BID ADDENDUM #6

April 21, 2022

To:
Prospective Bidders/Planholders

Child Development Center
ST-01828
California State University Stanislaus
One University Circle, Turlock, CA 95382

This Addendum forms a part of the contract documents and modifies the original bidding documents. Addendum shall be noted as received and acknowledged on the Bid Proposal Form when submitted as outlined in the Bid Package referenced above.

The following corrections, additions, deletions, and/or modifications to the above package, by this reference, shall be incorporated therein:

Addition:

SUBSTITUTIONS
Contractor is directed to interpret listed products in plans and specifications to include "or equal" to allow for substitutions in accordance with Section 01 25 00 – Substitutions, with the exception of the following four items:

- Access Control – Paxton Net 2
- Building Management System – Automated Logic Controls
- Fire Alarm – Notifier
- Keyways – Corbin Russwin to match campus standard

The aforementioned four items are campus proprietary systems and substitutions will not be considered. Refer to the Contract General Conditions Section 5.04 (c).

ALTERNATES
Sheet G0.01 lists seven (7) alternates. Please see revised Section 01 23 00 included in this addendum for alternates. To clarify:

- #3 not used – disregard
- #4 Change Eomac Veneered Linear Plank Wood ceiling to Armstrong Wood Works Grille Tegular 663008 2x4 for 9/16" tegular, light cherry. Disregard this alternate. Specifications Section 09 54 29 2.01 already lists three approved manufacturers.
- #5 Increase PV scope from 100kW system to 300kW, see E6.1. The base bid is for 100kW. The add alternate is for 300kW.
- #6 Add water meter, see P0.02 Plumbing Fixture Schedule. The hot water meter in the plumbing fixture schedule should be deleted.
- Alternates #1, 2, 5, and 7 are included on the revised bid proposal form. Please see bid form included in this addendum.

SPECIFICATIONS

The specifications posted on the e-arc website may be difficult to read. Please click on this link to access a clearer copy. https://www.dropbox.com/s/p8z8ggrl5zy5jve/02 CSUS CDC SPECS.pdf?dl=0 Additionally, see revised Specifications Sections included in this addendum.

Further, the University will **not** require wood products to be FSC certified.

QUESTIONS/RESPONSES

Question #1:

Would it be acceptable to submit the Company Address on the "List of Proposed Subcontractors" within 24 hours after bid opening?

Response: Per Exhibit C of the bid documents, list of proposed subcontractors is to be submitted with the bid.

Question #2:

Item 1.3.B lists a Geotechnical Report by Krazan & Associates. I couldn't find this report in the specifications, please provide.

Response: CSU Stan to post Krazan report to ARC Public Planroom

Question #3:

Can the architect/owner issue a better copy of the specifications, the scan pdf file is very light in some areas and hard to read.

Response: CSU to post higher quality scans to Dropbox link below:
https://www.dropbox.com/s/p8z8ggrl5zy5jve/02%20CSUS%20CDC%20SPECS.pdf?dl=0

Question #4:

Please advise what are the allowances amounts to be entered on the newly issued addendum 4 Bid Proposal Form?

Response: There are no allowances on this project.

Question #5:

The Small Business & DVBE Incentives are no longer listed on the updated Bid Proposal Form, are they both still available to claim?

Response: Yes, an updated bid form will be issued as part of this addendum.

Question #6:

Regarding OCIP requirements, per general conditions page 24 subcontractor with an EMR rating over 1.25 will be excluded. Does this mean the subcontractor will not be able to bid on this project if the EMR is higher than the listed limit? If the subcontractor's EMR rating is over 1.25 can they provide their own insurance in order to comply with the insurance requirements?

Response: per section 4.06 b(2)(g), Excluded Parties and Their Insurance Obligations, "Subcontractors, of any tier, with an EMR rating of over 1.25 unless specifically approved by the Underwriter."

Question #7:

Spec section 10 14 00 SIGNAGE, Part 2 Products, 2.01.A. Acrylic Sheet, reads, "thickness specified," however we did not find thickness dimension(s) cited on Sheet G0.11 V3. Please provide the thickness(es).

Response: Standard 1/4" thickness.

Question #8:

Spec section 10 14 00 SIGNAGE, Part 2 Products, 2.01.B. Aluminum Sheet, please advise if sheet thickness should also be as "recommended by the aluminum producer or finisher…" or please provide the thickness(es).

Response: 3/16" minimum thickness

Question #9:

For all plaque signage types shown on Sheet G0.11, please also indicate if corners are sharp, eased, or radiused, and if the latter, provide the radius dimension. Similarly, indicate if exposed edges are sharp, beveled, or eased.

Response: All corners and edges are to be eased.

Question #10:

Detail 17/G0.11 (G0.11 PREMISE IDENTIFICATION) shows 4" minimum height letters depicting "BUILDING NAME" and "BUILDING ADDRESS." There is no notation as to the sign materials; are these possibly cast or flat cut out acrylic, aluminum or other metal, and if so, what type of finish? We inspected Sheet A2.21 V3 SIGNAGE PLAN & FINISH PLAN AND SCHEDULE but did not find any noted instances of these #17 premise identification signs, nor did any appear on the A3.01 V3 BUILDING ELEVATIONS. If these are part of the scope of work, please provide locations and additional specification detail.

Response: Building signage and details were provided in Addendum 3.

Question #11:

For type 2/G0.11 MEANS OF EGRESS SIGNAGE that appear to be applied to glazing at Reception 100 and South Entry 121 (and any other acrylic sign plaques applied to glazing such as type 15/G0.11 DELAYED EGRESS DOOR SIGN at South Entry 121), please specify whether a backer panel should be furnished and installed on the other side of the glazing from that sign.

Response: All signs applied to glazing must have a backer panel.

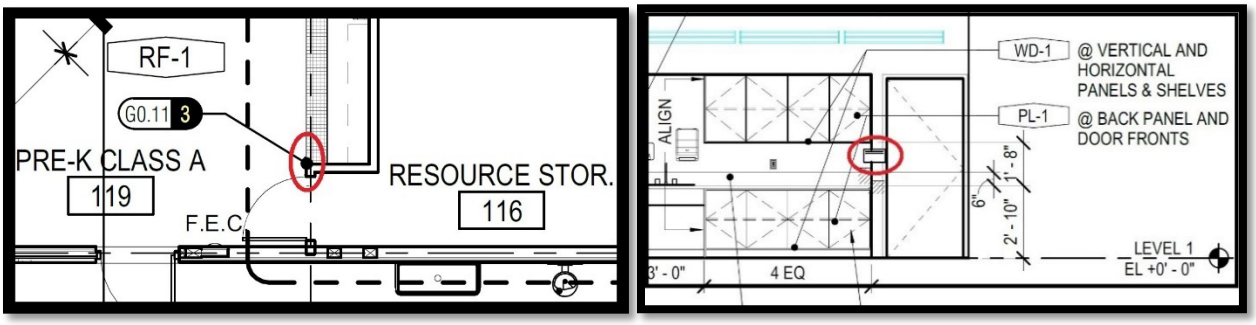
Question #12:

The Sign Type shown at detail 1/G0.11, "Back of House Room Number/Name Signage" is indicated as having braille and thus appears to be an acrylic sign type. However, the 7 locations shown are all at exterior locations. Nearly all manufacturers we are aware of for the "standard one-piece photopolymer sign face with tactile Braille and letters or acrylic sign face with applied tactile lettering and Braille" will not warranty this type for outdoor use. Please advise if a sign plaque product using a "sand blasted" hard phenolic ES/MP plastic laminate resulting in integral raised braille and letters and integral color (such as Mohawk Sign Systems Series 200A Sand Carved), may be used at these exterior locations. As that product is also cost effective, please advise if this may be specified for all interior locations as well.

Response: Exterior room signage to be painted 1/8" Zinc face panel laminated to 1/8" aluminum mounting plate. Etched to raise tactile and braille. Details were provided in Addendum 3.

Question #13:

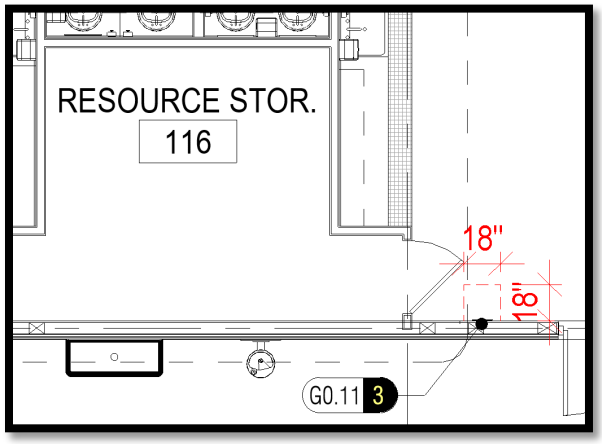
Interior elevation 6/A5.02, viewed east from within Room 119 PRE-K CLASS A, appears to show the 8½" wide (or more) sign type 3/G0.11 (ROOM NUMBER/NAME SIGNAGE) mounted on a narrower width of wall on the strike side of door no. 116A such that a portion of sign would freely protrude into air (and it appears to be drawn that way in elevation). This would not appear to be a feasible configuration; the same is true for its mirror image in Pre-Class B, Room 115. Please advise if this is the intended scope of work signage configuration to be furnished, or provide alternative(s).



Response: Per CBC 11B-703.4.2 -

"Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches (457 mm) minimum by 18 inches (457 mm) minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45-degree open position."

Signage at doors 108A, 108B, 116A, 116B will be relocated to the adjacent wall similar to the sketch below.



Question #14:

Regarding our previous question #6, we found that additionally at door 108A in Room 107/Toddler Class A and at door 108B in Room 111/Toddler Class B, the same condition of the 3/G0.11 wall sign being much wider than the available wall for its mounting, resulting in a significant length of sign jutting out freely into space, as clearly indicated in the elevation detail 3/A502.

Response: Refer to response of question #13

Question #15:

The Sign Type shown at detail 6/G0.11, Fire Bell Exterior Sign, did not appear to be marked on 1/A2.21 FINISH PLAN, will this sign be part of the Scope of Work? If so, please provide location(s).

Response: Sign type 6/G0.11 will be used in the project and will be located outside of the mechanical room on the south exterior wall near the fire bell. See plan note #12 on E2.1 for gong location.

Question #16:

The FACP & Fire Riser Signage shown at detail 9/G0.11 is noted as having red lettering and red border on white background. However, nothing is noted for the "FIRE RISER INSIDE" SIGN at 10/G0.11. May we assume that 10/G0.11 will have the same lettering, border and background colors as for 9/G0.11?

Response: Yes, same red lettering, white background and red border to be provided on both details 9&10/G0.11.

Question #17:

A4.01/02 toilet accessory schedule tag v calls out for a Koala Kare KB100-0. This model number has been discontinued for a number of years, and this unit is not called out on the plan pages. Can we please have an updated model number, and confirm where this is to be used

Response: Accessory 'V' has been deleted from the schedule and is reflected in Addendum 3.

