake motions determined according to ASCE 7, and CBC 1616A.
- G. Thermal Movements: Provide metal roof panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

- A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
1. Coordination Drawings: Roof plans and Wall Elevations drawn to scale, coordinating penetrations and roof-and/or wall-mounted items. Show the following:
 - a. Roof panels and attachments.
 - b. Purlins and Rafters.
 - c. Wall Panels and attachments.
 - d. Roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.
 - e. Wall-mounted items including supports, pipe supports and penetrations.
 2. Product Data.
 - a. Material List and product information regarding material composition, product names, profiles, shapes, finishes, and application for each item.
 - b. Submit manufacturer's standard color range for selection by the Architect.
 - c. Submit manufacturer's full color range (including any standard, premium and custom colors) of all metal panels and exposed components for selection by the Architect.
 3. Shop Drawings.

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- a. Submit shop drawings and Structural Calculations prepared by the manufacturer under the supervision of a registered Civil or Structural Engineer in the State of California, detailing fabrication and assembly of the work under this section, as well as procedures and diagrams. Include setting drawings, templates, and directions for installation of anchor bolts and other anchorage to be installed as unit of work of other related sections.
 - 1) Manufacturer shall prepare, review and approve all drawings and shop drawings prior to submittal to the Architect.
 - a) Calculations shall include design wind load pressures for components and cladding (walls and roofs) in accordance with CBC 1609A.
 - b) Calculations shall also include checks for panel spans between attachment points.
 - c) Check of attachment hardware to panel.
 - d) Check of fasteners connecting panel hardware to structure,
 - 2) Manufacturer shall approve of all details (including Architects standard details) prior to fabrication. If different details than the Architects details are required to satisfy manufacturers warranty requirements, submit the differences (highlighted as to differences) to the Architect for review.
 - 3) Show fabrication and installation layouts of metal roof panels; details of edge conditions, joints, lap seams, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.
 - 4) Include details of the following accessory items, at a scale of not less than 1-1/2 inches per 12 inches:
 - a) Flashing and trim.
 - b) Gutters.
 - c) Downspouts.
 - d) Roof curbs.
4. Samples.
 - a. For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1) Metal Panels: Provide 12 inches long by actual panel width.
 - 2) Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
 - 3) Roof Underlayment: 6 inch square samples.
 - 4) Vapor Retarders: 6 inch square samples.
 - 5) Water Barriers: 6 inch square samples.
 - 6) Accessories: 12 inch long samples for each type of accessory.
 - 7) Provide two (2) fasteners with any neoprene washers, metal washers, nuts or rivets for every type of fastener condition on this Project. Tag and label each fastener indicating that location and use for each fastener condition on this project.
5. Quality Assurance/Control Submittals:
 - a. Installer Qualifications:
 - 1) Submit three (3) copies of manufacturer's Installer Certification.
 - b. Manufacturer's Written Instructions:
 - 1) Submit three (3) copies of manufacturer's written instructions.
 - c. Manufacturer's Field Reports:
 - 1) Submit three (3) copies of manufacturer's field reports.
 - d. Manufacturer's Test Reports:
 - 1) Provide Test Reports per ASTM E 1592 or FM 4474.
 - e. Engineering Calculations:

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- 1) Submit four (4) copies of engineering calculations computed and signed by a registered Civil or Structural Engineer in the State of California.
6. Closeout Submittals in accordance with the following:
 - a. Maintenance Data in accordance with Specification Section - PROJECT CLOSEOUT.
 - b. Project Record Documents in accordance with Specification Section - PROJECT RECORD Documents.
 - c. Warranty in accordance with Specification Section - WARRANTIES.
 - 1) Special Warranties:
 - a) Twenty (20) Year Weather Tightness Warranty.
 - b) Five (5) Year Installation Warranty.
 - c) Twenty (20) Year Finish Warranty.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications:
 - a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this Project.
 - b. Engage an experienced Installer who is certified in writing by the manufacturer listed herein as qualified to install manufacturer's product (or system) in accordance with manufacturer's warranty requirements.
 - 1) Installer shall have manufacturers signed Certified Installer Agreement as a rider to the warranty.
2. Manufacturer/Supplier Qualifications:
 - a. Firm experienced in successfully producing/supplying products similar to that indicated for this Project, with sufficient production/supply capacity to produce/supply required units without causing delay in the work.
 - b. Manufacturer shall inspect during installation and after completion and report to the Architect.
 - 1) A factory trained representative approved by the manufacturer shall visit the project site a minimum of five (5) times, in order to review the installation of the metal panels, and provide a follow-up written report for the following periods in the construction schedule.
 - a) At the preliminary metal panel conference.
 - b) During the first week of installation, in order to review the installation requirements.
 - c) When the metal panel installation is approximately 50% complete
 - d) Upon completion of the metal panel installation.
 - e) When punch list and corrections have been completed

B. Regulatory Requirements:

1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
 - a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.

C. Meetings:

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1. Preliminary Metal Panel Conference: Before starting roof deck and wall panel, sheathing, wood joists or purlin and rafter construction, conduct conference scheduled by the Contractor at Project site. Review methods and procedures related to roof construction and metal roof panels including, but not limited to, the following:
 - a. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal panel installer, metal panel manufacturer's representative, deck, sheathing, wood joists or purlin and rafter installer, and installers whose work interfaces with or affects metal panels including installers of metal panel accessories and roof-mounted equipment.
 - 1) Review wood blocking layout (if any) required for metal panel fastener / anchorage system.
 - b. Coordinate the work with all other related work.
 - c. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - d. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - e. Examine conditions for compliance with requirements, including flatness and attachment to structural members.
 - f. Review structural loading limitations of metal panel substrate construction during and after roofing and wall construction.
 - g. Review metal panel flashings, special metal panel details, metal panel drainage, metal panel penetrations, equipment curbs, and condition of other construction that will affect metal panels.
 - h. Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable.
 - i. Review temporary protection requirements for metal panels during and after installation.
 - j. Review metal panel observation and repair procedures after metal panel installation.
 - k. Identify any potential problems that may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
2. Progress Meetings: Scheduled by the Contractor for the proper performance of the work.
 - a. Review for proper installation of work progress.
 - b. Identify any installation problems and acceptable corrective measures.
 - c. Identify any measures to maintain or regain project schedule of necessary.
3. Final Inspection: Scheduled by the Contractor upon proper completion of the work.
 - a. Inspect and identify any problems that may impede issuance of warranties or guaranties.
 - b. Maintain installed work until the Notice of Substantial Completion has been executed.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

- D. Protect strippable protective covering on metal panels from exposure to sunlight and high humidity, except to extent necessary for period of metal panel installation.

1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of metal panel framing and metal panel opening dimensions by field measurements before metal panel fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal panels without field measurements, or allow for field-trimming of panels. Coordinate metal panel construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

1.9 SEQUENCING AND SCHEDULING

- A. Coordinate installation of roof curbs, equipment supports, and roof penetrations, which are specified in Specification Section - ROOF ACCESSORIES.
- B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of metal panel substrate, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

- A. Contractor's General Warranty:
 - 1. In accordance with Specification Section - WARRANTIES.
 - 2. Installer shall have manufacturers signed Certified Installer Agreement as a rider to the warranty.
- B. Manufacturer's Warranty:
 - 1. Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - a. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - 1) Color fading more than 5 Hunter units when tested according to ASTM D 2244 "Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Coordinates."
 - 2) Chalking in excess of a No. 8 rating when tested according to ASTM D 4214 "Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films."
 - 3) Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - b. Finish Warranty Period: 20 years from date of Substantial Completion.
 - 1) All costs for Warranty shall be included in the bid price. There shall be no additional costs associated with the implementation or maintaining of the warranty.
 - 2. Weathertightness Warranty for Standing-Seam Metal Roof Panels:

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- a. Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
 - 1) Warranty shall include roof panel side seams, end laps, roof to wall flashing, ridge flashing, hip flashing, valley flashing, high side eave flashing, rake flashing, approved expansion joints, approved curb and penetration flashing, approved gutters and built-in gutters, and approved wall systems.
 - 2) A Factory trained manufacturer representative approved by the manufacturer shall inspect during and at completion of installation and certify that the system is acceptable to the manufacturer's weathertightness standards.
 - b. Warranty Period: 20 years from date of Substantial Completion.
- C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES
 - a. Warranty Period Five (5) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Specified Flat Sloped Roof Panel (Standing Seam) product manufacturer:
 - a. NCI (CENTRIA) SRS-3.
 - b. Acceptable alternative manufacturers:
 - 1) GARLAND R-MER SPAN.
 - 2) TREMCO TREMLOCK VP.
 - 3) UNA-CLAD UC-6WT.
 - 4) TAYLOR METAL PRODUCTS, MS-200
 - a) 22-Ga x 2" nominal high seams x 18" wide panels.
 - b) Kynar 500
 2. Specified Wall Panel product manufacturer:
 - a. NCI (CENTRIA) ECONOLAP 1/2".
 - b. Acceptable alternative manufacturers:
 - 1) AEP SPAN NU-WAVE CORRUGATED.
 - 2) TAYLOR METAL PRODUCTS, Classic 7/8" Corrugated
 - a) 22-Ga x 7/8" nominal high seams x 37-1/3" wide panels.
 - b) Kynar 500
 3. Specified Soffit Panel:
 - a. AEP SPAN FLUSH PANEL
 4. Specified Vapor Retarder:
 - a. REEF INDUSTRIES GRIFFOLYN T-65.
 5. Specified Roof Underlayment product manufacturer:
 - a. TYPAR ROOF WRAP 30.
 6. Specified Water Barrier (also qualifies as an "Air Barrier"):

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- a. TYVEK COMMERCIAL WRAP.
 - b. Acceptable alternative manufacturers:
 - 1) TYPAR METRO WRAP.
 - 7. Specified Ice and Water Shield:
 - a. GCP APPLIED TECHNOLOGIES; CE and WATER SHIELD HT.
 - 1) Formerly GRACE CONSTRUCTION PRODUCTS.
 - b. Acceptable alternative manufacturers:
 - 1) CARLISLE COATINGS & WATERPROOFING CCW WIP 300HT.
 - 8. Specified Insulation:
 - a. Acoustical Fiberglass OWENS-CORNING FIBERGLASS.
 - b. Rigid Board RMAX - "RE-COVER BOARD-3."
- B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. Properties:

- 1. Panels: Metallic-Coated Steel Sheet Prepainted with Coil Coating composed of steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755 "Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products." See Schedule Article at the end of this section for profiles and manufacturer/product names, gages, application and finish requirements.
 - a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process," G90 coating designation; structural quality.
- or-
- b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792 "Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process," Class AZ50 coating designation, Grade 50; structural quality.
- 2. Flashing and Trim: Formed from zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet (minimum thickness and material to match gage of Metal Panels, unless noted otherwise) pre-painted with coil coating. Provide custom profile shape flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fascia, and fillers. Finish flashing and trim with same finish system as adjacent metal panels. All pieces shall have self-hemmed edges fully pre-finished. No raw or field painted cut-edges will be permitted.
 - a. Provide components required for a complete metal panel assembly including trim, copings, fascia, corner units, closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels, unless otherwise indicated.
 - b. Exactly matching materials, gage of Metal Panels, profile, texture and pre-finish.
 - c. Supply in continuous lengths as long as possible with minimal seams the full extent of the roof.
 - d. As required for a pre-finished, weathertight assembly.
 - e. All metal work that comes in contact with and/or is an accessory to the metal panels shall be provided and installed by the Metal Panel Manufacturer from the same materials as the Metal Panels.
 - f. Mylar-Coated Tape: 1/4 inch x 1 inch with PSA one side and Mylar one side where required by the manufacturer.

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3. Gutters: Formed from zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet (minimum thickness to match gage of Metal Panels, unless noted otherwise) pre-painted with coil coating. Match profile of trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, sized according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced 36 inches o.c., fabricated from same metal as gutters, unless noted otherwise. Provide bronze, copper, or aluminum wire ball strainers at outlets. Finish gutters to match metal roof panels.
 4. Downspouts: Formed from zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet (minimum thickness to match gage of Metal Panels) pre-painted with coil coating; in 10-foot- long sections, complete with formed elbows and offsets, unless noted otherwise. Finish downspouts to match metal roof panels.
 5. Roof Curbs: Fabricated from 0.0747-inch- thick, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet pre-painted with coil coating, with welded top box and bottom skirt, and integral full-length cricket, unless noted otherwise. Fabricate curb sub-framing of minimum 0.0747-inch- thick, angle-, C-, or Z-shaped steel sheet, unless noted otherwise. Fabricate curb and sub-framing to withstand indicated loads, of size and height indicated. Finish roof curbs to match metal roof panels.
 - a. Insulate roof curb with 1-inch- thick minimum, rigid insulation.
- B. Vapor Retarder: Provide GRIFFOLYN "T-65."
1. Performance Requirements:
 - a. Water Vapor Permeance 0.038 grams/hr-ft²-in-Hg.
 - 1) Per ASTM E-96 "Standard Test Methods for Water Vapor Transmission of Materials".
 2. Accessories:
 - a. Seam Tape GRIFFOLYN "FAB TAPE."
 - b. Repair Tape GRIFFOLYN "GRIFF-TAPE."
- C. Roof Underlayment: Provide "TYPAR ROOF WRAP 30" with compatible lap seam tape, or approved equivalent.
1. Performance Requirements:
 - a. Gurley Hill (TAPPI T-460): Greater than 2500 sec/100cc.
 - b. Water Vapor Transmission per ASTM E-96 "Standard Test Methods for Water Vapor Transmission of Materials," Method A:
 - 1) Greater than 13 perms.
 - c. Water Penetration Resistance per AATCC-127: 165 cm on Hydrostatic Head.
 - d. Trapezoidal Test per ASTM D 5733 "Standard Test Method for Tearing Strength of Nonwoven Fabrics by the Trapezoid Procedure":
 - 1) Equal to 68 / 67.
- D. Water Barrier (also qualifies as an "Air Barrier"): Provide "TYVEK" "Commercial Wrap" with compatible lap seam tape, or approved equivalent, that complies with 60 Water Resistant, Grade D, in accordance with CBC Sections 1404.2 and 2510.6.
1. Provide manufacturer's preformed tape and recommended cap fasteners for attachment.
 2. Seam and Repair Tape: DUPONT "TYVEK 3" WIDE TAPE."
- E. Ice and Water Shield: Self-Adhering, Polyethylene-Faced Sheet, ASTM D 1970 "Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection," 40 mils thick minimum, elongation from 250 percent to 300 percent, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.
- F. Insulation:

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1. Acoustical Fiberglass: ASTM C 665 "Standard Guide for Determination of the Thermal Resistance of Low-Density Blanket-Type Mineral Fiber Insulation," type indicated below; consisting of fibers manufactured from glass, Class 1, sized to fit the interior liner panel profile.
 - a. Type I (blankets without membrane covering), passing ASTM E 136 "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C," for combustion characteristics.
 2. Roof Curb (1 inch thick minimum unless otherwise noted):
 - a. Un-faced, Glass-Fiber Board Insulation: ASTM C 612 "Standard Specification for Mineral Fiber Block and Board Thermal Insulation," Type IA or Types IA and IB; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; and with a nominal density of 3 lb/cu. ft. and thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
 3. Rigid Board (1-1/2 inch thick minimum unless otherwise noted):
 - a. Between framing members.
 - 1) In accordance with ASTM C 1289 "Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board," Type II, Class 1, isocyanurate with top and bottom surface glass fiber/organic mat facer on both sides (balanced panel), conditioned "R" value of 5.70 per inch.
 - a) Flame Spread Index: 0 - 25, in accordance with ASTM E84 "Standard Test Method for Surface Burning Characteristics of Building Materials."
 - b) Smoke Density Developed Index: 0 - 450 in accordance with ASTM E84 "Standard Test Method for Surface Burning Characteristics of Building Materials."
 - c) Compressive Strength: 20 PSI, in accordance with ASTM D 1621 "Standard Test Method for Compressive Properties Of Rigid Cellular Plastics."
 - d) 4' x 4' or 4' x 8' panels.
- G. Furring:
1. General: Comply with ASTM C 754 "Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products" for conditions indicated.
 - a. Steel Sheet Components: Complying with ASTM C 645 "Standard Specification for Nonstructural Steel Framing Members" requirements for metal and with ASTM A 653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process," G60, hot-dip galvanized zinc coating.
 2. Hat Channels (Subgirts): In accordance with ASTM C 645 "Standard Specification for Nonstructural Steel Framing Members."
 - a. Minimum Base Metal Thickness: Appropriate to depth indicated.
 - b. Depth: As indicated.
 3. Cold-Rolled Channels: Thickness appropriate to span, bare steel with minimum 1/2-inch-wide flange.
 - a. Depth: As indicated.
 - b. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare steel thickness of 0.0747 inch.
 - c. Tie Wire: ASTM A 641 "Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire," Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
 4. Zee Channels:
 - a. At Roofs: Provide in depth as indicated.