Question #18:

S1.2 General Notes, Section D.1 states contractor to furnish design items by an engineer for review. Section D.2 states design for the pre-fabricated wood roof trusses and the seismic supports for the solar arrays shall be submitted for review by the University Seismic Review Board (SRB). There is no reference to DSA in these sections. Confirm these design items only require the review of the SRB and no review by DSA is required.

Response: There are no structural reviews by DSA.

Question #19:

S1.2 General Notes, Division 06 Wood, Section 061753 Metal Plated Wood Trusses, note 3, states "Shop fabrication of all wood trusses shall be certified by recognized independent testing agency per CBC 1704.2.5.1". The referenced CBC does not provide a list of certified independent testing agencies. Which agencies are recognized as certified?

Response: The question of researching sub-contractor qualifications is not the responsibility of the design team.

Question #20:

S1.2 General Notes, Division 06 Wood, Section 061753 Metal Plated Wood Trusses, note 6, states, all framing lumber shall be Forest Stewardship Council (FSC) certified. According to our manufacture and supplier community, most, if not all, manufactures are not FSC certified due to lack of traction within the program. Confirm FSC is not required for this project?

Response: The FSC requirement will be removed per Addendum #6.

Question #21:

Sheet L4.2 shows length of linear root barrier shall be 16 linear feet (8 panels), but refer to the symbol shown on sheet L4.1 and L4.2, the length is various. Please clarify.

Response: Length of root barrier shall be 16' linear feet on each side of any tree that is within 5' of hardscape.

Question #22:

Detail F on sheet L2.1 shows 4" layer of 3/4" chip aggregate, but refer to construction callouts 10 shown on sheet L1.1, it's 3" depth. Please clarify.

Response: 3”

Question #23:

Sleeves size shown on irrigation legend sheet L3.1 and L3.2 is 4" minimum size, but refer to callouts on plan, it's 2" or 2 1/2". Please clarify.

Response: Install quantity and size as shown in callouts on plan.

Question #24:

General irrigation notes #7 on sheet L3.1 requires two spare wires along mainline, but refer to specs section 32 80 00/3.06/D/6a, only one spare wire is needed. Please clarify.

Response: Specs call for 1 spare common wire, and additional spare control wires in quantity at a ratio of 1 spare per 6 valves. Install spare wires per specifications. Note #7 on sheet L3.1 has been updated.

Question #25:

Please provide model, size and detail of air vacuum relief valve shown on sub-surface dripline notes on sheet L3.1.

Response: Please disregard all subsurface dripline notes. Plans previously included subsurface drip irrigation, but there is no longer any subsurface drip included in the project.

Question #26:

Please provide detail of automatic flush valve shown on sub-surface dripline notes on sheet L3.1

Response: See response to question #25.

Question #27:

Maintenance period is 60 days per general planting notes #5, spec section 32 90 00/1.05/J calls for 1 year. and spec section 32 90 00/1.11/A, calls for 90 days. Please clarify.

Response: Maintenance period is defined in spec section 32 90 00/1.11/A. Section 1.05/J has been removed from the planting specs to avoid confusion. Planting Note #5 on sheet L4.1 has updated to conform to the specs, indicating the 90-day maintenance period.

Question #28:

Please provide size and material of aggregate base under decomposed granite per detail E/L2.1.

Response: Class II

Question #29:

Per Piping Material Specification on Contract Drawing M0.02 v3, Hydronic Pipe (HHWS/R & CHWS/R) above ground is to be Type “K” copper. Per mechanical building standards, Type L is not only acceptable but preferred. Please confirm Type L is an approved material for the hydronic piping above ground.

Response: Not acceptable; Type K is a University requirement.

Question #30:

Specifications Section 06 10 00 – Rough Carpentry Page 3, e. LEED Submittals:2a requires FSC Lumber and a Chain of Custody with documentation. There are no Lumber suppliers that can supply 100% FSC material for this project. Please provide a minimum percentage of FSC required to achieve the FSC LEED requirements? Typically, the maximum achievable is 51% of the entire wood framed portion of the project.

Response: The FSC requirement will be removed per Addendum #6

Question #31:

Section: 06 17 53-Metal Plated Wood Trusses Page 2 & 3, Part 2, Products. A. Lumber, 5, All Framing lumber shall be FSC certified. There is no truss supplier that will use FSC lumber to manufacture the roof trusses. Can this specification be eliminated?
Response: The FSC requirement will be removed per Addendum #6.

Question #32:
Section 06 18 50-Structural Glued Laminated Timber Page 2, 4. Submittals, e. LEED Submittals 2. FSC Lumber is required. A. Chain of custody with documentation is required. Please provide a percentage of FSC required to meet these requirements, needs to be 51% maximum. For your information. FSC Lumber is commanding a significant cost over standard lumber. The supply chain of FSC is difficult even for the items that should be available. Do to supply chain issues we suggest eliminating all FSC requirements as FSC adds an additional 50% material cost increase.
Response: The FSC requirement will be removed per Addendum #6.

Question #33:
Detail C/L2.1 calls for two integral colors of concrete at the enhanced entry areas:
1. Please provide a complete layout plan identifying exact locations of color #1 and color #2 for all "enhanced entry areas." This greatly affects pour sequencing.
2. Please specify colors for color #1 and color #2, as well as for the colored concrete bike bath (Note #26 on L1.1)
Response: See Addendum 6. Layout and selected colors are included in new Detail D, Sheet L2.5.

Question #34:
Please specify anchorage sizing and spacing for the wood decking connection to concrete on the site. No anchorage information is given on detail D/L2.1.
Response: Wedge anchors shall be provided at 32" O.C., centered between joists. Anchor to be 1/2" Hilti Kwik Bolt TZ2 CS Wedge anchor or approved equal

Question #35:
Please advise on whether an equal alternate to the Contech Stormfilter manhole can be submitted for consideration on the project.
Response: Normally we would allow equal alternatives; however, stormwater quality control measures are an exception due to most agencies' standards limiting the devices that can be used. Contech should be used if possible as their device has been approved for this installation.

Question #36:
Cover sheet G0.01 notes Alternates, Bid Proposal Form does not list all alternates as noted on G0.01 or on Drawings.
Response: CSUS to provide revised bid proposal form with all listed alternates in addendum #6.

Question #37:
Drawing A3.12, 3.21, 3.22 Roof Monitor North notes, Add Alternate, no details noted or listed on G0.01. Do we use North Roof Monitor detail A3.23?
Response: The roof monitor along gridline C has been removed, see updated elevations included with Addendum 6.

Question #38:
Provide color selection for light and dark colors for pricing. Reference C/L2.1
Response: Included with Addendum 6.

Question #39:
Please consider substitution Leviton to Signamax, see attached product data.
Response: The successful bidder should utilize the substitution process as specified in the Contract General Conditions and Specification Section 01 25 00 – Substitutions.

Question #40:
1. Voice/Data; how many wires per drop? 1v 1d?
2. WAPs owner furnished or contractor furnished? How many wires needed?
3. NVR; required resolution, frame rate and storage duration?
4. Paxton access; quantity of user cards?
Response:

1. Refer to Telecomm Schedule on E0.3 for cabling requirements.
2.WAPs are University furnished, refer to E0.3 for cabling requirements.
3. None required.
4. No additional cards required.

Question #41:

Please confirm framing lumber to be fire treated, reference Detail 11/A901.
Response: Fire-rated note has been deleted.

Question #42:

Please provide Fire Sprinkler Specification, Division 21 not found. Reference Fire Protection Drawings and Hydraulic and Seismic Calculations
Response: Included with Addendum 6.

Question #43:

Please confirm University standard for water meter. Reference Note G on Sheet C-7.1.
Response: A water meter is to be installed on the incoming domestic water within five (5) feet of the point of entry in the mechanical room and prior to any outlets. The water meter must be connected to the building management system. The basis of design is an Onicon F1000 Series Turbine Flow Meter or equal.

End of Addendum No. 6

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WORKING FOR CALIFORNIA

BID PROPOSAL FORM

CHILD DEVELOPMENT CENTER, PROJECT NUMBER ST-01828
CALIFORNIA STATE UNIVERSITY, STANISLAUS
One University Circle
Turlock, CA 95382

To the Trustees of the California State University, on behalf of the State of California (hereinafter called the Trustees):

The undersigned bidder hereby offers, in the amount stated below, to furnish all labor, materials, tools, equipment, apparatus, facilities, transportation and permits for the construction of the Child Development Center at California State University, Stanislaus, if this offer is accepted by the Trustees.

TOTAL AMOUNT OF BASE BID: **$_____LUMP SUM**
(use figures only)

Bidder shall include Allowances and Lump Sum Amount in Base Bid Lump Sum Price.

The Base Bid amount is to be stated in figures only and is the total amount bid for the entire contract work including all applicable taxes. Any alteration, erasure, or change must be clearly indicated and initialed by the bidder. The bidder agrees that if there are any discrepancies or questions in the figures, the Trustees will use the lower figure despite the bidder's intent. The Trustees' Construction Budget is $15,243,000.

SPECIFY THE NUMBER OF EACH ADDENDUM YOU HAVE RECEIVED ON THE LINE BELOW.

_____

ALTERNATIVES – BASIS OF AWARD
The lowest bid shall be the lowest total of the bid prices on the base contract (Base Bid) and those additive or deductive alternatives that, when taken in order and added to, or subtracted from the Base Bid, are less than or equal to the Trustees' Construction Budget stated above. If Trustees award a contract, it will go to the responsible bidder who submitted the lowest bid as determined by this basis of award. The Trustees are not precluded from adding to or deducting from the contract any of the additive or deductive alternatives after they have determined the lowest responsible bidder.

ADDITIVE ALTERNATIVES
The following additive alternatives are an integral part of this proposal, and to be responsive, the bidder shall quote for the Base Bid, and also for the following listed additive alternatives.

Additive Alternative No. 1:
Addition of fire lane extension as shown on sheet C3.1. $_____Lump Sum
(use figures only)

Additive Alternative No. 2:
#5 Increase PV scope from 100kW system to 300kW, see E6.1. The base bid is for 100kW. The add alternate is for 300kW.
$_____ Lump Sum
(use figures only)

Additive Alternative No. 3:
Add 77 SF of dichroic glazing panels at truss of north roof monitor. See 2/A3.11, A6.01, 7/A9.41, & 08 80 00.
$_____ Lump Sum
(use figures only)

DEDUCTIVE ALTERNATIVES
The following deductive alternatives are an integral part of this proposal, and to be responsive, the bidder shall quote for the Base Bid, and also for the following listed deductive alternatives.

Deductive Alternative No. 1:
Alternate fence construction – Replace custom steel fences and gates at all yards with prefabricated steel fence shown on callout #17 on Sheets L1.1 and L1.2. Shape and layout of fences and gates to conform to original design.

$_____ Lump Sum
(use figures only)

Bidder shall state the above amounts in figures only, and these are the total amounts bid for all of the alternatives including all applicable taxes. Any alterations, erasures, or changes must be clearly indicated and initialed by the bidder. The bidder agrees that if there are any discrepancies or questions in the figures, the Trustees will use the lower figure despite the bidder's intent.

The Bidder shall hold the lump sum prices for all alternatives for 60 calendar days after the start date of the Notice to Proceed. The Trustees reserve their right, within 60 calendar days after the start date of the Notice to Proceed, to add into or deduct from the awarded contract amount by change order, any or all alternatives that were not previously awarded at the listed lump sum amounts, without any delay or impact to the project and with no mark-up or mark-down.

The Trustees reserve the right to adjust by change order the actual quantity of each unit item utilizing the quoted add/deduct unit prices.

The bid is subject to the provisions contained in the Contract General Conditions (note especially Article 2.00 *et seq*.) regarding instructions to bidders, and the bidder agrees that failure to comply with the conditions thereof may be the basis for rejection of this bid.

Five Percent Small Business Preference
The undersigned bidder is hereby requesting the five percent Small Business Preference. To receive the five percent bid advantage, Bidder must submit with its bid a completed "Small Business Preference and Certification" form 701.09, and also indicate its intent by checking the appropriate response below:

By checking the appropriate box below, Bidder is requesting the five percent Small Business Preference, as either a:

1) CA certified Small Business upon verification in accordance with the CA Code of Regulations, Title 2, Section 1896.2, having applied for certification no later than 5:00 p.m. on bid opening date, or — Yes ☐ No ☐
2) Non-small business that commits to subcontracting at least 25% of its net bid price to CA certified small businesses and/or microbusinesses. — Yes ☐ No ☐

If Proposer checks one of the boxes above, and submits the completed Small Business Preference and Certification form 701.09, the Trustees will grant a bid preference of 5% of the lowest responsive bidder's bid. Reference the Contract General Conditions and Supplementary General Conditions for Design-Bid-Build Project, Article 2.12, Small Business Five Percent Bid Advantage.

DVBE Participation / Request for DVBE Bid Incentive
The Trustees require the successful bidder to achieve three percent (3%) DVBE participation in contracting construction projects as established in the bidding documents, and this must occur prior to the bid opening. The basis of award for this contract includes alternatives, and bidder shall ensure that three percent DVBE participation is met whether or not the Trustees add or deduct alternatives from the Base Bid. The University is offering a 1% DVBE incentive. Bidders shall contact the Trustees' DVBE Program Advocate at (209) 667-3323 or dsawyer1@csustan.edu.

The Trustees are granting a DVBE Bid Incentive, for bid evaluation purposes only, in accordance with the Contract General Conditions (for Design-Bid-Build Major Projects, Article 2.13, and for Design-Bid-Build Minor Projects,

Article 2.11). Bidder shall indicate whether or not Bidder is requesting the DVBE Bid Incentive by checking the appropriate response below. Bidder commits to subcontract at least the percentage of DVBE participation of its net bid price as stated hereon with one or more DVBE(s).

DVBE Participation	Incentive
3.00% to 3.99%	None
4.00% to 4.99%	1%
5.00% to 5.99%	2%
6.00% or more	3%

Bidder is requesting the DVBE Bid Incentive (check one): Yes ☐ No ☐

Bidder shall indicate its Total DVBE Participation Percentage Commitment in the spaces below:

3% Mandatory + _____**%** DVBE Incentive = ____**%** Total DVBE Participation Percentage Commitment

Bidder must submit its bid on this Proposal Form, completely filled out and in a sealed envelope provided by the Trustees, and delivered to the Mary Stuart Rogers Building, Room 270 on the California State University, Stanislaus campus, before **2:00 p.m. on May 5, 2022**, or it will be disregarded. The Trustees will only accept bids from prequalified contractors with current California State License Board-issued A or B license and current California Department of Industrial Relations Public Works Registration number.

Bidders shall enclose with this Bid Proposal Form, bidder's security in the amount equal to at least ten (10) percent of the amount of the bid (see Article 2.06-c of the Contract General Conditions). If the bidder is awarded the contract and then fails to execute the contract, the bidder's security shall be forfeited to the Trustees.

The time period for completion of the base bid of the project shall be **488 calendar days** from the construction start date as stated on the Notice to Proceed. Liquidated damages shall be **$5,000** for each calendar day completion is beyond the time prescribed for the project.

For projects with a construction value of $10 million or more:
By initialing below, Proposer represents that he/she has read and understood the Contract General Conditions, including but not limited to its OCIP obligations: Proposer and all subcontractors shall exclude from their proposals, bids and change orders all costs for Proposer's insurance coverage described in Article 4.06-a, Insurance Requirements. Proposer shall exclude from its bid, and ensure every subcontractor of every tier excludes from his or her respective bids, the amount of the Proposer and its subcontractors' reduction in insurance costs due to eligibility for OCIP coverages. Reference Article 4.06-b-5, Trustees Insurance Obligations.

By placing his/her initials in the space below, Proposer acknowledges this notification of its Contract General Conditions and OCIP obligations:

_____
(Initial here)

-End of Bid Proposal Form for Design-Bid-Build Project-

SECTION 01 23 00 – ALTERNATES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes: Administrative and procedural requirements for Alternates.
1. Acceptance or rejection of each Alternate is at discretion of the Trustees. None, any, or all Alternates may be accepted or rejected by the Trustees in order of precedence.

B. Requirements and descriptions for products and scopes of Work identified as Alternates in the Drawings and Specifications and listed as “Bid Alternative “on the Bid Proposal Form.

C. Included in this Section: non-technical descriptions of Alternates listed by number only on the Bid Proposal.

D. Included in other Sections: technical specifications for work revising or adding/deducting from Base Bid work by Alternates.

E. Unless otherwise specifically provided, the work described in Alternates shall be completed with no increase in Contract Time.

F. The additional cost or credit for each Alternate shall represent the total adjustment to the contract sum associated with said Alternate.

G. Refer to the Bid Proposal Form for information concerning order of acceptance of alternates.

H. All labor, material, equipment, accessories, and incidental items required for a complete installation shall be included, whether or not specifically mentioned as part of the Alternate. Contractor shall perform necessary modifications or adjustments to affected adjacent work, whether new or existing, in order to fully and properly integrate the Alternate work into the Project. These necessary modifications and adjustments shall be included in the Alternate

1.01 QUALITY ASSURANCE

A. The Base Bid specifications shall govern work of Alternates unless otherwise noted.

1.02 GENERAL REQUIREMENTS FOR ALTERNATES

A. Coordination:
1. Determine the full effect on the Work of implementing each Alternate, including coordination, modification or adjustment of portions of the Work. Contract Amount included on the Bid Form for each Alternate includes the cost for all work required to incorporate the Alternate.
2. To enable University to compare total costs where alternative materials and methods might be used or where scope of Work might be altered, Bid Alternate Work items have been established as described in this Section.
3. Unless otherwise noted, Alternates will be accepted in the order listed until the Construction Budget is reached.

A. Contract Amount included in Base Bid and as stated in executed Agreement shall include all costs for Work described in Contract Documents.

C. Bid Proposal Form or other means prescribed for submission of proposed cost of Work shall include line items for each Alternate described in this Section. No Alternates other than as described in this Section shall be submitted, except in accordance with product options and substitutions provisions specified in Section 01 25 00, Substitutions.

D. Each Alternative is identified herein by number. This identification shall be used whenever referring to Work described in Alternate and when submitting cost proposals and payment requests.

E. Alternative construction described in Alternates and revised scopes of Work shall be performed only when such Alternate is made a part of the Work by specific provision in the University-Contractor Agreement, if selected by University prior to execution of the Agreement, or by Change Order or Change Directive if selected subsequent to execution of the Agreement.

F. Costs for Alternates shall be valid for no less than 120 calendar days from date of Notice to Proceed and University may select any or all Alternates during that time. Once an Alternate is selected and the Contract modified for Work as described in the Alternate, changes to return to original scope of Work will be made only by Change Order or Change Directive in accordance with provisions of the Contract General Conditions for changes.

PART 2 - PRODUCTS AND EXECUTION

2.01

A. If University elects to proceed on the basis of one or more of the described Alternates, Contractor shall make all modifications to Work as required to provide products complete, in place and fully functional, including all labor, equipment, services and incidental consumables necessary to apply, install and finish Work described in Alternate in accordance with requirements specified in related product

Sections of these Specifications.

B. Cost for Alternates shall be complete and include all net increases and decreases in Contract Amount for Work described in Alternate and for all changes in related Work. No claims for additional costs to University will be honored other than as stated in cost proposal for each Alternate.

2.02 SCHEDULE OF ALTERNATES

A. Additive Alternate Bid No. 1 – Fire Lane Extension.
1. Base Bid condition: 190’ of fire lane running east-west south of the building.
2. Alternate Bid condition: extend fire lane an additional 112’ to the east.
3. Location in contract documents: Sheet C3.1.

B. Additive Alternate Bid No. 2 – 77 SF of Dichroic Glazing Panels at Truss of North Roof Monitor.
1. Base Bid condition: area without glazing infill.
2. Alternate Bid condition: infill at each exposed truss with dichroic glazing of north roof monitor
3. Location in contract documents: Spec Section 08 80 00 and Sheet 2/A3.11, A6.01, and 7/9.41.

C. Deductive Alternate Bid No. 1 – Alternative Fence Construction
1. Base Bid condition: Custom tube steel fence system and gates at all yards.
2. Alternate Bid condition: prefabricated steel fence shown on callout #17 on Sheets L1.1 and L1.2.
3. Location in contract documents: Sheets L1.1 and L1.2.

D. Deductive Alternate Bid No. 2 – Wood Ceiling
1. Base Bid condition: Eomac Veneered Plank Wood ceiling.
2. Alternate Bid condition: Armstrong Wood Works Grille Tegular 663008 2x4 for 9/16” tegular, light cherry.
3. Location in contract documents: Spec Section 09 54 29.

END OF SECTION 01 23 00

SECTION 23 21 13 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of the GENERAL CONDITIONS, SUPPLEMENTAL CONDITIONS, and DIVISION 1, GENERAL REQUIREMENTS, apply to the work of this SECTION.

1.2 SUMMARY

A. Section Includes:
   1. Piping
   2. Special Duty Valves
   3. Hydronic Specialties for chilled water
   4. Hydronic Specialties for hot water
   5. Condensate drain piping
   6. Plastic pipe and fittings.
   7. Insulation

1.3 ACTION SUBMITTALS

A. Product Data: For the following:
   1. For each type of special-duty valve indicated. Include flow and pressure drop curves based on manufacturer's testing for diverting fittings, calibrated balancing valves, and automatic flow-control valves
   2. Pipe insulation
   3. Pre-insulated piping
   4. Hydronic piping
   5. Substitutions acceptable.