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- b. At Walls: Provide in depth as indicated.
 - 1) Zee Channels: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare metal thickness of 0.059 inch, and depth required to fit insulation thickness indicated.

2.3 ACCESSORIES

- A. Profile Closures:
 - 1. Metal: Exposed To View:
 - a. Provide metal closures, fabricated of same metal as metal roof panels.
 - 2. Neoprene: Concealed from view:
 - a. Provide closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or pre-molded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction and to prevent nesting of birds or insects.
- B. Clips: Minimum 0.0598-inch-thick, Galvanized or stainless steel panel clips per manufacturer's written recommendations (stainless steel clips only for aluminum or stainless panels) designed to withstand negative-load requirements.
 - 1. Compatible material and size with Standing Seam Roof System.
- C. Cleats: Mechanically seamed cleats formed from minimum 0.0359-inch-thick, stainless-steel.
- D. Backing Plates: Provide metal backing plates at panel end splices, fabricated from non-corrosive material recommended in writing by manufacturer.
- E. Sealants:
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C 920 "Standard Specification for Elastomeric Joint Sealants"; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: In accordance with ASTM C 1311 "Standard Specification for Solvent Release Sealants."
- F. Fasteners:
 - 1. Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating.
 - a. Fasteners for Metal Panels: Self-drilling or self-tapping type 304 stainless hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal roof panels.
 - b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
 - 1) Blind Fasteners: Stainless Steel Blind Rivets.
 - c. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
 - d. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

- e. Exposed to view fasteners shall be color matched.

2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
 - 1. Fabricate panels in longest practical lengths possible (20 foot minimum) to minimize seaming and lapping. See drawings for Curved Roof panel lengths for longer length and lapping requirements.
 - 2. Sound Control: Where sound-absorption requirements are indicated for liner panels, fabricate with 1/8 inch diameter holes at 3/8" o.c. staggered with a 10 percent free area.
- B. Provide panel profile, including major ribs for full length of panel.
- C. Fabricate metal panel joints with factory-installed butyl sealant that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly.
- D. Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal roof panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal roof panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- D. Exterior Exposed Finishes: Apply the following coil coating, as specified or indicated on Drawings for all exterior metal panels.
1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces (both sides of panel when both sides are exposed to view) to comply with coating and resin manufacturers' written instructions.
 - a. Fluoropolymer Three-Coat System: Manufacturer's standard three-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a minimum total dry film thickness of 1.5 mil; complying with physical properties and coating performance requirements of ASTM D 2247 "Standard Practice for Testing Water Resistance of Coatings in 100 percent Relative Humidity," except as modified below:
 - 1) Humidity Resistance: 2000 hours.
 - 2) Water Resistance: 2000 hours.
 2. Durability: Provide coating field tested under normal range of weather conditions for a minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of a chalk rating of 8 according to ASTM D 4214 "Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films"; and without fading in excess of 5 Hunter Units.
 3. Color: "Custom Colors" as selected by the Architect.
- E. Interior Exposed Finishes: Apply the following coil-coating, as specified or indicated on Drawings for all interior liner panels.
1. Apply pretreatment and manufacturer's standard white or light-colored epoxy primer (PPG 55PLY3305 or approved equivalent) finish, consisting of prime coat with a minimum total dry film thickness of 0.2 mils on each side.
 2. Color: "Custom Colors" as selected by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of work.
1. Examine primary and secondary metal panel framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal panel manufacturer.
 2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before metal panel installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.
 - 1. When applying Ice and Water Shield products, clean and prime the substrates in accordance with the manufacturer's written recommendations.
- B. Install flashings and other sheet metal to comply with requirements specified in Specification Section SHEET METAL flashing and trim.
- C. Install fascia and copings to comply with SMACNA requirements specified in Specification Sections - SHEET METAL and ROOF ACCESSORIES.
- D. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous metal panel support members and anchorage according to metal panel manufacturer's written recommendations.

3.3 INSTALLATION

- A. Roof Panel Installation:
 - 1. Metal Roof Panel over Metal Roof Deck:
 - a. Place the vapor retarder on metal roof decks within the zee furring. Lap vapor retarder joints 6 inches minimum and adhesively attach in accordance with roofing manufacturer's written recommendations and in accordance with manufacturer's warranty requirements, to provide a continuous uninterrupted membrane. Tape all joints with compatible tape. Repair any holes or damage to vapor retarder with compatible repair tape.
 - b. All fastening shall be done in accordance with FMG 1A-90 and manufacturer's written recommendations for the type of panel and fastening system required.
 - 1) Submit fastening schedule along with all shop drawings showing the type of fastener and the spacing required.
 - c. Insulation Board: Install insulation boards over roof deck on entire roof surface in thicknesses as indicated on the drawings.
 - 1) Install insulation board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 - 2) Erect insulation horizontally and hold in place with zee furring spaced in accordance with wind uplift requirements. Securely attach narrow flanges of furring members to deck with welds in accordance with wind uplift requirements.
 - d. Place a layer of vapor retarder over installed insulation boards. Lap vapor retarder joints 6 inches minimum and adhesively attach in accordance with roof underlayment manufacturer's written recommendations and in accordance with manufacturer's warranty requirements, to provide a continuous uninterrupted membrane. Tape all joints with compatible tape. Repair any holes or damage to vapor retarder with compatible repair tape.
 - 2. Metal Roof Panel Installation:
 - a. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

METAL PANELS**2116**

- 1) Provide Ice and Water Shield at all eaves, ridges, hips, valleys & gutters in accordance with roof panel manufacturer's written recommendations.
 - 2) Field cutting of metal panels by torch is not permitted.
 - 3) Install panels perpendicular to purlins.
 - 4) Rigidly fasten ridge end of flat sloped metal roof panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
 - 5) Provide metal closures at peaks, rake edges, rake walls and each side of ridge and hip caps.
 - 6) Flash and seal metal panels with profile closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
 - 7) Locate and space fastenings in uniform vertical and horizontal alignment.
 - 8) Install ridge and hip caps as metal panel work proceeds.
 - 9) All panels shall be fabricated in continuous lengths whenever possible to eliminate lap seams. When lap seams are unavoidable, locate panel splices over, but not attached to, structural supports. Locations of lap seams shall be submitted to the Architect for review as part of the submittal process. Panels that require lap seams shall be in the longest possible lengths to minimize the overall number of lap seams per roof area.
 - a) Provide ice and water shield at all lap joints in accordance with metal roof panel manufacturer's written recommendations for a watertight seal. Follow manufacturer's cleaning and priming recommendations prior to application of this product.
 - b) Length of lap seals shall be in accordance with manufacturer's warranty requirements for watertight seals.
 - 10) Lap metal flashing over metal panels to allow moisture to run over and off the material.
3. Fasteners:
 - a. Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.
 4. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
 5. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.
 - a. Seal metal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal panel manufacturer.
 - b. Prepare joints and apply sealants to comply with requirements in Specification Section - SEALANTS.
- B. Exterior Wall Panel System:**
1. Wall Panel Installation over Metal Framing:
 - a. Place the one layer of the water barrier on wall framing. Lap water barrier joints 6 inches minimum and adhesively attach in accordance with water barrier manufacturer's written recommendations and in accordance with manufacturer's warranty requirements, to provide a continuous uninterrupted membrane. Tape all joints with compatible tape. Repair any holes or damage with compatible tape.
 - b. Provide metal wall panels of full length from sill to top plate, unless otherwise indicated or restricted by shipping limitations. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 2. Fasteners:

METAL PANELS

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- a. Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.
 - 1) All fastening shall be done in accordance with manufacturer's written recommendations for the type of panel and fastening system required.
 - a) Submit fastening schedule along with all shop drawings showing the type of fastener and the spacing required.
 - b) Locate and space fastenings in uniform vertical and horizontal alignment.
 - b. Field cutting of metal wall panels by torch is not permitted.
 - 1) Install panels perpendicular to wall blocking or subgirts.
 - 2) Provide metal and neoprene closures at bottom and top of metal wall panels.
 - 3) Flash and seal metal wall panels with weather closures at perimeter of all openings. Fasten with self-tapping screws.
 - 4) Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5) All panels shall be fabricated in continuous lengths whenever possible to eliminate lap seams. When lap seams are unavoidable, locate panel splices over, but not attached to, structural supports. Locations of lap seams shall be submitted to the Architect for review as part of the submittal process. Panels that require lap seams shall be in the longest possible lengths to minimize the overall number of lap seams per wall area.
 - a) Length of lap seals shall be in accordance with manufacturer's warranty requirements for watertight seals.
 - 6) Lap metal flashing over metal wall panels to allow moisture to run over and off the material.
 3. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.
 4. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.
 - a. Seal metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.
 - b. Prepare joints and apply sealants to comply with requirements in Specification Section - SEALANTS.
- C. Accessory Installation:
1. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 - a. Install components required for a complete metal panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 2. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - a. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

METAL PANELS**2116**

- b. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- 3. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 4 feet o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- 4. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
 - a. Provide elbows at base of downspouts to direct water away from building.
 - b. Tie downspouts to underground drainage system when indicated.
- 5. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.
- 6. Pipe Flashing: Form flashing around pipe penetration and metal panels. Fasten and seal to metal panels as recommended by manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Erection Tolerances:
 - 1. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal panel installation, including accessories. Report results in writing.
- C. Remove and replace applications of metal panels where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 CLEANING

- A. Clean in accordance with Specification Section - PROJECT CLOSEOUT.
- B. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

3.6 SCHEDULES

- A. Metal Panel Schedule:
 - 1. Exterior Roof Flat Sloped:
 - a. Style: Standing Seam, low slope.
 - b. Manufacturer: CENTRIA.
 - c. Type: SRS-3.