1.4 INFORMATIONAL SUBMITTALS

A. Profile Drawings: Show system piping in elevation. Show types, sizes, materials, and elevations of other utilities crossing hydronic piping.

B. Qualification Data: For qualified Installer.

C. Maintenance Data: For hydronic specialties and special-duty valves to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Fusion piping: Certify that each installer has been trained by the manufacturer’s representative for fusion piping installation.

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

C. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with the ASME Boiler and Pressure Vessel Code, Section Vlll, Division 1.

1.6 COORDINATION

A. Coordinate layout and installation of hydronic piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire suppression system components, and partition assemblies.

B. Coordinate pipe sleeve installations for foundation wall penetrations.

C. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations.

D. Coordinate pipe fitting pressure classes with products specified in related Sections.

E. Coordinate size and location of concrete bases.

F. Coordinate installation of pipe sleeves for penetrations through exterior walls and floor assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Calibrated Balancing Valves:
      a. Armstrong Pumps, lnc.
      b. Flow Design, lnc.
      c. Nexus.
      d. Griswold Controls.
      e. lTT Bell & Gossett; lTT Fluid Technology Corp.
      f. Taco, lnc.
      g. Or equal.
   2. Pressure-Reducing Valves:
      a. Amtrol, lnc.
      b. Armstrong Pumps, lnc.
      c. Conbraco lndustries, lnc.
      d. lTT Bell & Gossett; lTT Fluid Technology Corp.
      e. Spence Engineering Company, lnc.
      f. Watts lndustries, lnc.; Watts Regulators.

g. Or equal.

3. Safety Valves:
   a. Amtrol, lnc.
   b. Armstrong Pumps, lnc.
   c. Conbraco lndustries, lnc.
   d. lTT McDonnell & Miller Div.; lTT Fluid Technology Corp.
   e. Kunkle Valve Division.
   f. Spence Engineering Company. lnc.
   g. Or equal.
4. Expansion Tanks:
   a. Amtrol, lnc.
   b. Armstrong Pumps, lnc.
   c. lTT Bell & Gossett; lTT Fluid Technology Corp.
   d. Taco, lnc.
   e. Wessels & Elbi
   f. Or equal.
5. Air Separators and Air Purgers:
   a. Amtrol, lnc.
   b. Armstrong Pumps, lnc.
   c. lTT Bell & Gossett; lTT Fluid Technology Corp.
   d. Taco, lnc.
   e. Or equal.
6. Strainers
   a. Keckley
   b. Muller Brass Company
   c. Or equal.

2.2 PIPING MATERIALS

A. COPER TUBE AND FITTINGS

1. Drawn-Temper Copper Tubing: ASTM B 88, Type L.
2. Annealed-Temper Copper Tubing: ASTM B 88, Type K.
3. Wrought-Copper Fittings: ASME B16.22.
4. Wrought-Copper Unions: ASME B16.22.
5. Solder Filler Metals: ASTM B 32, 95-5 tin antimony.
6. Viega ProPress.

B. STEEL PIPE AND FITTINGS

1. Steel Pipe, NPS 2 and Smaller: ASTM A 53, grade B, Schedule 40, black steel, plain ends.
2. Steel Pipe, NPS 2-1/2 through NPS 12: ASTM A 53, grade B, Schedule 40, black steel, plain ends.
3. Cast-lron Threaded Fittings: ASME B16.4; Classes 125 and 250.
4. Malleable-lron Threaded Fittings: ASME B16.3; Classes 150 and 300.
5. Malleable-lron Unions: ASME B16.39; Classes 150, 250, and 300.
6. Cast-lron Pipe Flanges and Flanged Fittings: ASME B16.1; Classes 25, 125, and 250, raised ground face, and bolt holes spot faced.
7. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.

8. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
   a. Material Group: 1.1.
   b. End Connections: Butt welding.
   c. Facings: Raised face.
9. Welding Materials: Comply with Section ll, Part C. of the ASME Boiler and Pressure Vessel Code for welding materials appropriate for wall thickness and for chemical analysis of pipe being welded.
10. Gasket Material: Thickness, material, and type suitable for fluid to be handled; and design temperatures and pressures.

C. POLYPROPYLENE (PP-R) PIPE AND FITTINGS FOR WATER DISTRIBUTION AND WATER SERVICE
1. Pipe shall be manufactured from a PP-R resin (Fusiolen) meeting the short-term properties and long-term strength requirements of ASTM F 2389. The pipe shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipe shall be made in an extrusion process. Domestic hot water shall contain a fiber layer (faser) to restrict thermal expansion. All pipe shall comply with the rated pressure requirements of ASTM F 2389. All pipe shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11.
2. Pipe shall be Aquatherm® Blue Pipe® MF® available from Aquatherm or equal manufacturer.
3. Fittings shall be manufactured from a PP-R resin (Fusiolen) meeting the short-term properties and long-term strength requirements of ASTM F 2389. The fittings shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All fittings shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11.
4. Polypropylene Fittings: socket fusion, butt fusion, electrofusion, or fusion outlet fittings shall be used for fusion weld joints between pipe and fittings.
5. Mechanical fittings and transition fittings shall be used where transitions are made to other piping materials or to valves and appurtenances.
6. Polypropylene pipe shall not be threaded. Threaded transition fittings per ASTM F 2389 shall be used where a threaded connection is required.
7. Polypropylene pipe used for hot water distribution shall include a fiberglass-reinforced layer to reduce thermal expansion/contraction.
8. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.
9. Plastic-to-Metal Transition Fittings shall be the following:
   a. PP-R one-piece fitting with threaded stainless steel, brass, or copper insert and one PP-R fusion weld joint end.

2.3 VALVES

A. Gate, globe, check, ball, and butterfly valves are specified in Section 23 0523 "General- duty Valves for HVAC Piping."

B. Refer to Part 3 "Valve Applications" Article for applications of each valve.

C. Calibrated Balancing valves, N PS 2 and Smaller: Bronze body, ball type, 125-psig working pressure, 250 deg F maximum operating temperature, and having threaded ends. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

D. Calibrated Balancing Valves, NPS 2-1/2 and Larger: Cast-iron or steel body, ball type, 125- psig working pressure, 250 deg F maximum operating temperature, and having flanged connections. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

E. Pressure-Reducing Valves: Diaphragm-operated, bronze or brass body with low inlet pressure check valve, inlet strainer removable without system shutdown, and noncorrosive valve seat and stem. Select valve size, capacity, and operating pressure to suit system. Valve shall be factory set at operating pressure and have capability for field adjustment.

F. Safety Valves: Diaphragm-operated, bronze or brass body with brass and rubber, wetted, internal working parts shall suit system pressure and heat capacity and shall comply with the ASME Boiler and Pressure Vessel Code, Section lV.

2.4 HYDRONlC SPEClALTlES

A. Manual Air Vent: 1-piece 1/4 turn ball valve with 1/2" threaded connections.

B. Automatic Air Vent: Designed to vent automatically with float principle, bronze body and nonferrous internal parts, 150-psig working pressure, 240 deg F operating temperature with NPS 1/4 discharge connection and NPS 1/2 inlet connection.

C. Expansion Tanks: Welded carbon steel, rated for 125-psig working pressure and 240 deg F maximum operating temperature. Separate air charge from system water to maintain design expansion capacity by a flexible bladder securely sealed into tank. lnclude drain fitting and taps for pressure gage and air-charging fitting. Support vertical tanks with steel legs or base; support horizontal tanks with steel saddles. Factory fabricate and test tank

D. with taps and supports installed and labeled according to the ASME Boiler and Pressure Vessel Code, Section Vlll, Division 1.

E. Air Purgers: Cast-lron body with internal baffles that slow the water velocity to separate the air from solution and divert it to the vent for quick removal; Maximum working pressure of 150 psig and temperature of 250 deg F.

F. Bypass Chemical Feeder: Welded steel construction, 125-psig working pressure, 2 gallon capacity, with inlet, outlet, and drain valves.

G. Chemicals: Specially formulated, based on analysis of makeup water, to prevent accumulation of scale and corrosion in piping and connected equipment.

H. Strainers shall be Keckley, Mueller Brass Company, Or equal, installed where shown on drawings or as required by the specifications.

I. Strainers 2 inches and smaller shall be a wye-type, basket strainer. With 1/16- iinch mesh. Provide bronze body with soldered or threaded connections as required.

J. Strainers 2-1/2-inch and larger shall be wye-type basket strainer with cast iron body, and type 304 stainless steel cylindrical removable baskets with 1/1-inch diameter perforations. Provide with grooved or flanged connections.

2.5 INSULATION

A. Underground Piping
   1. Spray-on Pipe Insulation
      a. Insulation shall be polyurethane foam or polyisocyanurate foam spray applied to the surface of the pipe with a minimum thickness of one inch. Insulation shall be rigid when dried, 90-95% closed cell polyurethane or polyisocyanurate with a 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K- Factor) of 0.16 and shall conform to ASTM C-591.
   2. Pre- or post-insulated Pipe
      a. Pre-insulated pipe shall be a complete system of factory pre-insulated polypropylene piping for the specified service.

      b. Carrier pipe shall be polypropylene PP-R by Aquatherm, conforming to ASTM F-2389 as previously specified herein.

      c. Insulation shall be polyurethane foam with a minimum thickness per material specifications on plans. Insulation shall be rigid, 90-95% closed cell polyurethane with a 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K- Factor) of 0.16 and shall conform to ASTM C-591.

      d. Manufacturers: Subject to compliance with requirements,

         i. Aquatherm TI Pipe
         ii. Thermacor Process, L.P..
         iii. Or equal.
   3. Jacketing

      a. Jacketing material shall be high density polyethylene (HDPE) or polyvinyl chloride (PVC), having a minimum wall thickness of 60 mils. Seams to be sealed with pressure sensitive wrap, 30 mils thick.

B. Above Ground Piping
   1. General:

a. All insulation material shall have a mold, humidity, and erosion resistant face that has met the requirements of the latest CMC.
b. Insulation applied to the exterior surface of pipes located in buildings shall have a flame spread of no more than 25 and a smoke developed rating of not more than 50.