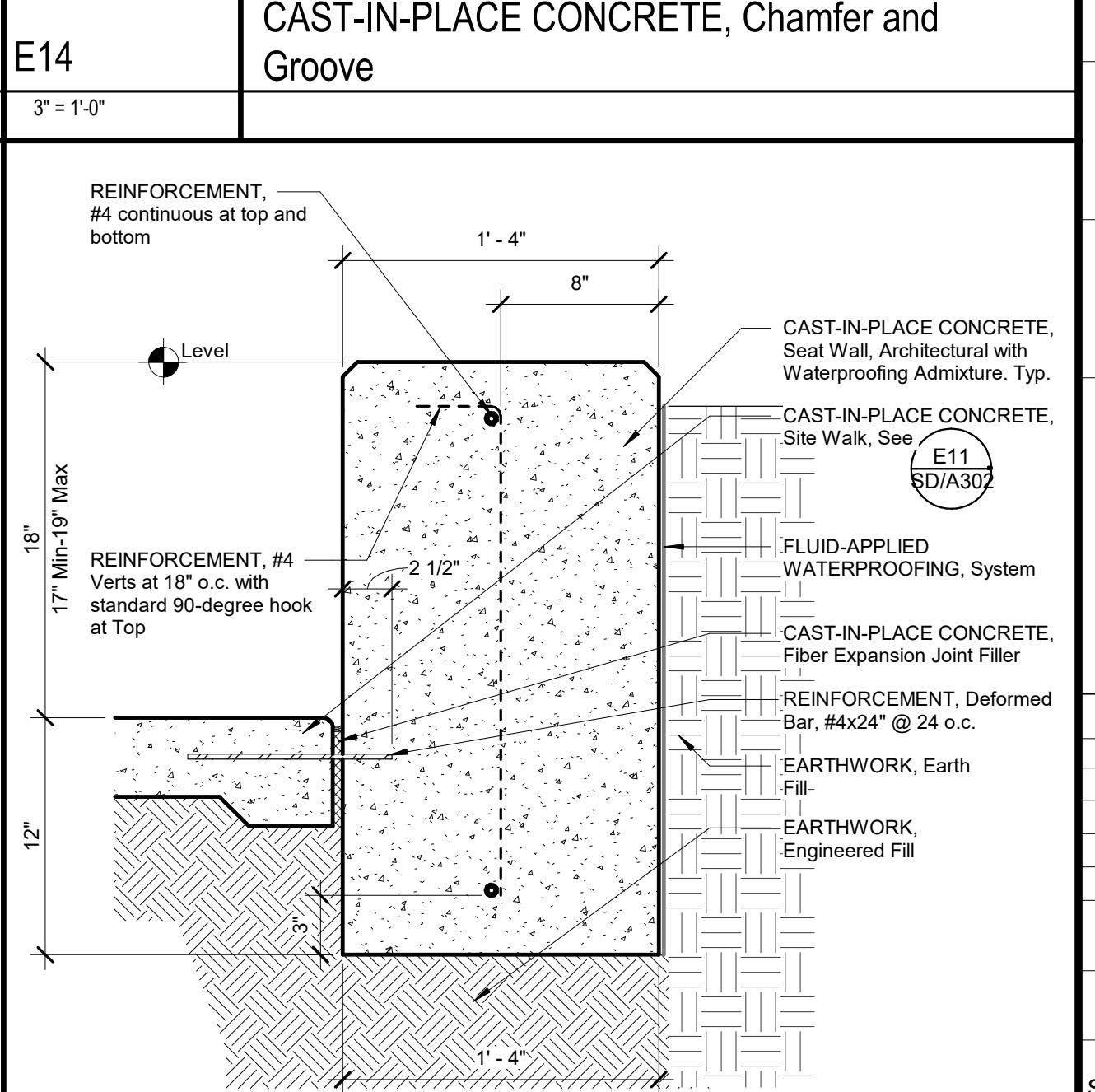
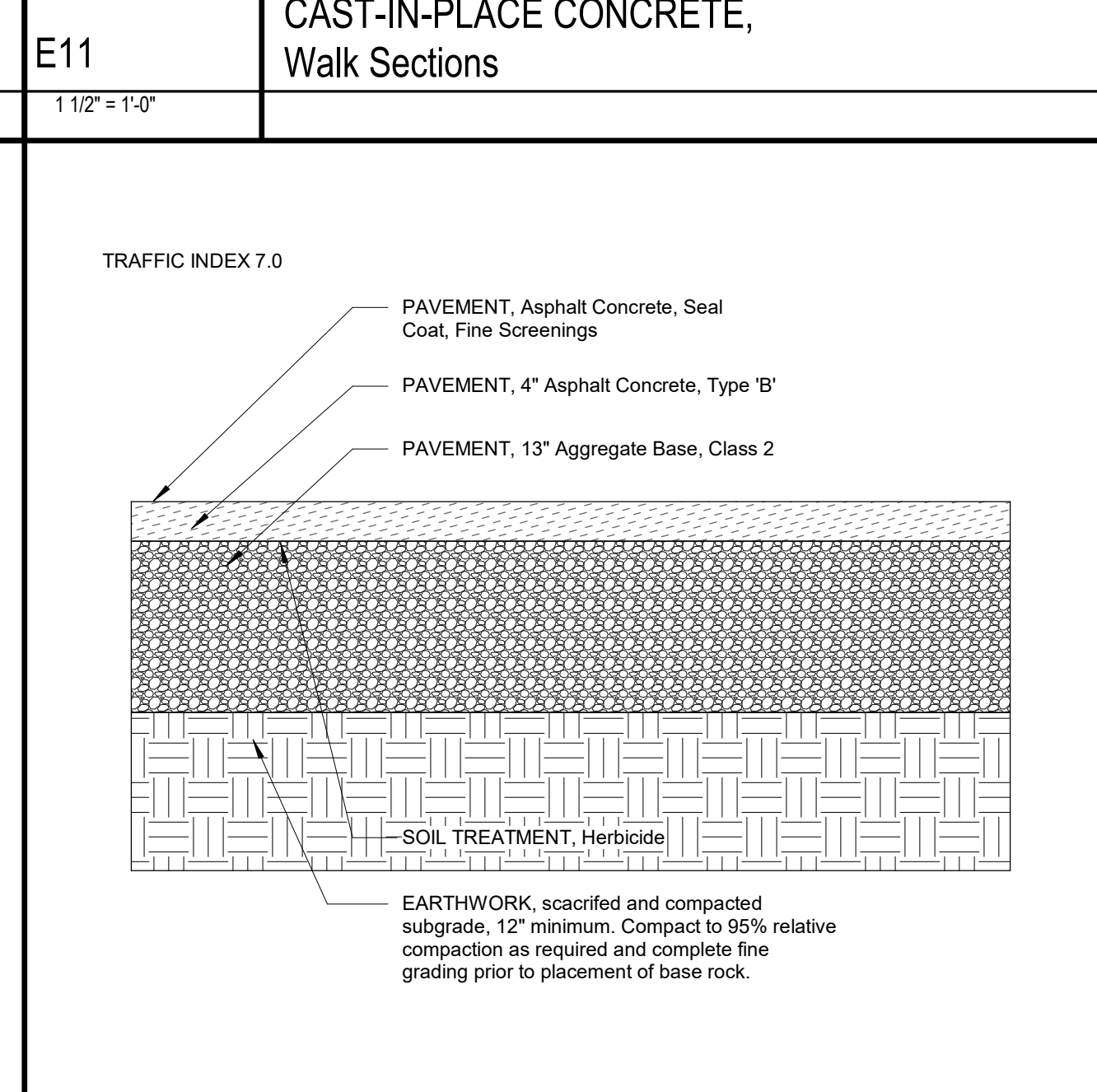
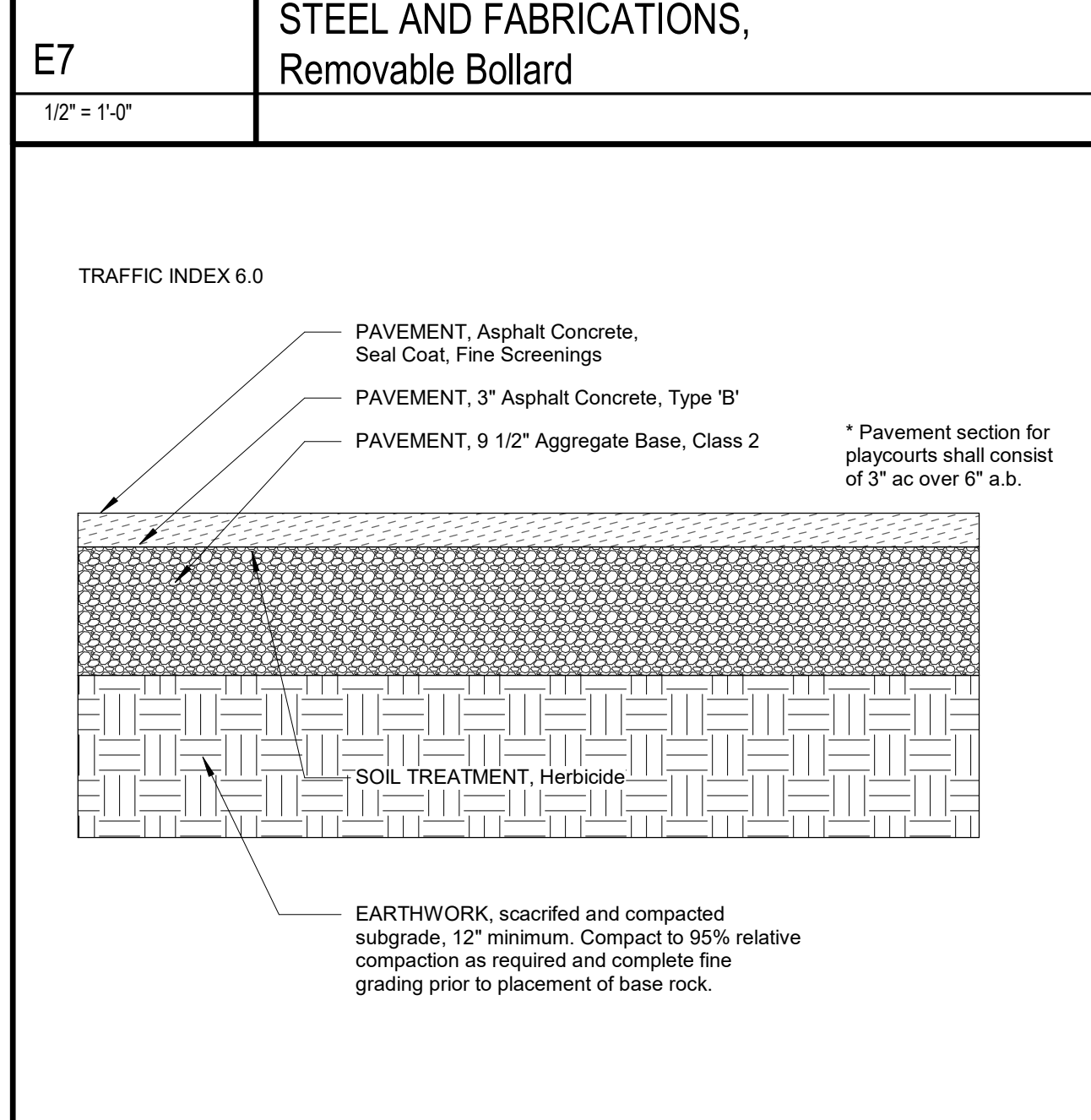
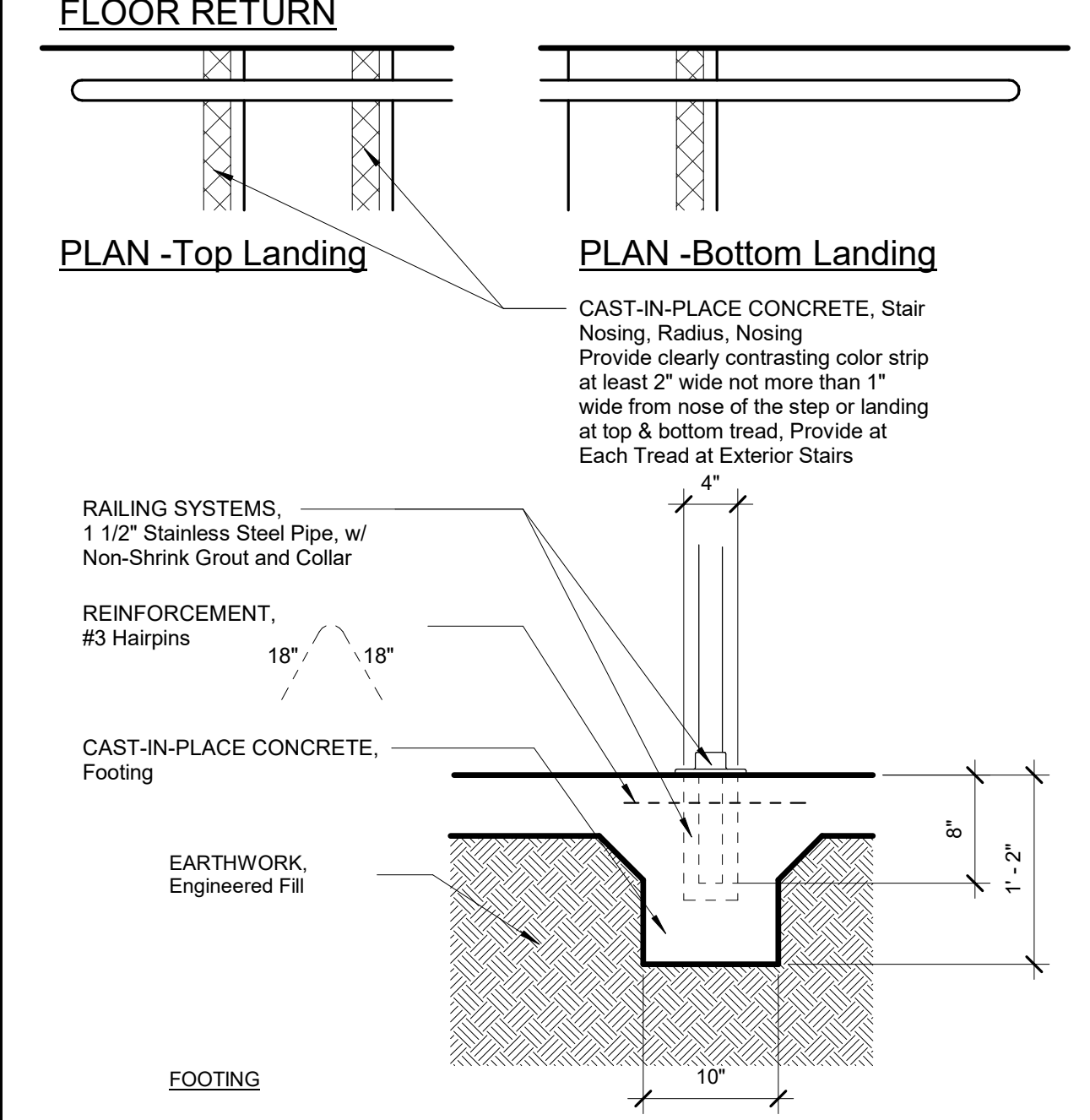
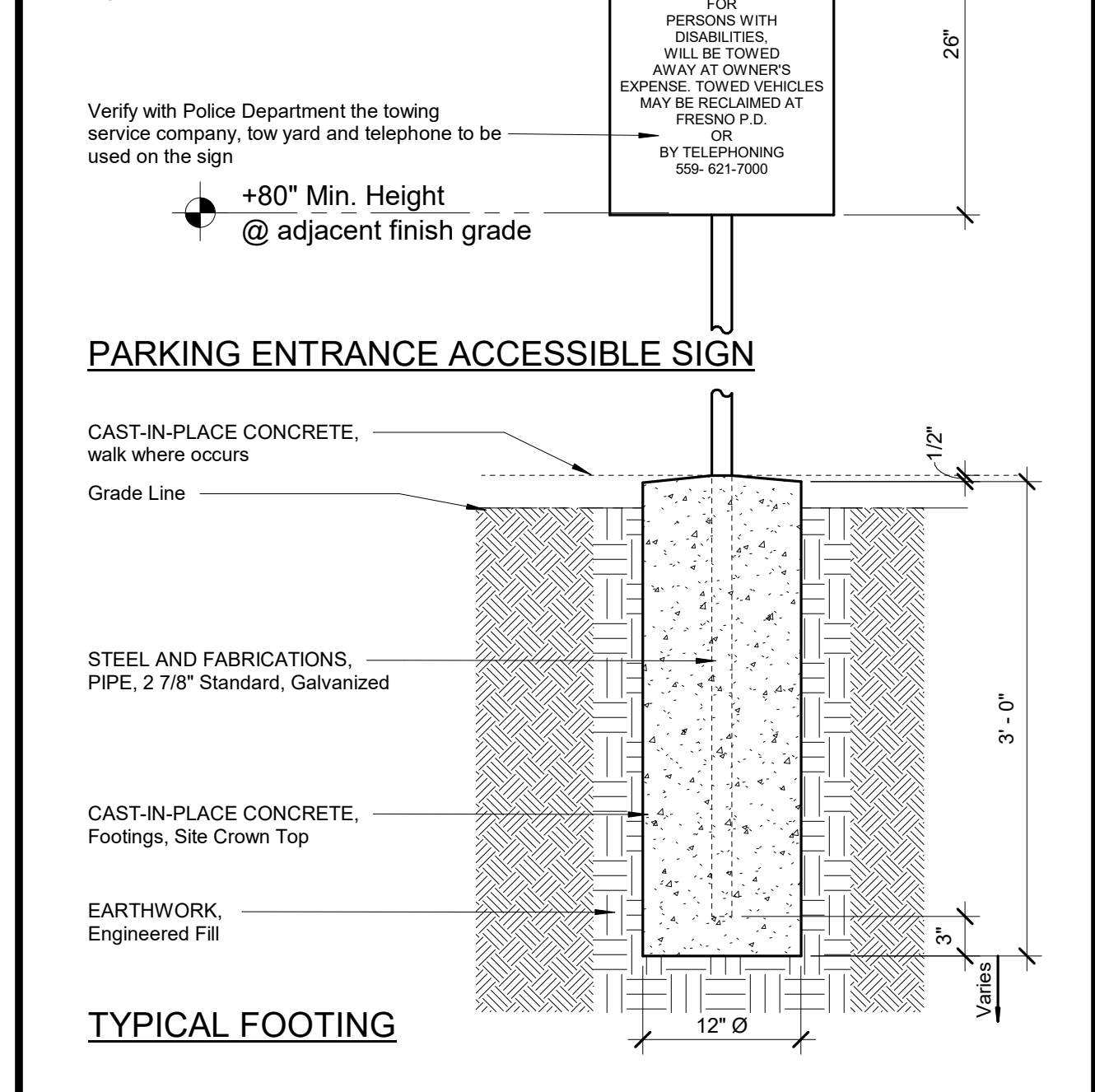
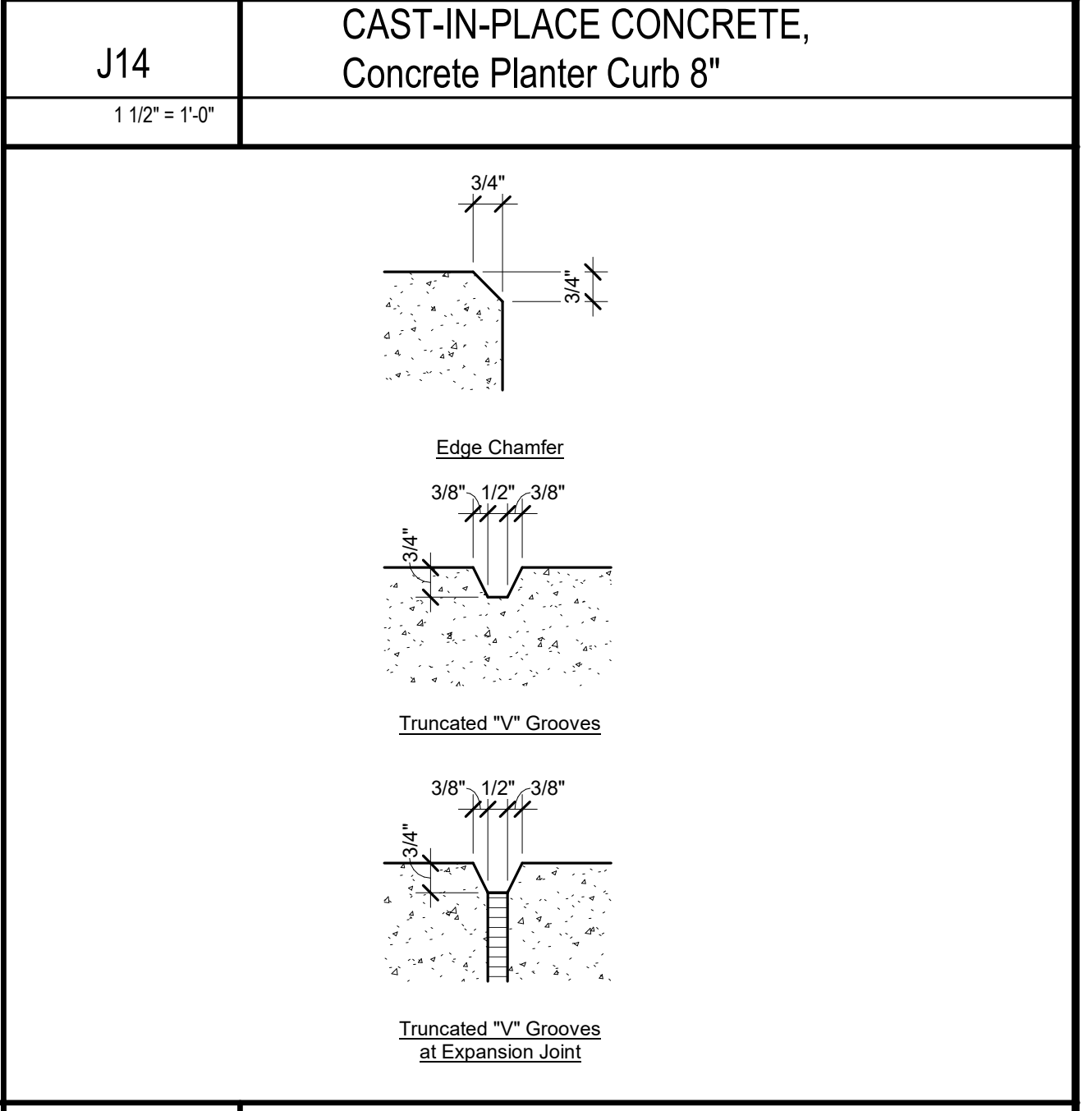
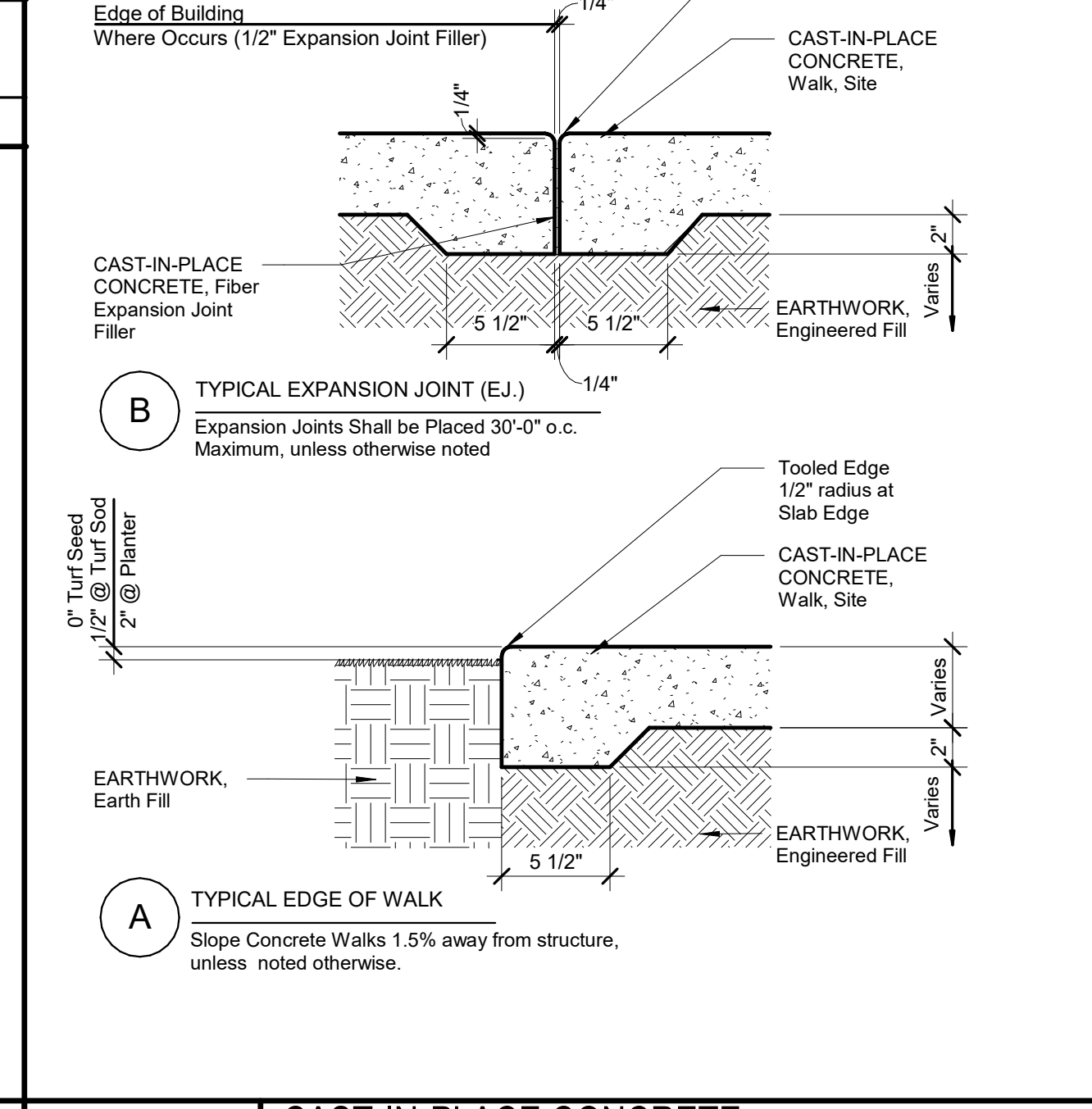
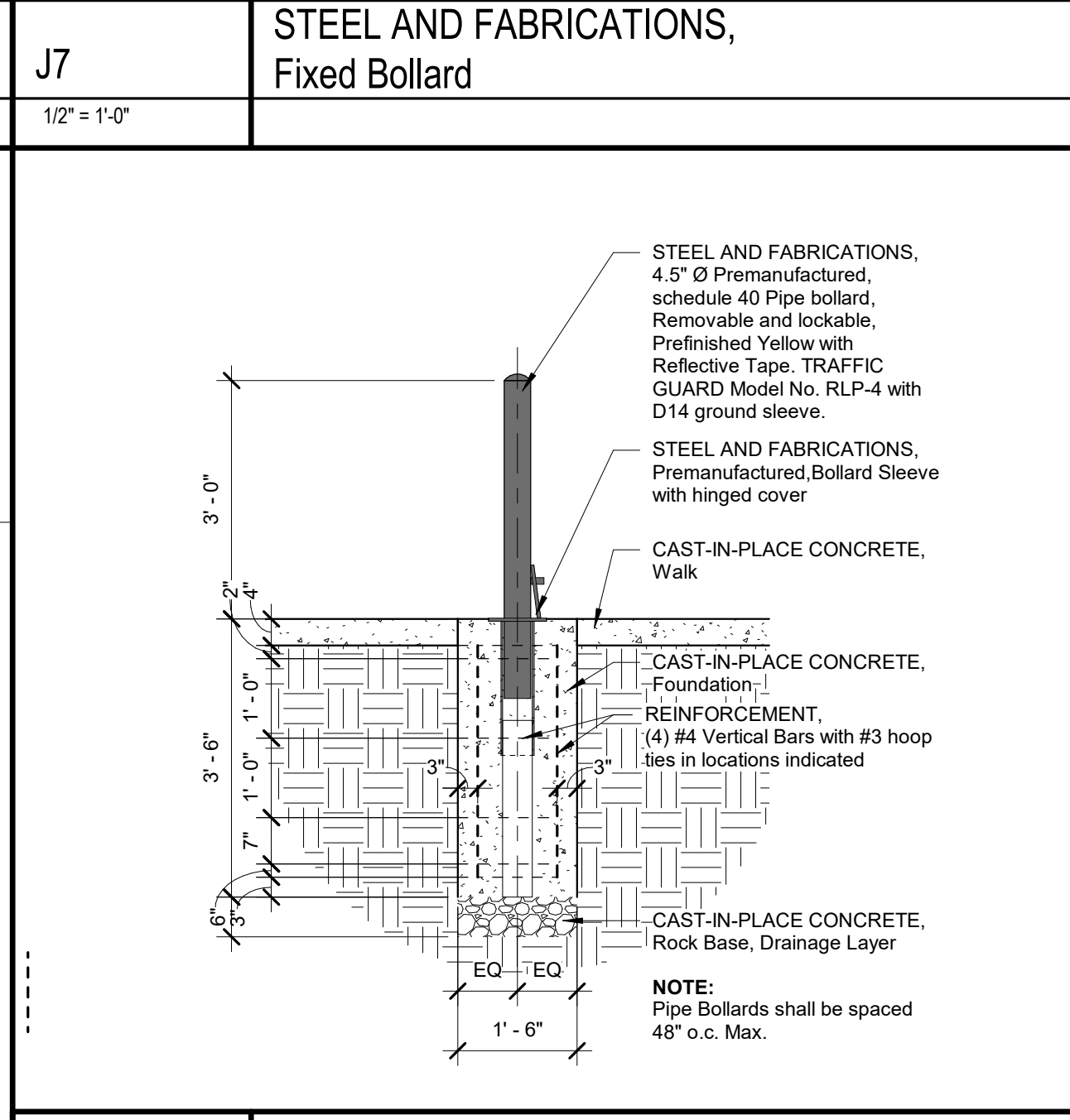
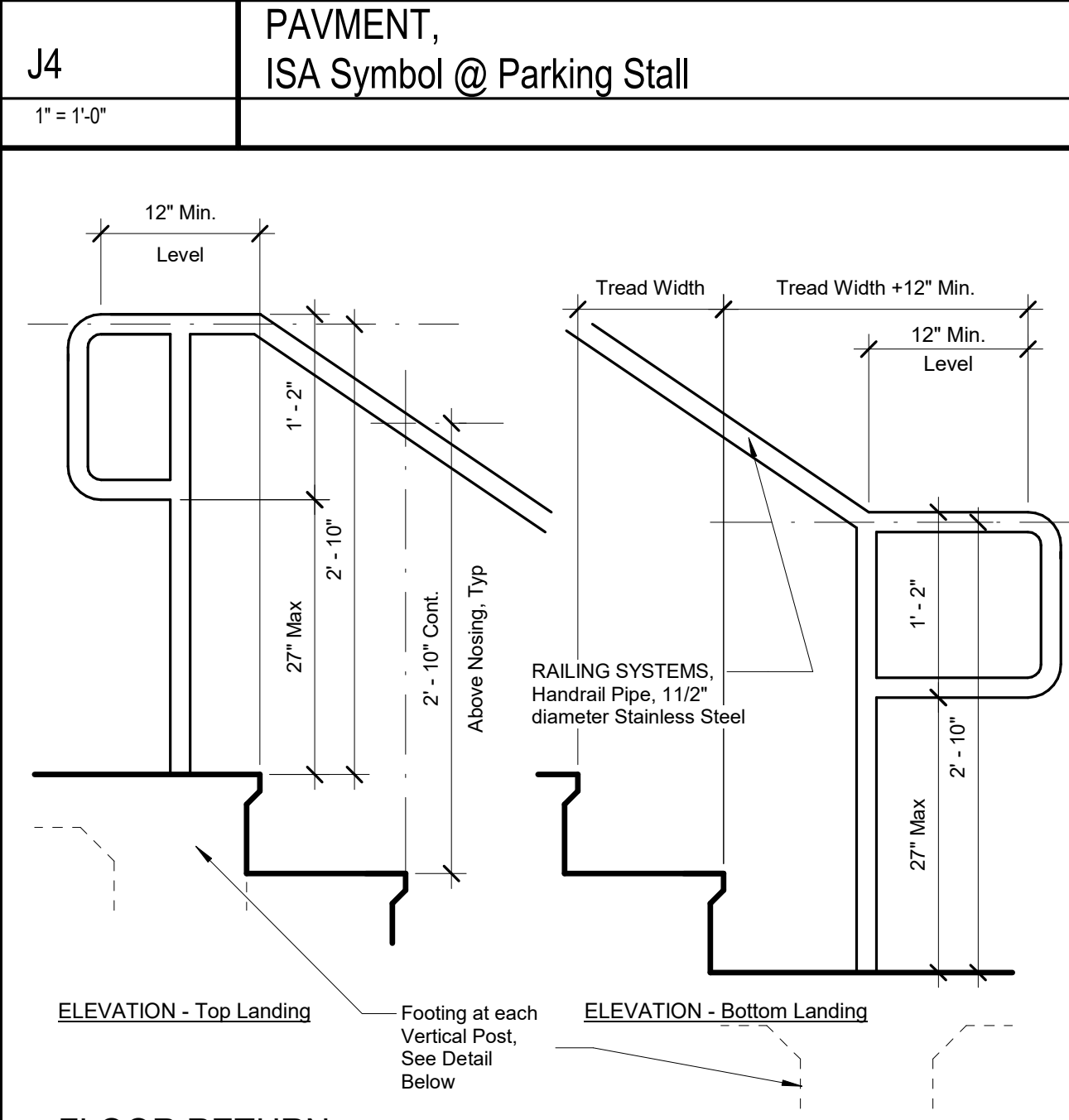