2. Rigid Molded Sectional Indoor/Concealed Jacket
   a. Molded sectional, factory fabricated of heavy density resin bonded fibrous glass, with integral factory applied all service jacket of Kraft paper/aluminum foil & glass fiber reinforcement.
   b. Insulation shall have a thermal conductivity k factor of 0.23 at 75 degrees Fahrenheit mean temperature and be suitable for direct application and service on piping having operating surface temperatures of minus 60 degrees to 450 degrees Fahrenheit.
   c. Jacket shall:
      1) Extend 1 1/2 inches (minimum) along one edge of longitudinal joint to form a sealing lap which shall be faced inside with a paper protected pressure sensitive adhesive.
      2) Have a permanence rating of 0.02 perm per inch and a Beach puncture resistance of 50 units
   d. Have an exterior suitable for painting with latex or water base paint.
   e. All insulation shall have composite (insulation, jacket, tape seal and adhesive used to adhere jacket to the insulation) Fire and Smoke Hazard ratings as tested under procedure ASTM E-84, NFPA 255 and UL 723, not exceeding Flame Spread of 25 and a Smoke Developed of 50. PVC fitting covers and accessories, such as adhesives, mastics, cements and cloth for fittings shall have the same component ratings.
   f. Paper laminate jackets shall be permanently flame and smoke resistant. Chemicals used for treating paper in jacket laminates shall not be water soluble and shall be unaffected by water and humidity.
   g. Fiberglass Schuler Manville Micro Lok, or equal.
   h. Irregular shape (fittings, flanges, valves, etc.):
      1) Fibrous glass of same density, thickness, and other properties or characteristics as the adjacent regular shape insulation either pre-molded or field forged to fit the item being insulated. The pre-molded insulation shall be provided with weather protection cover.

3. Rigid Molded Sectional Outdoor Jacket
   a. Molded sectional, factory fabricated of heavy density resin bonded fibrous glass, with integral factory applied all service jacket of Kraft paper and aluminum foil and glass fiber reinforcement.
   b. Insulation shall have a thermal conductivity k factor of 0.23 at 75 degrees Fahrenheit mean temperature and be suitable for direct application and service on piping having operating surface temperatures of minus 60 degrees to 450 degrees Fahrenheit.
   c. Jacket:
      1) Straight runs: .016-inches thick smooth sheet aluminum finish.
   d. Irregular shapes:
      1) Surefit Aluminum Pipe Fitting Covers for pipes up to 6-inches.
      2) Mitered aluminum sheet matching straight run jacketing for pipes over 6-inches.
      3) Alternative jacketing: Schuler Manville Type ML, metal jacketing system.

e. All insulation shall have composite (insulation, jacket, tape seal and adhesive used to adhere jacket to the insulation) Fire and Smoke Hazard ratings as tested under procedure ASTM E-84, NFPA 255 and UL 723, not exceeding Flame Spread of 25 and a Smoke Developed of 50. PVC fitting covers and accessories, such as adhesives, mastics, cements and cloth for fittings shall have the same component ratings.

f. Paper laminate jackets shall be permanently flame and smoke resistant. Chemicals used for treating paper in jacket laminates shall not be water soluble and shall be unaffected by water and humidity.
Fiberglass Schuler Manville Micro Lok, or equal.

PART 3 - EXECUTION

3.1 EARTHWORK

A. See Section 31 21 16 "Trenching" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Underground Piping
1. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
2. Installers shall be trained and certified to install the pipe per the manufacturer’s guidelines. Contact your local Aquatherm representative for training.
3. Remove standing water in the bottom of trench.
4. Do not backfill piping trench until field quality-control testing has been completed and results approved.
5. Install piping at minimum uniform grade of 0.2 percent. Install manual air vents at high points with concrete yard boxes.
6. Install components with pressure rating equal to or greater than system operating pressure.
7. Install piping free of sags and bends.
8. Install fittings for changes in direction and branch connections.
9. Thrust blocks shall not be required with PP-R piping.
10. Expansion loops shall not be required for direct buried underground PP-R piping.

B. Above Ground Piping
1. lnstall groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
2. lnstall drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS ¾ threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
3. Reduce pipe sizes using reducer fitting.
4. Unless otherwise indicated, install branch connections to mains using tee fittings or mechanical formed tees in main pipe.

5. Install piping free of sags and bends.
6. Install fittings for changes in direction and branch connections.

3.3 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment." Comply with requirements below for maximum spacing of supports. Add additional hangers as required to comply with California Building Codes and as directed by the Authority having jurisdiction.

B. Support vertical runs at roof, at each floor.

3.4 PIPE JOINT CONSTRUCTION

A. Refer to Section 22 05 00 "Basic Mechanical Materials and Methods" for joint construction requirements for soldered and brazed joints in copper tubing; grooved, threaded, welded and flanged joints in steel piping.

B. Fusion Piping
1. Ream ends of pipes and tubes and remove burrs.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Fusion Joints: Fusion join polypropylene pipe in accordance with ASTM D2657, ASTM F 2389, and the manufacturer’s instructions.
4. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
5. Insulation joints made for pre-insulated pipe shall be done in accordance with the insulation manufacturer’s instructions.

3.5 HYDONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents in mechanical equipment rooms only at high points of system piping, and elsewhere as required for system air venting.

C. Install air separator or air scoop in closed hydronic systems where indicated on the drawings.

D. Install bypass chemical feeders in each hydronic system where indicated, in upright position. Install feeder in bypass line, off main, using ball valves on each side of feeder and in the main between bypass connections. Pipe drain with ball valve.

E. Install expansion tanks where indicated. Vent and purge air from hydronic system and ensure tank is properly charged with air to suit system design requirements.

3.6 TERMINAL EQUIPMENT CONNECTIONS

A. Size for supply and return piping connections shall be same as for equipment connections.

B. Install control valves in accessible locations close to connected equipment.

C. Install ports for pressure and temperature gages at coil inlet connections.

3.7 FIELD APPLIED THERMAL INSULATION INSTALLATION

A. Do not disturb the bottom of trench; otherwise, compact and stabilize it to ensure proper support.

B. Remove standing water in the bottom of trench.

C. Bed the pipe on a minimum 6-inch layer of granular fill material (sand) with a minimum 6-inch clearance between the pipes.

D. Insulation and jacketing shall be applied to the piping in 10’ segments (maximum)

E. After completion, the segments are rotated 180o and the bottom of the jacketing and butt strips are inspected. Any defects or damage shall be replaced with new insulation.

F. Jacketing and insulations joints shall be staggered.

G. In larger diameter piping shorter segments can be insulated and jacketed if more practical.

H. Where conditions permit, insulation and jacketing may be applied outside of the trench to sections of piping. Pipe lengths should be insulated in segments. Length of insulation segment should not exceed 10' (3 m).

I. Backfill per manufacturer’s instructions.

3.8 IDENTIFICATION

A. Refer to Section 22 05 00 "Basic Mechanical Materials and Methods"

B. Install continuous metallic/plastic underground warning tapes during back filling of trenches for underground hydronic piping. Locate tapes 6 to 8 inches below finished grade, directly over piping. Alternatively install 8 – 10 gage copper wire at 6” – 8” directly over the pipeline. Provide warning tapes above the wire at 6” to 8” below the finished grade directly over the pipeline.

3.9 FIELD QUALITY CONTROL

A. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing, another liquid that is safe for workers and compatible with piping may be used.

B. While filling system, use vents installed at high paints of system to release trapped air. Use drains installed at low paints for complete draining of liquid.

C. Check expansion tanks to determine that they are not air bound and that system is full of water.

D. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the design pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed either 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A of ASME B31.9, "Building Services Piping."

E. After hydrostatic test pressure has been applied for at least 4 hours, examine piping, joints, and connections for leakage, eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.

F. Prepare written report of testing.

3.10 ADJUSTING

A. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.

B. Perform these adjustments before operating the system:
   1. Open valves to fully open position. Close all bypass valves.
   2. Check pump for proper direction of rotation.
   3. Set automatic fill valves for required system pressure.
   4. Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).

END OF SECTION 23 21 13

SECTION 28 13 00 - ACCESS CONTROL – Net2 System

PART 1 GENERAL

1.1 SUMMARY

A. Section includes
   1. Electronic Access Control

B. Products
   1. An Access Control Unit (ACU), which shall interface with access point peripherals and identity gathering devices, providing logic and decision making to manage an access point.
   2. An Input/Output (I/O) Board, which shall contain input and output peripherals to monitor digital states and switch mains rated relays.
   3. A Power Supply Unit (PSU), which shall provide the power necessary to power the ACUs.
   4. A Desktop reader, which shall provide the method of enrolling proximity tokens to the system to be associated with users.
   5. Access Control Server software, which shall provide system engineers and administrators with a method of managing and configuring access control hardware and users, and providing real-time access control monitoring of the entire system, all within a single, easy to use, intuitive package. All hardware and user configuration and system events shall be stored on the computer running this software.
   6. Access Control Client software – This shall provide identical functionality and usability to the Access Control Server software. This software however shall not store any configuration or events, instead it shall be used as a portal to managing the access control system from multiple workstations.

C. The products above shall form the fundamental part of an Access Control System (ACS), providing complete control and monitoring of access points at the installed site.

D. Overall system capability
   1. The system shall monitor and control facility access via electronic access controllers utilising card readers and keypad devices. It shall be implemented through TCP/IP architecture using the electronic single door controller approach via PoE infrastructure.
   2. The system shall be capable of monitoring alarm points, controlling output devices, and managing lift control floors. The system shall maintain an audit trail of operator activity and all access control and alarm activity.
   3. The system shall be capable of starting with a single door, and expanding one door at a time, to up to a minimum of 1000 doors
   4. Each controller shall be able to manage the hardware necessary to secure one door. If entry and exit is required, only one controller shall be required. Each controller shall maintain a full database of information so that access decisions are made within a maximum of one quarter of a second in both online and offline states.
   5. The access controller units (ACU) shall be capable of DHCP or static IP addressing.
   6. The system shall allow unlimited workstations for programming and administration of the system including database management, report generation, and real-time monitoring of activity. No license keys or fees shall be required to install and operate the software on client workstations. A dedicated computer shall not be required (but shall be recommended) for large projects.
   7. The system shall support 500 input/output controllers for monitoring the condition of external devices such as alarm contacts, push buttons, photo sensors, and temperature points. The I/O controller shall be TCP/IP communications and shall be capable of DHCP or static IP addressing.
   8. The user shall be able to launch the time and attendance, online video tutorials, documentation and card badge designer from the access control GUI home page.
   9. The system shall support at minimum 50,000 unique credentials.
   10. The system shall be scalable, allowing for additional hardware from the same manufacturer.

E. The ACS shall provide the following as a minimum:
   1. Access Control
   2. CCTV Video Integration
   3. Time and Attendance
   4. Intruder Alarm Integration
   5. Open SDK for 3rd party application Integration
   6. Smart Phone application for system control and user administration
   7. Graphical Maps
   8. Lift Control
   9. Email/SMS Notifications
   10. Emergency Lockdown
   11. Mustering
   12. Energy Management
   13. Card Designer
   14. Credential enrolment reader
   15. Automatic User Image Display at PC on card use
   16. Secondary door unlock control from fire alarm input
   17. Various card reader technologies including clock & data, Wiegand and GSM
   18. License free software and lifetime updates at no charge
   19. Intercom / Video Entry Station
   20. Wireless door locks

1.2 DEFINITIONS

A. Access Control System (ACS): The entire system as a whole, made up of hardware to control the relevant access points and appliances, readers to identify users, software/hardware to determine access control, and all firmware and additional hardware installed as part of the access control solution.