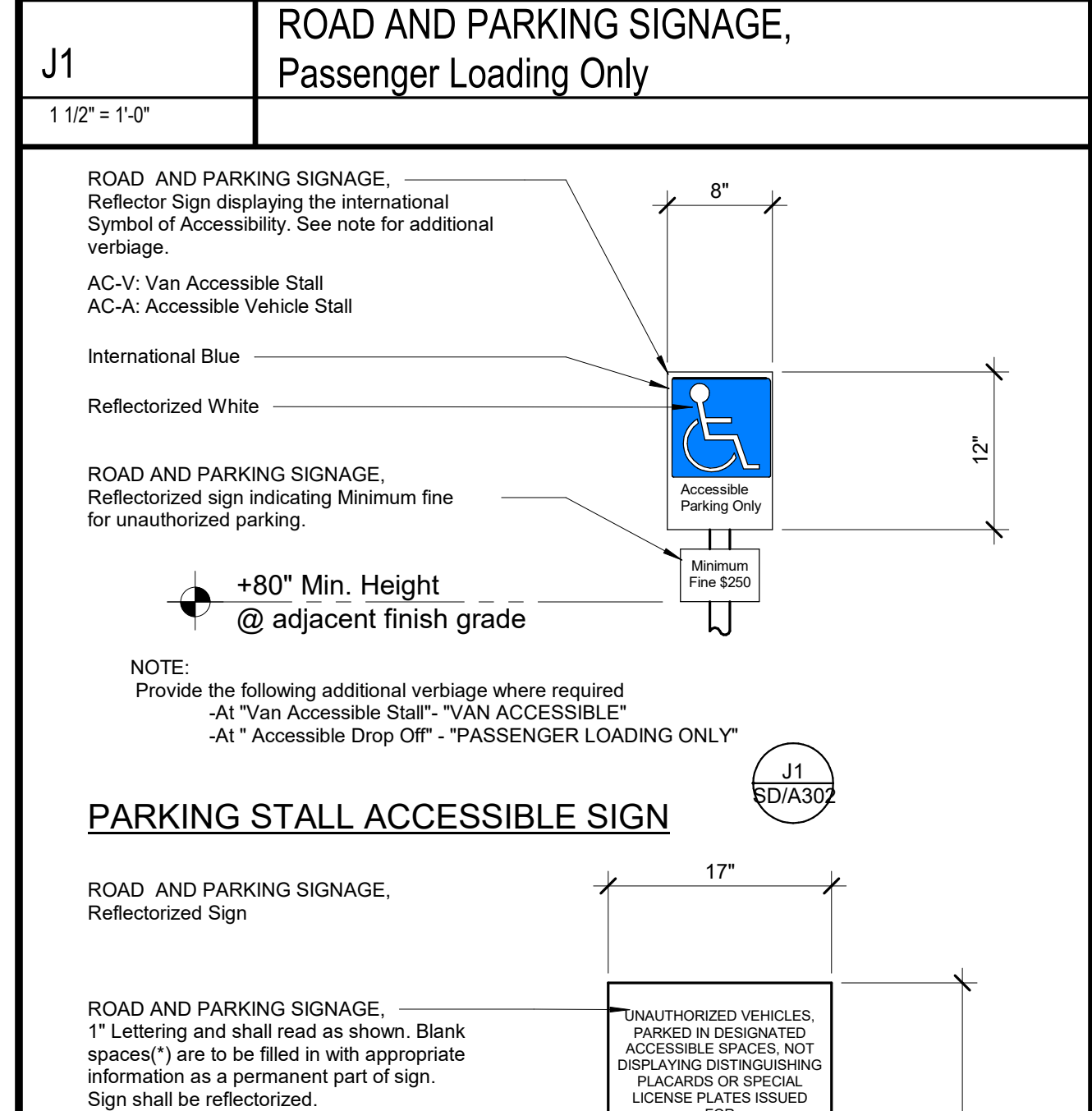
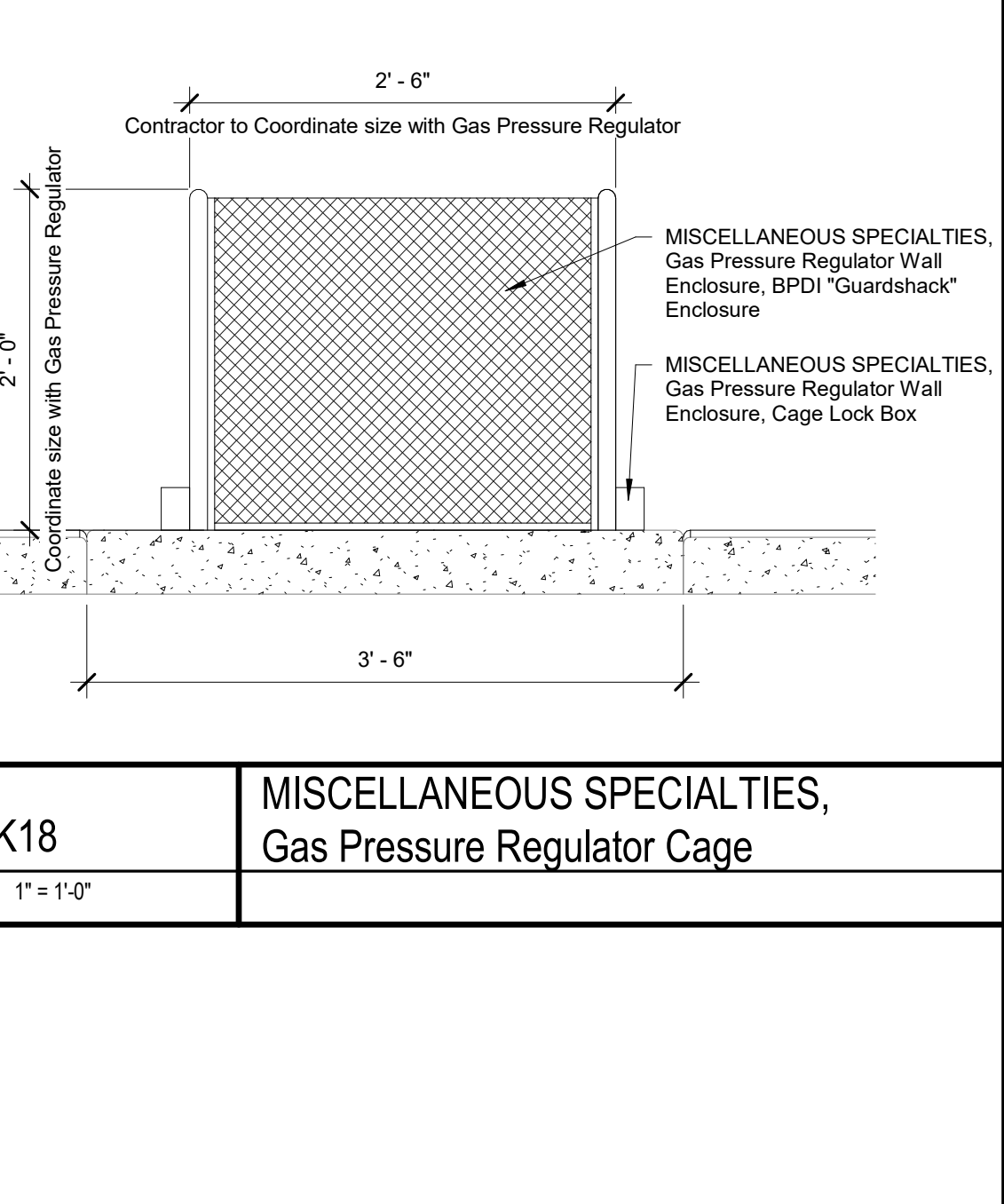
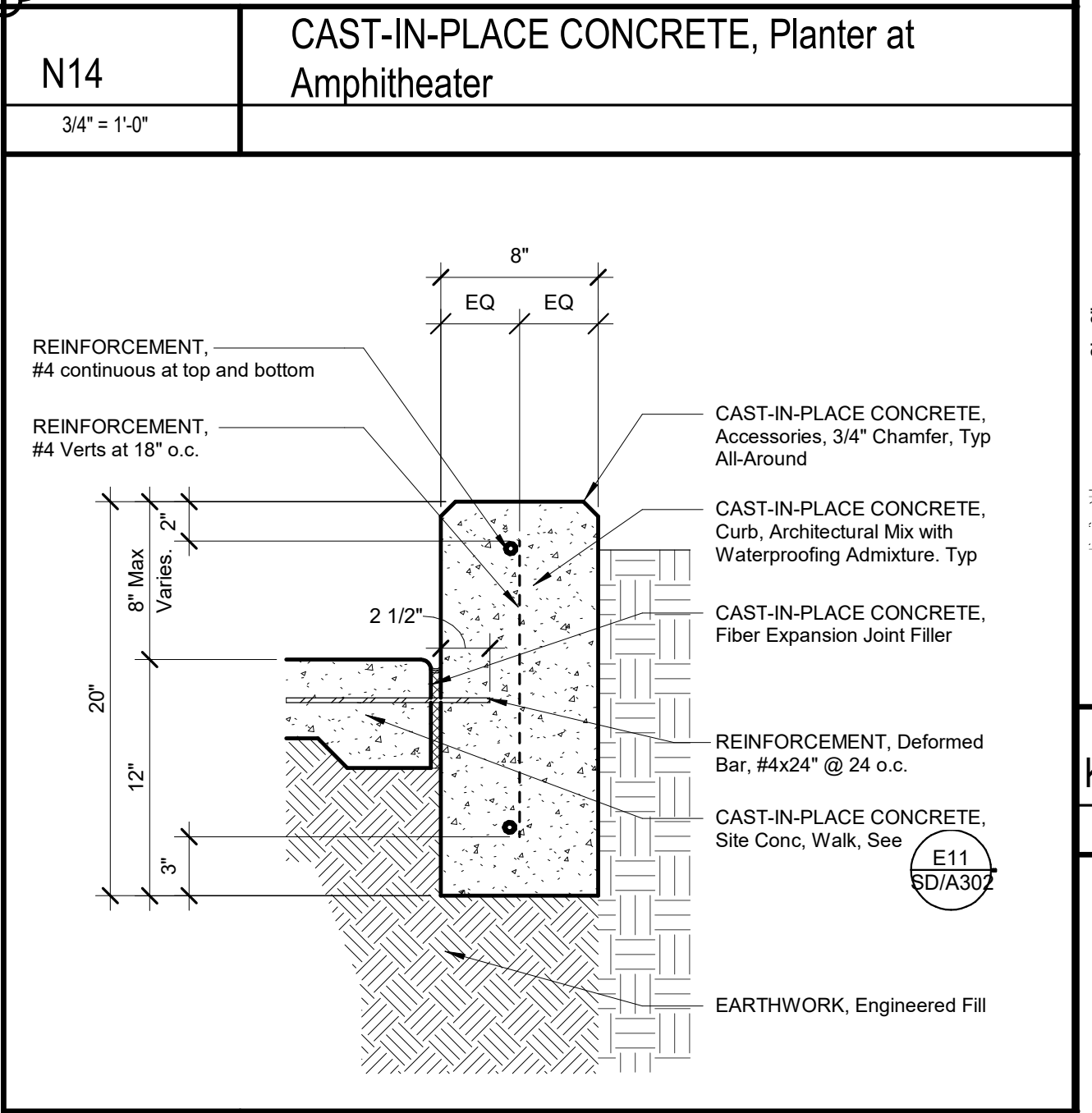
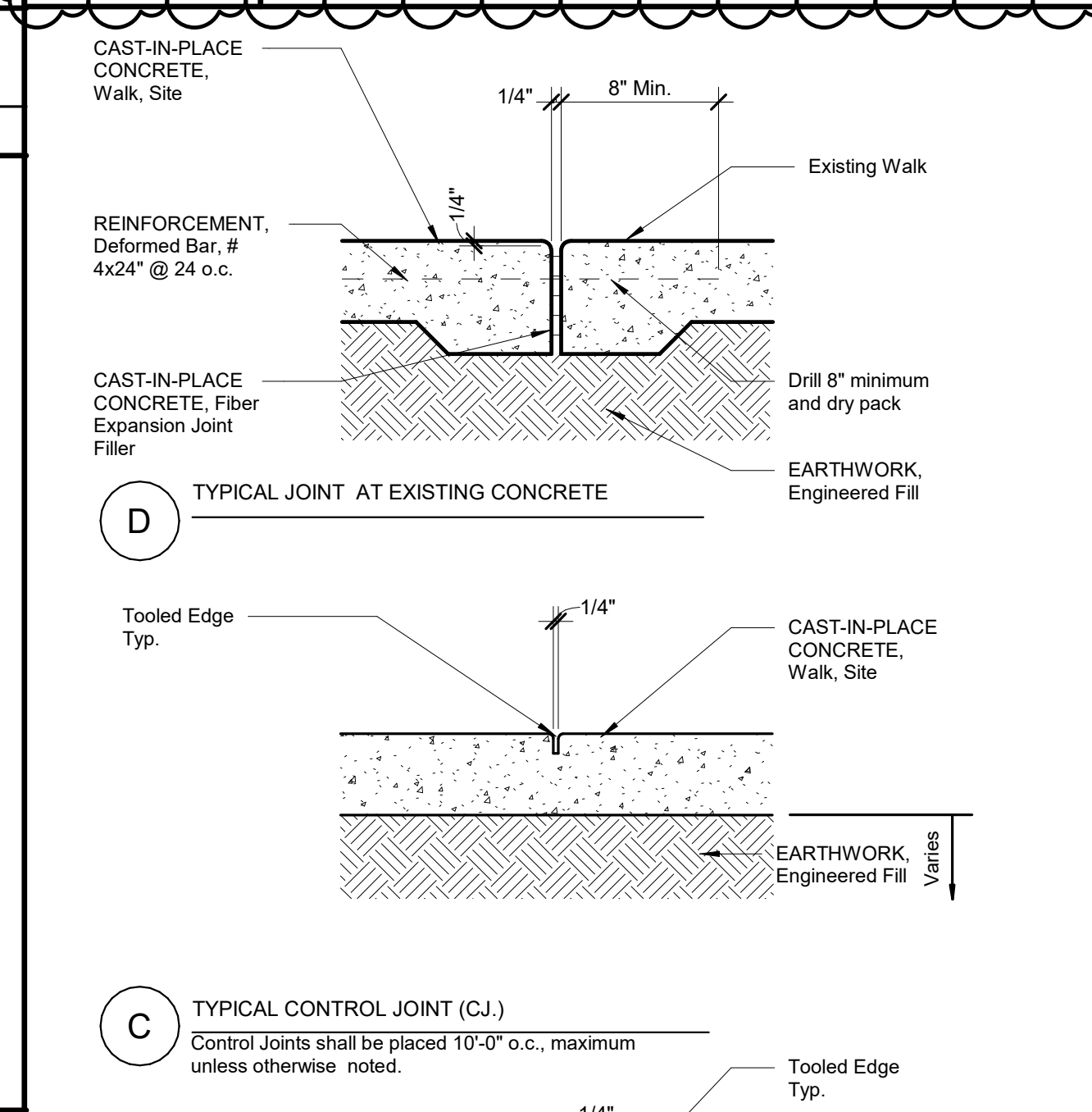
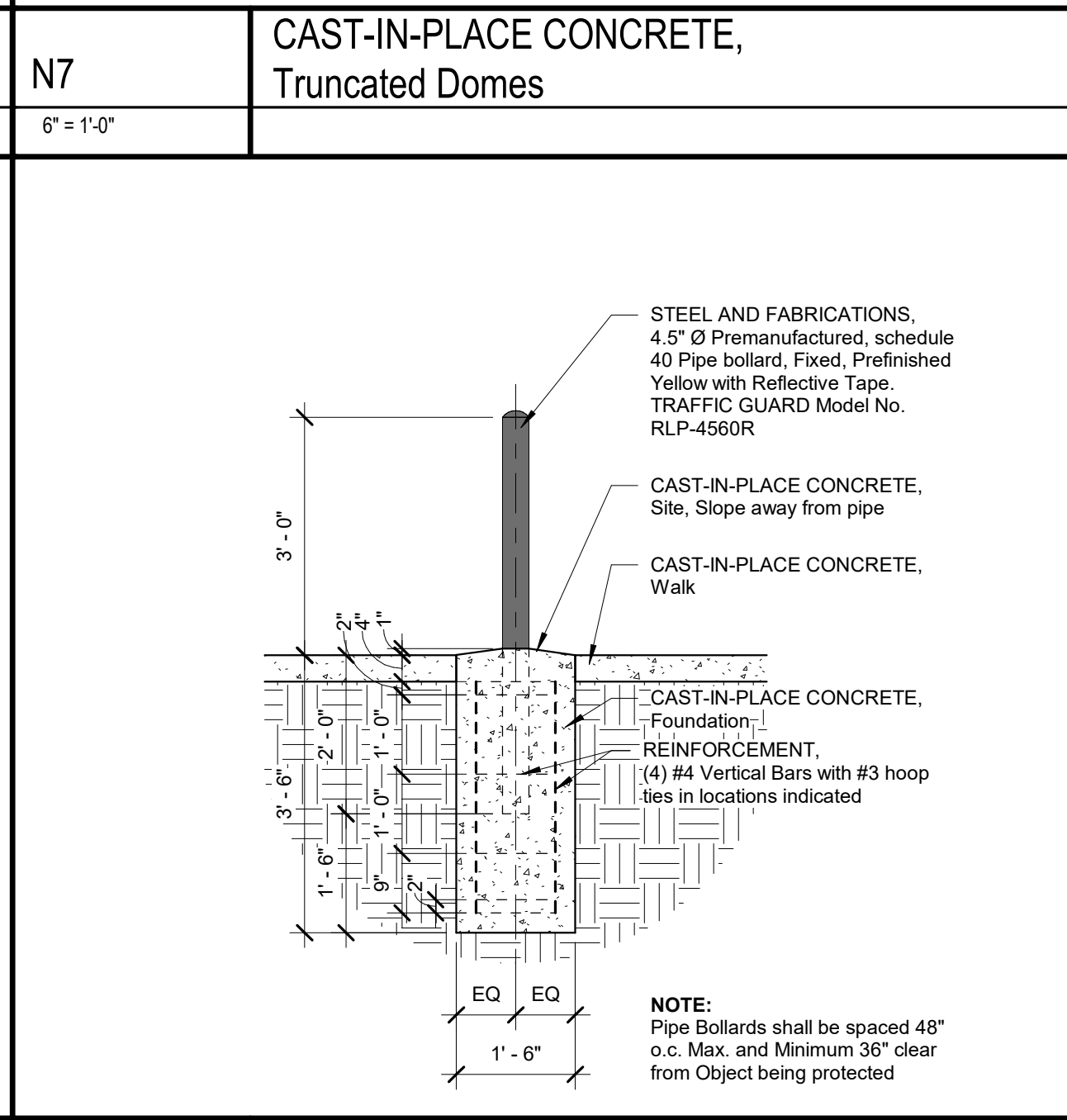
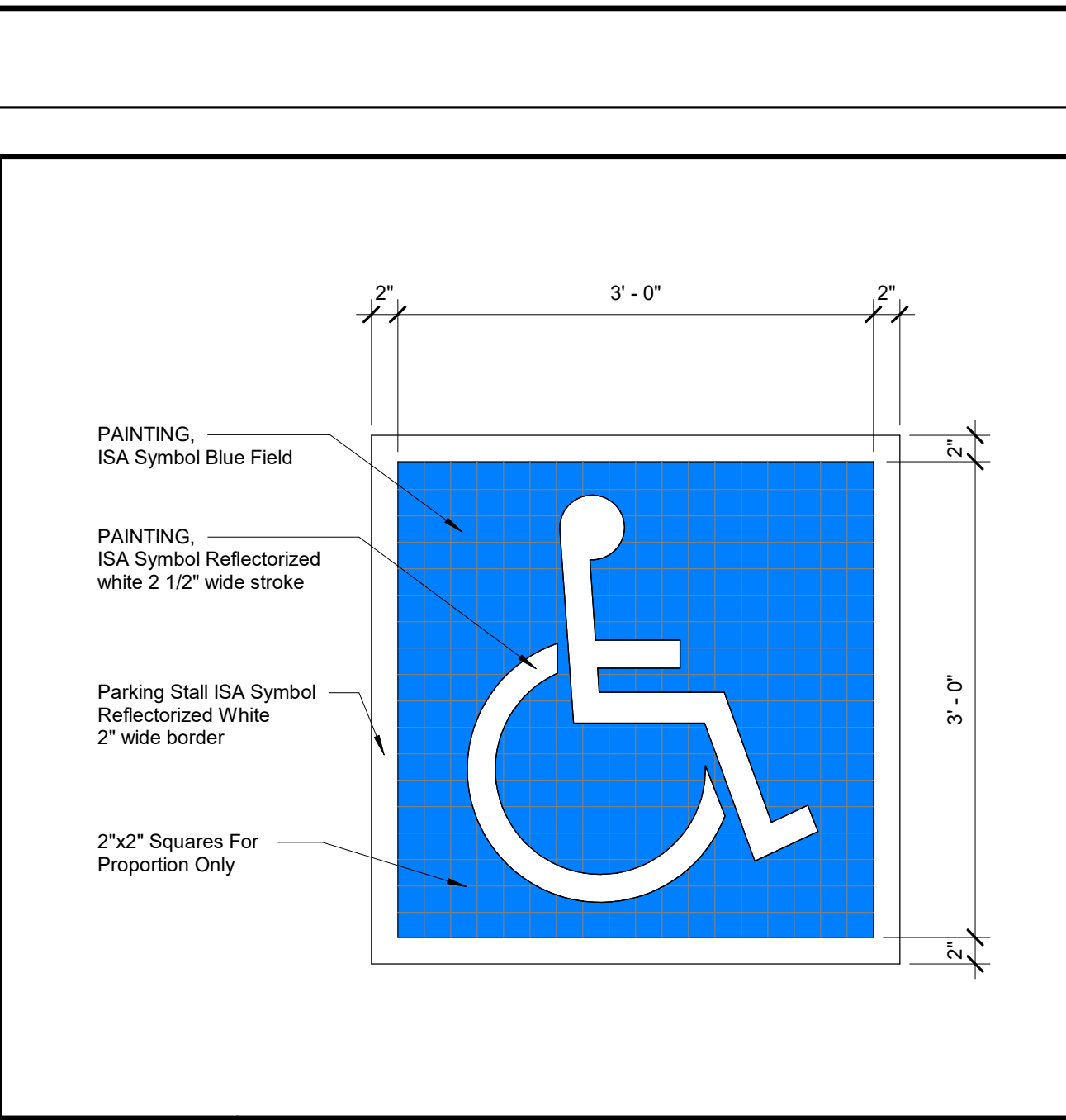
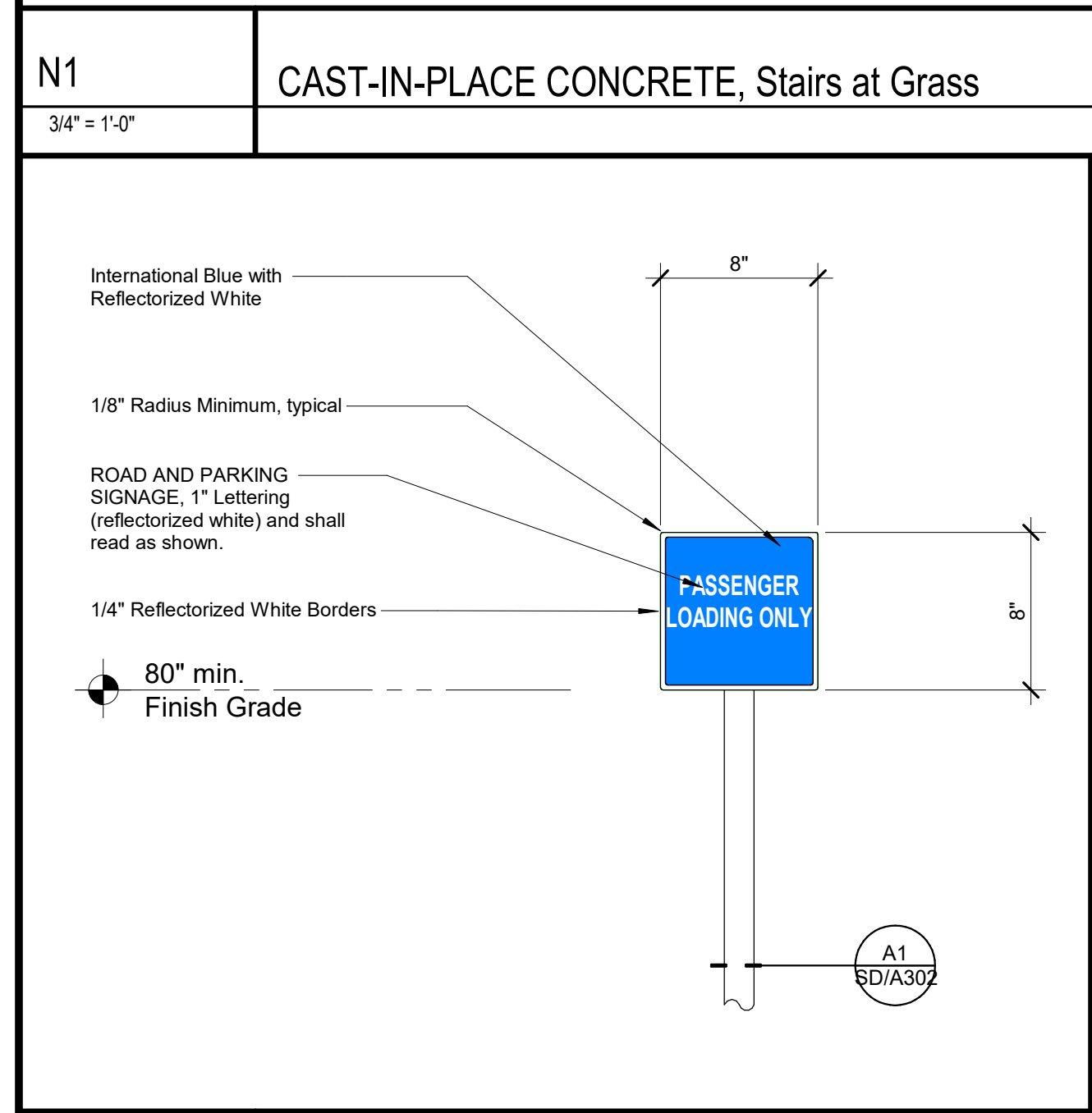
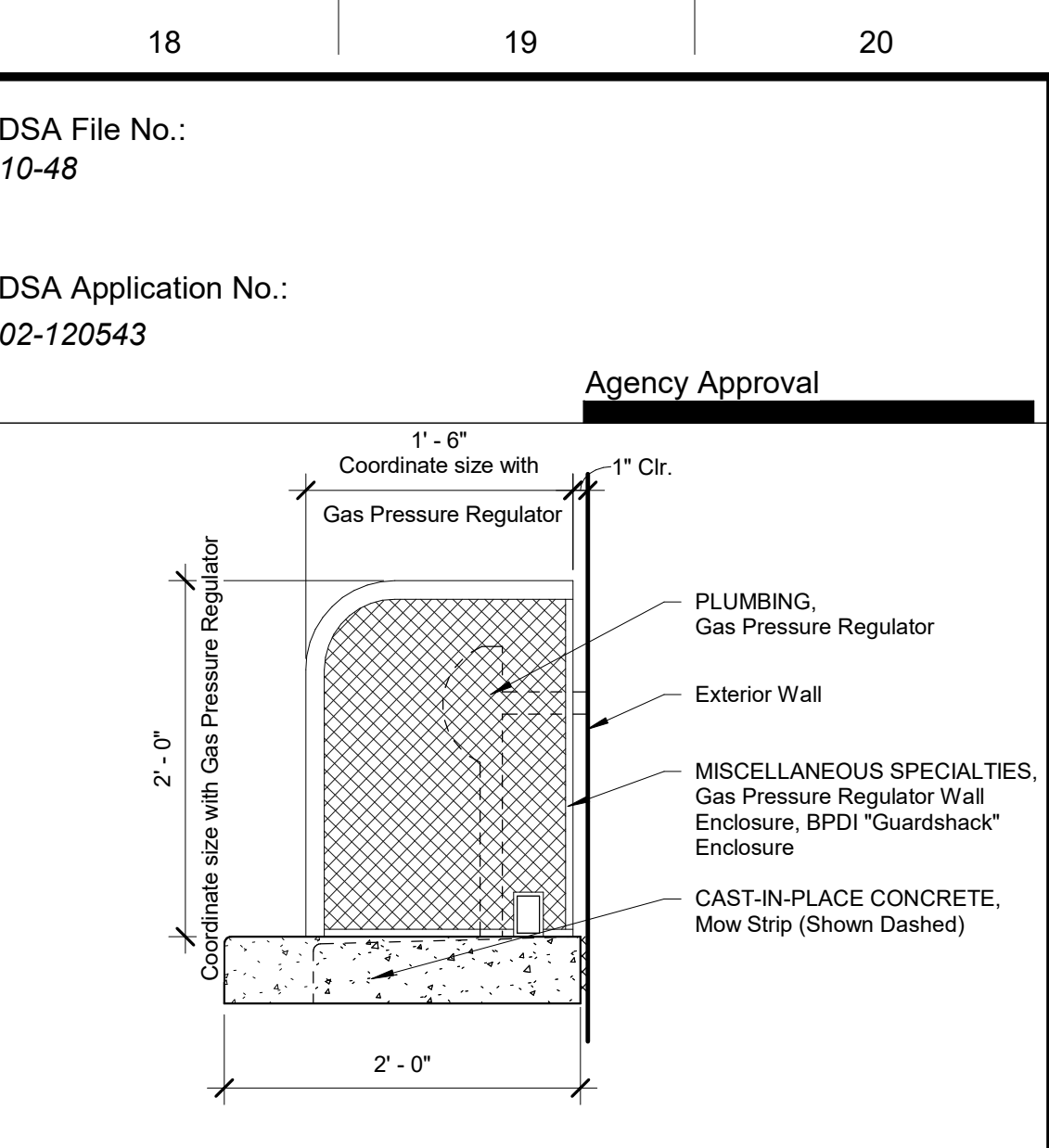