B. Access Control Unit (ACU): An intelligent peripheral control unit that provides the interface between the Management and Monitoring Subsystem and the devices installed at the access portal for the purpose of restricting access and monitoring the portal status.

C. AWG (American Wire Gauge): A unit of measurement for the diameter of wires.

D. Client: A PC that can view and manage the system database.

E. DHCP: Dynamic Host Configuration Protocol

F. EMC: Electromagnetic Compatibility.

G. Entry system (audio/video entry system): A system, either stand alone or integrated, comprised of Panels and Monitors to authorise access via video and audio communication.

H. GSM (Global System for Mobile Communications): The standard to describe the protocols commonly used in mobile communications.

I. I/O: Input / Output, relating to peripherals where an input is used to monitor the high/low state of a signal, and an output consists of a relay capable of switching a device on/off.

J. IP: Internet Protocol incorporated into Microsoft Windows.

K. LAN: Local area network.

L. Mbps: Megabits per second

M. Monitor: A piece of hardware that allows an occupant to validate entry to an unknown user via a location on the network.

N. Multicast: Communication where information is addressed to multiple recipients simultaneously.

O. Occupant/Resident: The user of a Monitor or the user of a reader.

P. Open air: Without obstruction or interference.

Q. Panel: A piece of hardware used to determine whether a known user is allowed access, and as a method of communication for unknown users to contact a buildings occupants.

R. PC: Personal computer, used as the Central Station, workstations, and file servers.

S. PoE: Power over Ethernet.

T. Reader: A proximity reader or biometric reader that captures credential information.

U. RS-485: A TIA/EIA standard for multipoint communications.

V. Server: A PC that contains the database of users and access control settings, which runs the access control software.

W. SIP: Session Initiation Protocol.

X. TCP: Transport Control Protocol incorporated into Microsoft Windows.

Y. Token: The credential issued to a person. This can be a PIN or a device containing an encoded number, used to determine if access will be granted or denied.

Z. Triggers and Actions: A software component which provides the ability to create rules to perform custom/bespoke functionality.

AA. UDP: User Datagram Protocol incorporated into Microsoft Windows.

BB. Unicast: Communication where information is addressed to a single recipient.

CC. UPS: Uninterruptible power supply.

DD. USB: Universal Serial Bus.

EE. Visitor: The user of a Panel.

FF. WAN: Wide area network.

GG. Wiegand: Patented magnetic principle that uses specially treated wires embedded in the credential card. Also known as reader data output format and Wiegand signal.

HH. Windows: Operating system by Microsoft Corporation.

II. Workstation: A PC with software that is configured for specific limited security system functions.

1.3 SYSTEM DESCRIPTION

A. General

1. The ACS shall control the movement of users through access points.
2. Users shall be identified and processed through any of these means:
   a. Presenting a token to a reader.
   b. Entering a unique PIN to a keypad
   c. Recognition of a unique physical property at a biometric reader.
   d. Phone number via GSM Access reader
   e. Visual and/or audio confirmation from an occupant of the premises
   f. Combination of the above
3. The system shall not require facility codes for card credentials. Each token/credential shall have a unique 40 bit encryption for high security.
4. The system shall provide for unique card serial numbers, so the user will not need to determine the next sequence of cards to purchase.
5. A PC shall be used to administer the access control system.
   a. The access control software shall have a Client/Server structure to facilitate operation on multiple PCs.
   b. A password shall be required to login and shall limit the activities an operator is permitted to perform.
6. A mobile application will be available for system control and user administration.
   a. The mobile application will be available for Android and iOS devices.

1. Hardware shall consist of:
   a. Access Control Units
   b. I/O Boards
   c. Proximity readers
   d. Desktop readers
   e. Power Supply Units
2. All hardware peripherals shall be clearly labelled and identified for ease of installation.

C. Software
1. The system database containing all hardware and user information shall be held at the PC running the Server software.
2. The software shall feature:
   a. Multi-user and multi-tasking to allow for independent activities and monitoring occurring simultaneously at different workstations.
   b. A graphical user interface to show pull-down menus and a menu tree format that complies with interface guidelines of Microsoft Windows operating system.
   c. A mobile application for user administration, event reporting, door open and roll call.
3. System license shall be for the entire system and shall include capability for future additions that are within the indicated system size limits specified in this Section. There shall be no license fee or yearly renewal fees.
4. The system shall use open architecture that allows importing and exporting of data and interfacing with other systems that are compatible with Microsoft Windows operating system.
5. Access shall be restricted using password-protected operator login.

1.4 GENERAL REQUIREMENTS FOR SOFTWARE

A. Two versions of the software shall be available from the manufacturer:
1. A 'Lite' version of the software shall contain all of the standard access control features to manage access privileges and report on users. Other features include unlimited free client login, CCTV and basic intruder alarm integration and graphical maps – this version shall be available free of charge.
2. A 'Pro' version of the software shall contain all of the features offered in the 'Lite' version, with the addition of more advanced functionality, including management features, fire alarm and multi-zone intruder alarm integration, security lockdown, and more – this version shall be available at an additional cost.

B. Overall software capability
1. The software shall allow the configuration and control of hardware controlling the operation of doors, turnstiles, and other controllable devices.
2. The software shall monitor and report access control events of the entire ACS. It shall be possible to view these events at any number of workstations.
3. The software shall be capable of supporting at minimum 50,000 unique credentials and be able to manage and report on at minimum 1,000 access points.

C. The software shall provide the following as a minimum:
1. Access Control
2. CCTV Video Integration
3. Biometric Integration
4. Time and Attendance
5. Intruder Alarm Integration
6. Fire Alarm Integration
7. Open SDK for HR Database Integration
8. Graphical Maps
9. Lift Control
10. Email/SMS Notifications
11. Emergency Lockdown

12. Roll Call and Mustering
13. Energy Management
14. Card Designer
15. Automatic User Image Display at PC on card use
16. Browser application for remote site management
17. Triggers and actions to achieve custom/unique functionality
18. Timesheet and timeline
19. Anti-passback
20. Customisable welcome page
21. Landlord Tenant
22. Support for various card reader technologies, including clock & data, Wiegand and GSM
23. Support for Graphical Images on selected LCD Readers
24. Support for a credential enrolment reader
25. Android and iOS mobile application

D. The Server and Client Graphical User Interface (GUI) shall be identical.
   1. All configuration available at the Server shall be available at the Client.

E. Operating system
   1. The Server software at a minimum shall support the following operating systems:
      a. Windows 10 Pro 64Bit
      b. Windows 8 & Windows 8.1
      c. Windows 7
      d. Windows Vista
      e. Windows Server 2008 & 2012

F. Processor
   1. A PC shall be able to run the Server software with the following, or greater, performance specifications:
      a. Memory size: 4GB.
      b. Hard disk free space: 20GB.
      c. Display: 1024 x 768.
      d. Interfaces: USB and Ethernet.
      e. DVD-ROM drive.
      f. Web browser: Internet Explorer 5 or later
   2. Number of PCs required:
      a. One PC running the Server software shall be required per system.
      b. There shall not be a limit to the number of PCs that can run the Client software. (Limits shall be placed based on the SQL licensing.)
      c. There shall not be a limit to the number of mobile devices that can install and run the Android and iOS mobile application.

1.5 PERFORMANCE REQUIREMENTS

A. The Server software shall create and maintain a single database for access-control and credential-creation functions.

B. Any change made to the database shall automatically be communicated to all intelligent access control hardware:
   1. When hardware is online, updates shall be communicated with appropriate changes taking immediate effect.
   2. When hardware is offline, updates shall be communicated when the hardware it is next online.

C. Distributed Processing:
   1. The system shall be a fully distributed processing system so that information (including time, date, valid codes, access levels, and similar data) is downloaded to Controllers in such manner access-control decisions for that location.

2. Intermediate Controllers shall be unacceptable for access control.
3. If communications to Central Station are lost, all Controllers shall automatically buffer event transactions until communications are restored, at which time buffered events shall be uploaded to the Central Station.

D. System capacities:
1. The system shall support at minimum:
   a. 1,000 controlled access points.
   b. 50,000 users, each with a unique credential.
   c. 2,000 input devices.
   d. 2,000 controllable appliances.
   e. 10,000 individual access levels.
   f. 64 time schedules and 512 segments per time zone.

E. System Network Requirements
1. Client PCs shall communicate with the Server PC via TCP/IP on a LAN/WAN:
   a. System events recorded by the Server shall be communicated to Clients.
   b. Changes made to the database at a Client shall be communicated to the Server.
2. The Server PC shall communicate with access control hardware via TCP/IP on a LAN:
   a. Access control events shall be communicated to the Server PC.
   b. Changes to the database shall be communicated to the access control hardware.
3. The system shall utilise standard networking protocols to allow installation on corporate infrastructure.
4. No manual addressing shall be required.

1.6 QUALITY ASSURANCE

~~A. The software shall receive lifetime updates from the manufacturer free of charge.~~

B. All equipment provided shall be covered by a manufacturer's warranty for a minimum of 5 years. The following aspects shall be covered:
1. Electrical
2. Electronic
3. Component
4. Mechanical

C. All hardware provided shall receive firmware upgrades from the manufacturer free of charge.

1.7 COMPLIANCE

A. The system shall comply with:
1. The General Data Protection Regulation (GDPR) 2018
2. EN60839-11-1 Grade 1
3. EN60839-11-1 Grade 2

B. Access Control Units shall comply with the following standards and directives:
1. The Electro-Magnetic Compatibility (EMC) Directive
2. The Restriction of Hazardous Substances (RoHS) Directive
3. Part 15 of the FCC Rules
4. UL 294 for Access Control
5. CSA 22.2 No.205
6. Innovation, Science and Economic Development (ISED) ICES-003

C. I/O boards shall comply with the following standards and directives:
1. The Low Voltage Directive (LVD)
2. The Electro-Magnetic Compatibility (EMC) Directive
3. The Restriction of Hazardous Substances (RoHS) Directive

4. Part 15 of the FCC Rules
5. Innovation, Science and Economic Development (ISED) ICES-003
6. IEC-60950-1 for Safety

D. PSU's shall comply with the following standards and directives:
1. The Low Voltage Directive (LVD)
2. The Electro-Magnetic Compatibility (EMC) Directive
3. The Restriction of Hazardous Substances (RoHS) Directive
4. Part 15 of the FCC Rules
5. Innovation, Science and Economic Development (ISED) ICES-003
6. IEC-60950-1 for Safety

E. Desktop readers shall comply with the following standards and directives:
1. The Low Voltage Directive (LVD)
2. The Radio Equipment Directive (RED)
3. The Restriction of Hazardous Substances (RoHS) Directive
4. ISED licence-exempt RSS standard(s)
5. Part 15 of the FCC Rules
6. IEC-60950-1 for Safety

1.8 GENERAL REQUIREMENTS FOR COMMUNICATIONS

A. ACU to Server
1. The ACU shall communicate with the Server using the TCP/IP LAN.
a. The ACU shall be addressable using:
(i) Static IP
(ii) DHCP
b. At minimum, 100 Mbps Ethernet network speed shall support

B. ACU to ACU
1. It shall be possible to daisy chain ACUs using RS485 such that only one ACU shall require connection to the Server. The following cable shall be used:
a. Belden 8723
(i) 2 x twisted pairs
(ii) Maximum length 1000m (3000')
b. Technical equivalent CAT5, CAT5e or CAT6 cable
2. Each RS485 data line shall support at minimum 200 ACUs.

C. ACU to Reader
1. Readers shall communicate with an ACU over any of the following or technical equivalent cable:
a. Belden 9540
(i) 8 core screened cable.
(ii) 18 AWG
(iii) Maximum length 100m (328')
b. Belden 9538
(i) 8 core screened cable.
(ii) 22 AWG
(iii) Maximum length 25m (82')
2. All surface mount readers shall be provided with 5m (16.4') Belden 9540 cable at no additional cost.

D. No manual addressing shall be required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturer: Paxton per University's standard.

B. The components of the ACS shall be available from a single source manufacturer to assure compatibility of products.

C. Components shall consist of:
   1. Access Control Software. The manufacturer shall have in its employ the software engineering staff that write and manage the code for the ACS, and shall maintain all licensing required.
   2. Access Control Panels. The manufacturer of the ACS control panels shall be the same as software manufacturer. The access panel manufacturer shall have in its employ the engineering and manufacturing staff to produce the hardware and software for the control panels.
   3. Readers. The manufacturer of the access control readers shall be the same as the manufacturer of the access control software and control panels.
   4. Tokens/credentials. The manufacturer of the access control tokens shall be the same as the manufacturer of the access control readers.
   5. Power Supply Units (PSU), which shall provide a voltage appropriate for all access control hardware requiring external power.

D. Substitution Limitations
   1. No substitutions.

2.2 SPECIFIC REQUIREMENTS FOR TOKENS

A. The manufacturer of the ACS shall be able to supply Paxton HiTag2 125KHz tokens.
   1. The supplied tokens shall contain an authentication method to deter the copying and unauthorised use of tokens.

2.3 SPECIFIC REQUIREMENTS FOR ACCESS CONTROL UNITS

A. Features
   1. The ACU shall store locally the system database for faster and offline lookup.
   2. The ACU shall be capable of making access control decisions.
   3. The ACU shall allow the control and monitoring of a single access point.
   4. The ACU shall be capable of supporting a combination of at least 4 of the following:
      a. Proximity readers
      b. Magstripe readers
      c. Keypads
      d. Combination reader/keypad.
   5. The ACU shall support up to 50,000 unique card ID's
   6. The ACU shall retain event data (at least 2,454 events per door) when there is no connection to the Server PC.
   7. The ACU shall be able to automatically unlock doors during specified time periods.
   8. All data shall be retained during a power loss.
   9. Where time and attendance is used, the ACU shall be configurable to support a Clock In reader and Clock Out reader on a single door controller.
   10. The ACU shall include support for tri-colour reader LED's control.

B. User interaction
   1. Once installed, no further interaction with the hardware shall be required.

C. Display
   1. The ACU shall have colour coding representation for reader, exit device, communications, and power connections to simplify installation, maintenance, and troubleshooting.
   2. The unit shall include installation LED's to indicate the output relay status', TCP/IP communications status, network server connected status, input status and end of line termination status.

D. Communications
   1. The ACU shall include TCP/IP interface for network communications directly into the processing

not approved.

2. In addition to TCP/IP, the ACU shall also include RS-485 communications for primary and/or secondary communications directly into the processing board.
    a. The following data lines shall be supported:
        (i) CAT5
        (ii) CAT5e
        (iii) CAT6
        (iv) Belden 8723
    b. The maximum cable length shall not exceed 1,000m (3,280').
3. It shall be possible to communicate with multiple ACU's over a single RS485 data line.
    a. At minimum, 200 ACU's shall be supported per data line.
4. The ACU shall support the connection of readers:
    a. The ACU shall support the following reader input technologies simultaneously:
        (i) Clock & data
        (ii) Wiegand.
    b. The following cable types shall be supported:
        (i) Belden 9540

E. Peripherals
1. The ACU shall provide at minimum the peripherals to support 2 readers or keypads.
    a. The reader peripheral shall not be limited to a fixed data input, and instead shall accept data read from a variety of token types of different lengths, including but not limited to the following:
        (i) PIN
        (ii) Code
        (iii) Token ID
    b. The reader peripheral shall output current states relevant to the appliance to control for supplying feedback to the token holder in the form of an LED and speaker.
    c. The reader peripheral shall provide the power that the reader requires to operate.
        (i) The peripheral shall provide:
            1. A voltage of 12V DC
    d. The ACU shall support an LCD graphics image reader capable of controlling four stages of image display including:
        (i) Image 1 for idle reader state
        (ii) Image 2 for access granted indication
        (iii) Image 3 for access denied indication
        (iv) Image 4 for personal identification code required indication
    e. The ACU shall include an output for keypad readers that have a built in bell button that are used to activate an intercom, camera, or turn on siren/strobes.
    f. It shall be possible to locate the reader at minimum 100m (328') from the door connector without communication becoming impaired.
    g. The ACU shall automatically detect any readers/keypads.
2. The ACU shall house independent changeover relay channels.
    a. The ACU shall provide at minimum 2 relays.
    b. Each relay shall be provided with N.O. and N.C. contacts.
    c. Relay contacts shall be voltage free.
    d. Each relay shall be capable of switching a resistive load of at least 4A at 24V.
3. The ACU shall house a powered output for controlling locks.
    a. The lock output shall provide at minimum 1A at 12V DC.
4. The ACU shall contain a tamper switch input.
    a. The input shall be used to alert appropriate users in the case of unknown/impermissible access to the ACU.
5. The ACU shall contain a power supply unit (PSU) fail input.

a. The input shall be used to alert appropriate users in the case of a door lock power supply failing.

6. The ACU shall contain a door contact input.
   a. The input shall be used to monitor the state of the door.
7. The ACU shall contain an input for an exit button or break glass.
   a. The input shall allow exit buttons, break glass, and any other push-to-make contacts to input to the ACS for the purpose of unlocking an access point.
   b. It shall be possible to connect multiple exit buttons in series to a single ACU.
   c. Exit buttons shall be available from the manufacturer of the door controller.
8. The ACU shall include connections for an external intrusion alarm panel.
   a. As a minimum, the ACU shall have a designated relay output, alarm condition status, and arming contact.

F. Power supply
1. It shall be possible to power the ACU with either of the following:
   a. A PoE / PoE+ Power Supply Unit (PSU)
   b. A 12V, 2A Power Supply Unit (PSU)
2. Maximum power usage shall not exceed 200mA at 24V DC.

G. Temperature
1. The ACU shall meet the required temperature standards for an internal product.
   a. The ACU shall operate reliably within the temperature range of 0°C to 55°C (32°F to 131°F)

H. Housing
1. The ACU shall include removable connectors to provide ease of installation and board exchange if necessary. The connection points shall not require any special tools to terminate.

2.4 SPECIFIC REQUIREMENTS FOR I/O BOARD

A. Features
1. The ACS shall include support for input/output boards designed to monitor auxiliary inputs and provide relay outputs for control of external devices.
2. The I/O board shall support a minimum of 4 inputs and 4 outputs.
3. It shall be possible to use input states to trigger events in the ACS via Triggers and Actions.
4. It shall be possible to control relay outputs via Triggers and Actions.
5. Detachable terminals for quick and hassle free maintenance.
6. Fault finding LEDs.
7. Quick and intuitive installation.

B. Power supply
1. The I/O board shall be powered from a 12V, 2A Power Supply Unit (PSU)
2. Power usage shall not exceed 400mA when all relays are energised.

C. Display
1. Peripherals shall be labelled clearly and intuitively.
2. The item shall house LEDs for fault finding.
3. An LED shall indicate when the item is powered.

D. Communications
1. The I/O board shall include TCP/IP interface for network communications directly into the processing board via an RJ45 connector. Add-on modules are not approved.

E. Peripherals
1. The I/O board shall house 4 independently controllable relays.
   a. Each relay shall be provided with COM, N.O. and N.C. contacts.
   b. Relay contacts shall be voltage free.
   c. Each relay shall be capable of switching a resistive load of at least:

(i) 13A @ 240V AC

d. Each relay shall be capable of switching inductive loads.
e. Each relay shall have a contact isolation of at least 4KV AC
f. Each relay shall retain its state when the I/O connector losses power.
g. The relay functionality shall be configurable in the access control software provided with the ACS.

2. The I/O board shall house 4 digital inputs.
   a. Each input shall be formed of 2 terminals.
   b. Each input shall be configurable to trigger a Trigger and Action rule to perform pre-defined tasks.

F. Temperature
1. The item shall operate reliably within the temperature range of -20°C to 55°C (-4°F to 131°F)

G. Housing
1. The I/O board shall include removable connectors to provide ease of installation and board exchange if necessary. The connection points shall not require any special tools to terminate.
2. The I/O board shall be available in a selection of enclosures:
   a. Plastic housing
      (i) This shall be a plastic enclosure for the I/O board only.
      (ii) The enclosure shall be wall mountable.
   b. Plastic cabinet
      (i) This shall be a plastic enclosure for the I/O board and a power supply.
      (ii) The enclosure shall be wall mountable.
3. The enclosures shall be available in white.

H. Dimensions
1. The dimensions of the I/O board shall not exceed:
   a. A width of 114mm (4.5")
   b. A height of 120mm (4.7")
   c. A depth of 32mm (1.3")
2. The dimensions of the plastic housing shall not exceed:
   a. A width of 200mm (7.9")
   b. A height of 200mm (7.9")
   c. A depth of 78mm (3.1")
3. The dimensions of the plastic cabinet shall not exceed:
   a. A width of 236mm (9.3")
   b. A height of 320mm (12.6")
   c. A depth of 80mm (3.1")

2.5 SPECIFIC REQUIREMENTS FOR POWER SUPPLY UNIT (PSU)

A. Features
1. PSU voltage shall be correct for all ACS hardware requiring an external DC power source.
   a. Output voltage shall be 12V DC (+/- 10%)
   b. Output current ripple shall not exceed 100mV
2. The PSU shall be capable of providing at minimum 2A.
3. The PSU shall be capable of powering at least 3 individual devices at 12V each.
4. Maximum cable length shall be at least 2m (6.6').
5. The PSU shall allow connection to a 12V / 7Ah backup battery.
   a. The PSU shall trickle charge the connected battery to keep it continuously charged at maximum capacity.