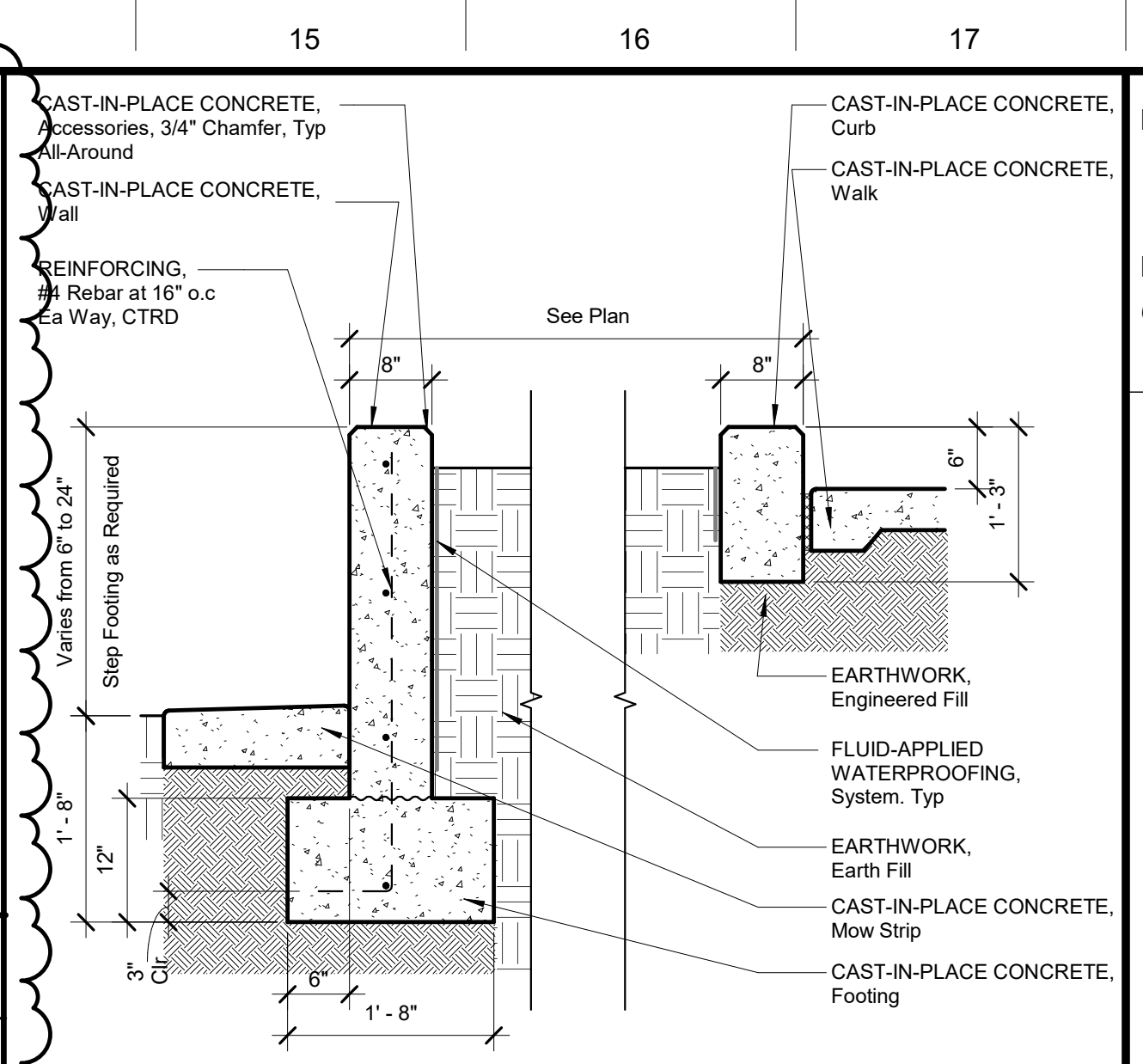
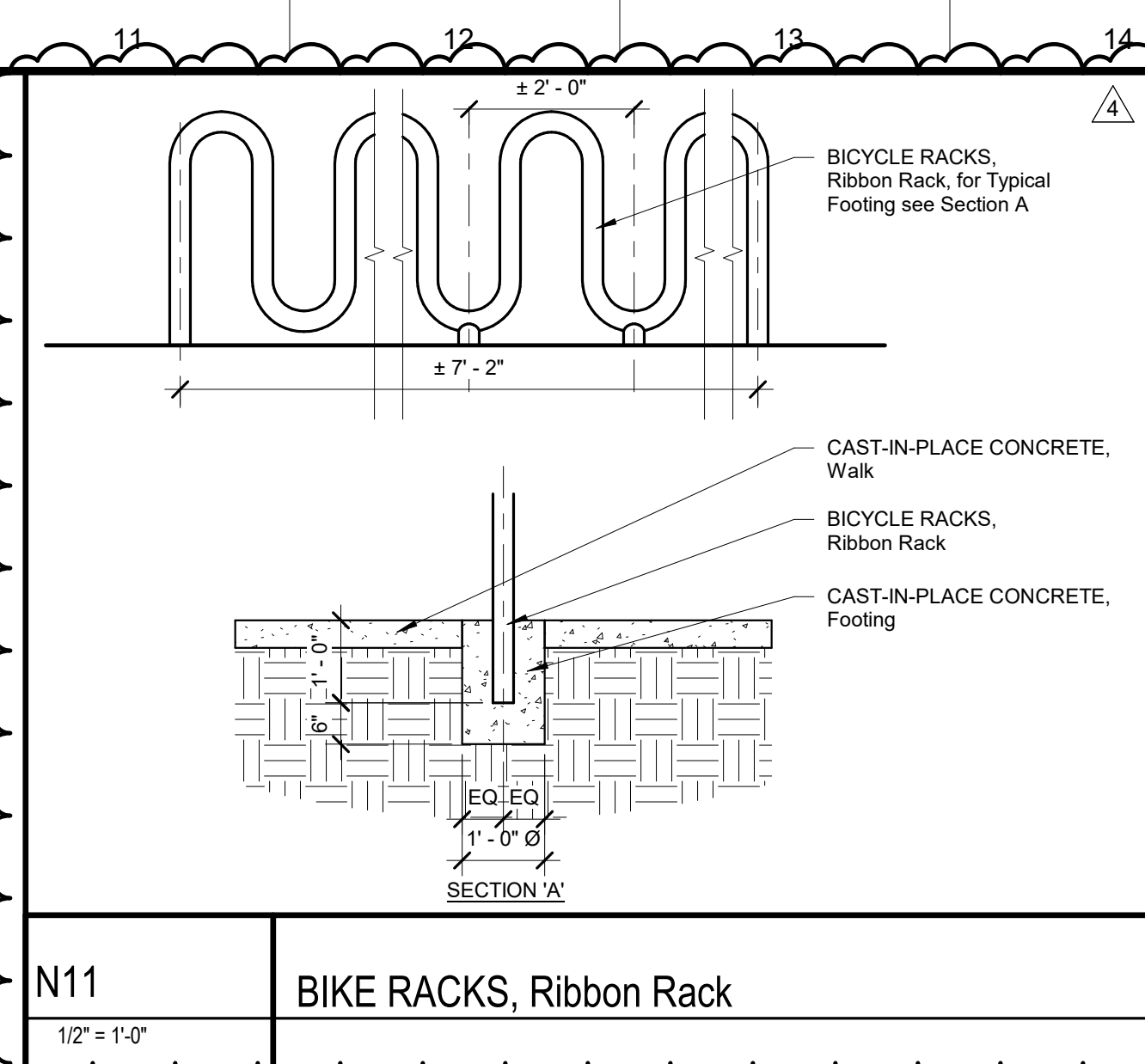
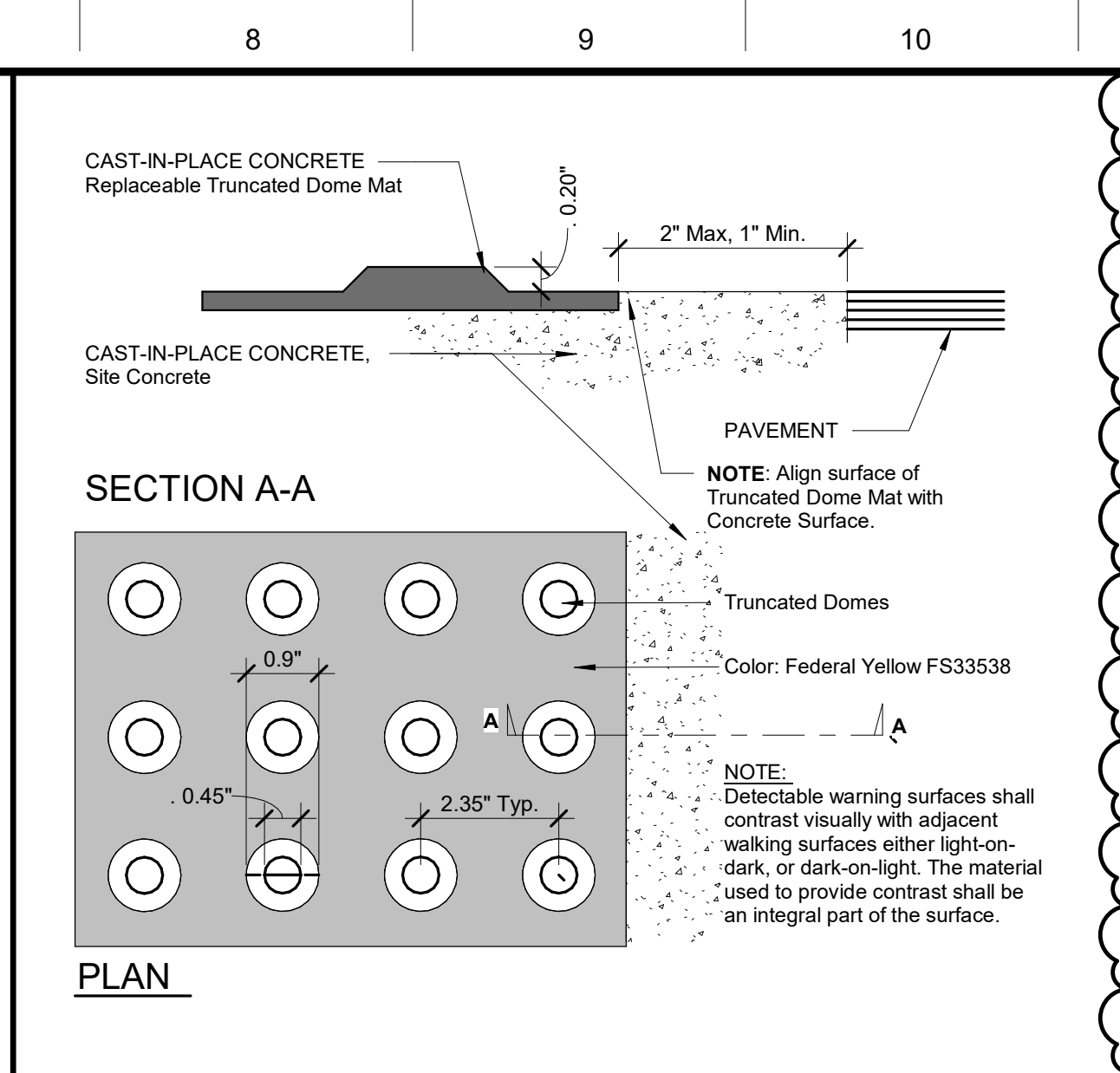
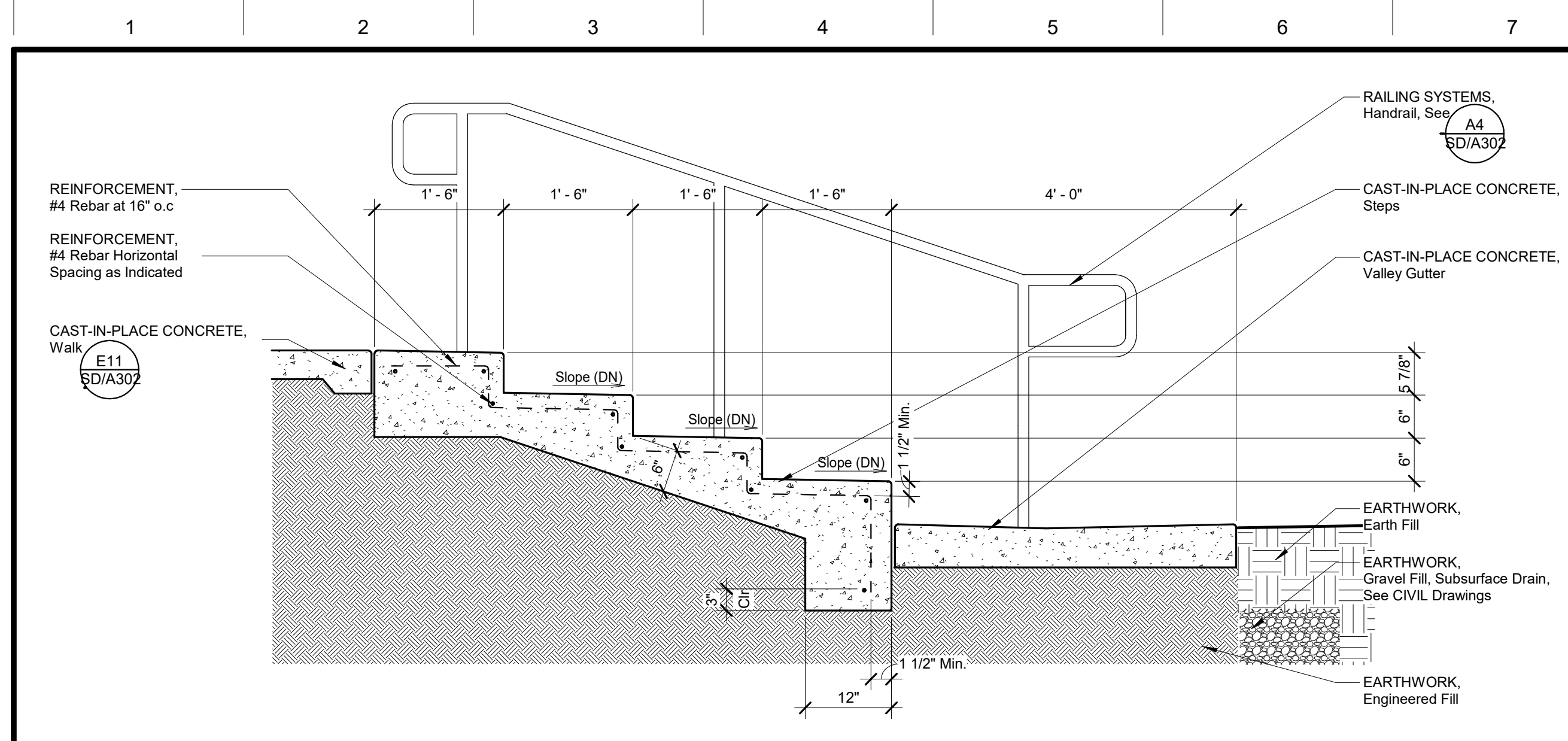
METAL PANELS

2116

- d. Gage: 22.
 - e. Size: 3" nominal high seams x 18" wide panels.
 - f. Finish: "Fluoropolymer" 3-coat system.
 - g. Remarks: Panels are to be flat with no dimples. Provide 1-1/4" wide "T" shaped caps.
2. Exterior Wall:
- a. Style: Ribbed.
 - b. Manufacturer: CENTRIA.
 - c. Type: ECONOLAP 1/2", exposed fastener.
 - d. Gage: 22.
 - e. Size: 1/2" deep x 37 1/3" coverage.
 - f. Finish: "Fluoropolymer" 3-coat system, one side only.
 - g. Remarks: N/A.
3. Exterior Soffit:
- a. Style: Flush Panel.
 - b. Manufacturer: AEP SPAN.
 - c. Type: Flush Panel.
 - d. Gage: 22.
 - e. Size: 1" x 12"
 - f. Finish: "Fluoropolymer" 3-coat system.
 - g. Remarks: Provide Vented Flush Panel Where indicated on Drawings

END OF SECTION

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McKinley/Fowler Elementary School- Increment 1
Clovis Unified School District
Fresno, CA 93727
Project

SITE DEVELOPMENT
SITE DETAILS
Drawing

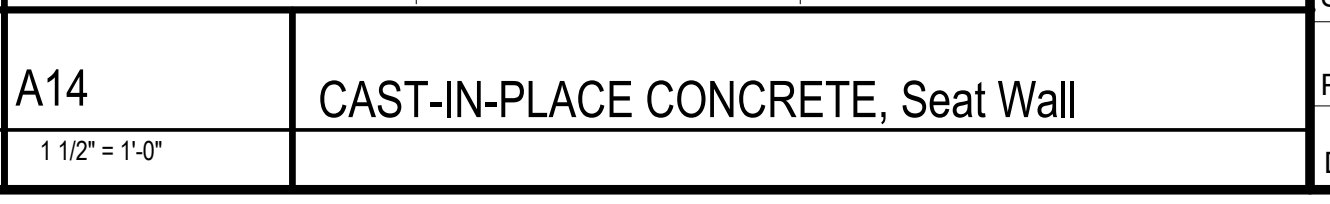
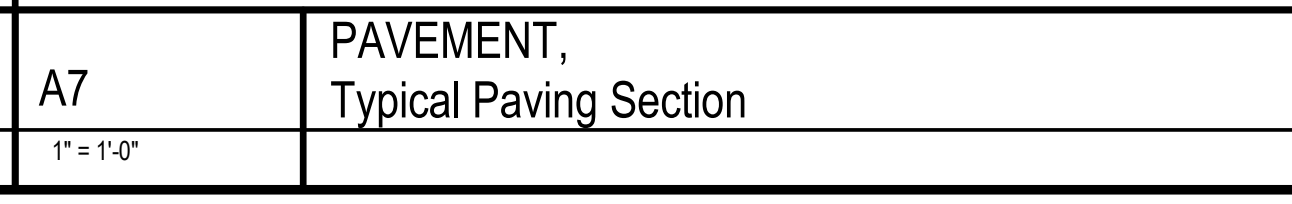
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No.	Revision/Submission	Date
4	Addendum #4	01/27/23

Designed By: AC
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Scale: As indicated
Drawn By: BP
Project Number: 2116
Checked By: AC
Date: 12/12/22
Reviewed By: MF

SD/A302



McKinley/Fowler Elementary School- Increment 1
Clovis Unified School District
Fresno, CA 93727
Project

SITE DEVELOPMENT
SITE DETAILS
Drawing

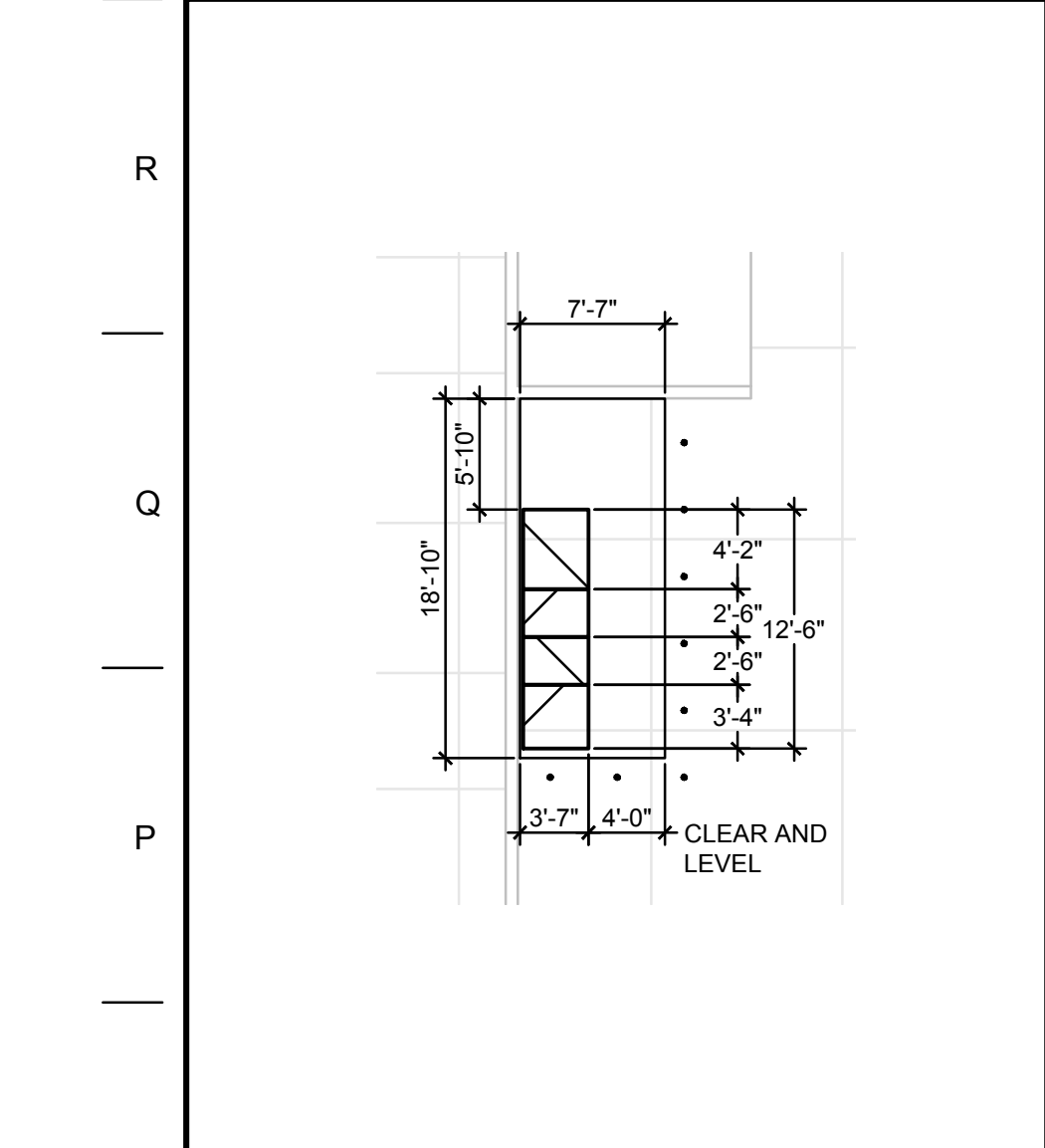
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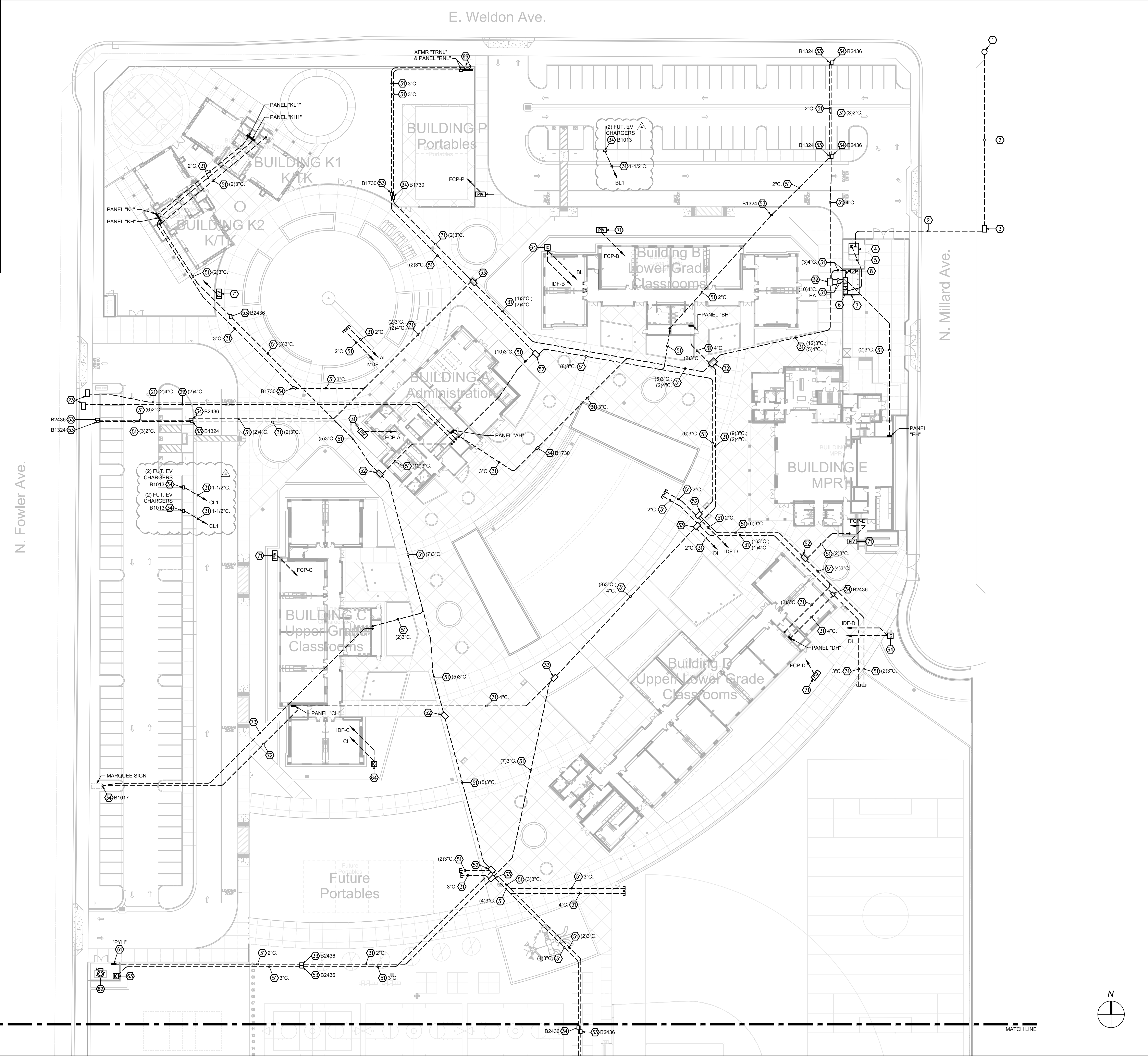
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Drawn By: BP
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Reviewed By: MF

SD/A302



N1 "MSB" & CONCRETE PAD
1" = 10' - 0"

R
Q
P
N
M
L
K
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F
E
D
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B
A



A1 Site Electrical - Power and Low Voltage Plan - North
1" = 30' - 0"

DSA File No.: 10-48
DSA Application No.: 02-120543
Agency Approval

- ### KEYNOTES
- EXISTING PG&E MANHOLE. BRING PRIMARY CONDUIT INTO CASING AND SEAL PER PG&E RULES AND STANDARDS.
 - PROPOSED 4" FOR PG&E PRIMARY. CONDUCTORS BY PG&E. PERFORM STREET CROSSING PER CITY OF FRESNO RULES.
 - PROPOSED PG&E 3X5 VAULT.
 - PROPOSED PG&E PAD AND TRANSFORMER. TRANSFORMER BY PG&E.
 - PROPOSED (5) 5" FOR PG&E SECONDARY. CONDUCTORS BY PG&E.
 - MAIN SWITCHBOARD "MSB". SEE G10X/E301.
 - CONCRETE PAD PER A1X/E301.
 - PV VERIFIABLE DISCONNECT SWITCH. SEE G10X/E301.
 - AT&T CONDUITS - QUANTITIES AND SIZES SHOWN ON PLAN.
 - OWNER FIBER INTERCONNECT CONDUITS - QUANTITIES AND SIZES SHOWN ON PLAN.
 - 3' x 5' TELECOMMUNICATIONS VAULT. SEE DETAIL M6X/E301.
 - POWER CONDUITS - QUANTITIES AND SIZES SHOWN ON PLAN. REFER TO POWER SINGLE LINE DIAGRAM G10X/E301.
 - 4' x 6'-6" POWER VAULT. SEE DETAIL G6X/E301.
 - 3' x 5' POWER VAULT. SEE DETAIL M6X/E301.
 - H20 POWER PULLBOX - SIZE SHOWN ON PLAN. SEE DETAIL G1X/E301.
 - SYSTEMS CONDUITS - QUANTITIES AND SIZES SHOWN ON PLAN.
 - 3' x 5' SIGNAL VAULT. SEE DETAIL M6X/E301.
 - H20 SIGNAL PULLBOX - SIZE SHOWN ON PLAN. SEE DETAIL G1X/E301.
 - IDF-BB: PAD MOUNTED IDF CABINET IN ENVIRONMENTAL CABINET PER B11X/E402. VERIFY LOCATION WITH DISTRICT. PROVIDE 20A BREAKER AND 1" 2#10. 1#10G. TO PANEL BBL. PROVIDE (3) WP PA SPEAKERS AT BACKSTOPS WITH 3/4" AND CAT6 CABLE EA. PROVIDE (6) CAMERA OUTLETS AT BACKSTOPS WITH 3/4" AND CAT6 CABLE EA.
 - PEDESTAL MOUNTED POWER PANEL & MINI UNIT SUBSTATION PER A1X/E304 AND A7X/E304.
 - IRRIGATION BOOSTER PUMP. 480V 30. 42 FLA. REFER TO IRRIGATION PLANS FOR EXACT LOCATION. PROVIDE 20A 3-POLE BREAKER AND CONNECT TO PANEL PY4 WITH 1-1/4" 3#4. 1#6G.
 - IRRIGATION CONTROLLER. REFER TO IRRIGATION PLANS FOR EXACT LOCATION. PROVIDE 20A BREAKER AND CONNECT TO PANEL PY1 WITH 1" 2#12. 1#12G. CONNECT TO MDF WITH 6-STR 5M. PROVIDE MEDIA CONVERTER AND CAT6 PATCH CABLE.
 - IRRIGATION CONTROLLER. REFER TO IRRIGATION PLANS FOR EXACT LOCATION. RUN 1" 2#8. 1#8G. TO INDICATED PANEL & 1" TO INDICATED IDF WITH CAT6 CABLE.
 - COACHES IRRIGATION SWITCH. PROVIDE 20A BREAKER AND 1" 2#10. 1#10G. TO PANEL BBL. SEE IRRIGATION PLANS.
 - PEDESTAL MOUNTED PANELBOARD AND TERMINAL CABINET.
 - FIRE SPRINKLER POST INDICATOR VALVE. VERIFY EXACT LOCATION. RUN 1" TO INDICATED FIRE ALARM CONTROL PANEL.
 - 1" 2#8. 1#8G. TO PANEL CL FOR THE MARQUEE SIGN. VERIFY EXACT LOCATION OF THE MARQUEE SIGN.
 - 1" WITH CAT6 CABLE TO "IDF-C" FOR THE MARQUEE SIGN. VERIFY EXACT LOCATION OF THE MARQUEE SIGN.

- ### UTILITY NOTES
- POWER UTILITY WORK SHALL CONFORM TO PG&E STANDARDS AND THE RULE 16 DOCUMENTS.
 - TELECOMMUNICATIONS WORK SHALL CONFORM TO AT&T STANDARDS AND DRAWINGS.

General Notes

Hardin-Davidson Engineering
356 Pollasky Ave., Suite 200, Clovis, CA 93612
559.323.4995 tel • 559.323.4928 fax
www.hardin-davidson.com
Consultant

McKinley/Fowler Elementary School
Clovis Unified School District
Fresno, CA 93727
Project

Site Electrical
Power and Low Voltage Plan - North
Drawing

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No.	Revision/Submission	Date
4	Addendum No. 4	01/26/23

Revision		
Designed By:	SD	Copyright 2022 Darden Architects
Scale:	As indicated	Drawn By: HDE
Project Number:	2116	Checked By: SD
Date:	09/19/2022	Reviewed By: SD

SD/E201

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