B. Power supply
1. The PSU shall operate from Mains supply, supporting the following:

a. 100V to 240V
b. 50 to 60 Hz AC

C. Display
1. Peripherals shall be labelled clearly and intuitively.
2. An LED shall indicate when the item is powered by Mains supply.
a. This LED shall be green to indicate that the item is working correctly.
3. An LED shall indicate when the item is powered by battery backup.
a. This LED shall be red to indicate that the supply has failed.

D. Peripherals
1. The PSU shall house 3 independent 12V connections.
2. The PSU shall house a power supply fail output.
a. This shall be a pair of voltage free contacts that shall go open circuit is the mains power fails.

E. Temperature
1. The item shall operate reliably within the temperature range of -20°C to 44°C (-4°F to 111.2°F)

F. Housing
1. The PSU shall be available in a selection of enclosures:
a. Plastic cabinet
(i) This shall be a plastic enclosure for the PSU, an ACU and a backup battery.
(ii) The enclosure shall be wall mountable.
b. Metal cabinet
(i) This shall be a metal enclosure for the PSU, an ACU and a backup battery.
(ii) The enclosure shall be wall mountable.
2. The enclosures shall be available in white.

G. Dimensions
1. The dimensions of the PSU shall not exceed:
a. A width of 58mm (2.3")
b. A height of 167mm (6.6")
c. A depth of 54mm (2.1")
2. The dimensions of the plastic cabinet shall not exceed:
a. A width of 236mm (9.3")
b. A height of 320mm (12.6")
c. A depth of 80mm (3.1")
3. The dimensions of the metal cabinet shall not exceed:
a. A width of 232mm (9.1")
b. A height of 320mm (12.6")
c. A depth of 80mm (3.1")

2.6 CABINET

A. Manufacturer:
1. LifeSafety Power #FPO250-4D8E8P per University's standard.

B. The ACUs, I/O modules, and power supplies shall reside in a unified cabinet

C. The cabinet is a dual voltage, offline switchmode power supply-battery charger system specifically designed for the access control segment of the lifesafety industry.

D. The unit is configured in a painted, steel, locking enclosure with tamper switch and integral battery space, and provides two power supplies, each of which can be set to 12 or 24V.

E. Eight auxiliary outputs are provided for readers, REX devices, or other similar units with each output selectable for either power supply.

F. Eight access controlled trigger inputs control eight relay based lock outputs, with each output selectable for either power supply, and programmable for fire alarm disconnect, failsafe, failsecure, or dry contact operation.

G. Complete fault detection and reporting, with programmable fault delays, is provided along with datalogging capability of fault occurrence, battery usage time and power supply status.

2.7 READERS

1. Mullion mounted readers shall be a HID iCLASS SE R10.
2. Wall box readers shall be a HID pivCLASS R40.

2.8 GENERAL REQUIREMENTS FOR APPLICATION SOFTWARE

A. The software shall use a familiar style user interface, enabling intuitive use.

B. The software shall be available in various languages to suit the installation and operator. Languages required at no additional cost include:
   1. English
   2. US English
   3. Dutch
   4. German
   5. Spanish
   6. Latin American Spanish
   7. French
   8. Japanese
   9. Danish
   10. Swedish
   11. Portuguese
   12. Greek
   13. Norwegian
   14. Czech
   15. Hungarian

C. A SQL server database shall be used for the storage of user data and events.

D. The software shall be capable of importing and exporting all user data in .vcf, .csv and .txt formats.

E. The software shall be structured to support multiple workstations without extra license charges being levied.

F. Access permissions:
   1. Access levels shall be used to administer the control of who is permitted through which access points and what times they are allowed through, on a minute by minute basis.
   2. A minimum of 256 unique access levels shall be supported, allowing for 10,000 individual permissions.
   3. The system shall be able to give alternative access permissions to some or all staff, to accommodate flexible scheduling and holidays.

G. Reporting
   1. User and system events shall be shown in real-time.
   2. Reporting shall offer filtering options to allow for selection of all events, access events, alarm events and system events. Such event filtering and selection shall be customisable by time periods.
   3. Reports shall be customisable. They shall allow for selection of date, time, users or user groups and access points.
   4. Reports shall be configured within the access control user software and not a third-party application. A simple wizard shall be used to make configuring and saving reports as simple as possible for the user.

H. Users

1. The system shall be capable of supporting 50,000 unique token holder records.
2. The system shall be capable of supporting a minimum of 27 active tokens/credentials per user.
3. Tokens/credentials shall be able to be designated as lost and, if used, shall create a special event message.
4. The system shall be capable of setting a valid date range for each user. Outside of this date range any credentials for that user shall be recognised as invalid.
5. The system shall have a minimum of 16 definable user fields that can be tailored by the system administrator to store specific information.

I. The system shall allow users to be grouped into departments with validity dates and card templates. Departments shall be selectable when generating event reports and setting access permissions.

J. Operators
1. Any user may be given operator rights that allow them to log onto the software and administer the system.
2. A minimum of 50 operators shall be supported.
3. The system shall allow the restriction of operator privileges from certain areas of the software.
4. A user shall require operator rights to login to the Android and iOS mobile applications.

K. Access control alarms
1. The software shall be able to handle alarms at controlled appliances. At a minimum, the following alarms shall be supported:
   a. Door forced open
   b. Door left open
   c. Power supply failure
   d. Hardware tamper
2. Each alarm event shall be reported in the event log. The system shall allow for alarm events to be acknowledged by an authorised operator.
3. The system shall support SMS texting and email notification of alarm information.
4. When an alarm event occurs, an alarm shall sound local to the alarm source.
   a. The action for alarms to sound shall be configurable in the software.
   b. The time delay before sounding the alarm shall be configurable in the software.

L. Data protection
1. The system shall comply with the General Data Protection Regulation (GDPR) 2018.
2. It shall be possible to permanently delete:
   a. A user, their events and activity.
   b. A user, but retain anonymised user events.
3. When required, the system shall automatically delete events after a user defined period of time.

2.9 SPECIFIC REQUIREMENTS FOR 'LITE' SOFTWARE

A. The manufacturer shall provide a 'Lite' version of the software.

B. The software shall be free of charge.

C. The manufacturer of the software shall provide updates and upgrades free of charge.

D. The software shall offer all features required to manage a basic access control system.

E. At minimum, the 'Lite' software shall provide the following features:
1. Access Control
   a. The software shall manage at minimum 50,000 single token users.
   b. The software shall manage at minimum 1,000 access points.
2. Access levels
   a. The software shall provide support for up to 256 access groups and 10,000 individual access levels.
   b. Each access level shall include a combination of access points defined as a single group name for ease of administration.

c. Each access point defined within an access level shall have a separate time schedule. For example, door one and door two can be within the same access level group, but each have a different time zone.
d. It shall be possible to apply temporary access permissions to allow a user temporary access to a door or area for a specific period of time.

3. Time schedules
   a. The software shall provide a minimum of 64 separate time schedules (zones) with each schedule supporting a minimum of 512 segments.
   b. Each time schedule shall have the option to be configured through a graphical display or via text input. Graphical display shall allow a mouse to drag / drop for time selection as well as copying one day or segment to another.
4. Users (cardholders) shall include as a minimum
   a. Automatic disabling of use when record is voided from use.
   b. A lost card, if found, shall be capable of being enabled again.
   c. Integrated photo display on primary card record page.
   d. Card template selection from card badge designs.
   e. 16 user definable fields.
   f. Ability to create new departments from cardholder screen.
   g. Start and expiration date for automatic card operation.
   h. General access level (door assignment) settings combining multiple doors and times.
   i. Customised individual access level settings
   j. Assignment of a minimum of 27 individual tokens/credentials per person.
   k. System generated personal identification numbers from 4-8 digits.
   l. Manually entered personal identification numbers from 4-8 digits.
   m. Permission to arm/disarm the intruder alarm system.
   n. Capability to void the user from working with a single command.
   o. Export the record in a .VCF format.
   p. A graphic showing the type of token with each token/credential in the record.
   q. Emergency information including:
      (i) Address
      (ii) Town
      (iii) County
      (iv) Postal Code
      (v) Home telephone number
      (vi) Home fax number
      (vii) Cell phone number
      (viii) Email address
   r. Employment information including:
      (i) Position
      (ii) Employee start date
      (iii) Car registration
      (iv) Notes allowing custom entry of information
   s. Last activity showing location, date, time, and event
   t. Real-time display of where the cards are active at that specific time/date
   u. Quick find button on main screen for cardholder search.
5. Door capabilities shall be at a minimum:
   a. Door name of 50 characters
   b. Controller serial number & MAC address
   c. Controller type
   d. Firmware version number

f. Communications port
g. Alarm Conditions
   (i) Door held open
   (ii) Door forced open
h. Last activity showing location, date, time, and event
i. Door unlock time up to 80 minutes
j. Auto-unlock time schedule
k. Manual open command
l. Door based access codes which do not follow access level definitions
m. Configure individual readers for entry and exit
n. Capability to change the reader configuration based on time schedule between any of the reader formats
o. Define a reader type as one of the following:
   (i) Wiegand
   (ii) Clock & data
p. Define a reader format as one of the following:
   (i) Token only
   (ii) Token + PIN
   (iii) Token + Code
   (iv) PIN only
   (v) Code only
   (vi) Token or PIN
   (vii) Token or Code
   (viii) Token, PIN or Code
q. Activate the main strike for door control
r. Toggle at least 2 door relays on access granted events
s. Sound local alarm under the following conditions:
   (i) Door is forced open
   (ii) Door is held open after valid exit or access
   (iii) Controller is tampered with and the tamper switch is opened
   (iv) Controller loses main power
t. Sound local alarm under the following conditions:
   (i) Delay alarm from sounding for up to 100 seconds
   (ii) Sound alarm continuously until door is closed and input restored
   (iii) Sound alarm for up to 100 seconds. Allowing the time to repeat indefinitely
   (iv) Delay the interval between sounding up to 100 seconds
   (v) Delay the alarm from sending to the PC/event logger for up to 100 seconds
u. Arm/Disarm burglar alarm panel via dry contact relay using selectable constant and momentary closure.
v. Automatically change the reader status based on whether the alarm is armed or disarmed.

6. Trigger & Actions
   a. A trigger (a system event that can cause an action within the system) can be any of the following:
      (i) User is granted access at a door
      (ii) User is denied access at a door
      (iii) Intruder alarm is armed or disarmed
      (iv) Exit button is pressed
      (v) Doorbell button is pressed
      (vi) I/O board input changes state
      (vii) A controller goes online or offline

(viii) Fire alarm input gets activated
(ix) Local forced door and door held open alarms
(x) Specific time of day
(xi) When a token is presented to a door
(xii) When a token is presented twice in short succession.
(xiii) When a system setting is changed.
(xiv) When an I/O board goes online or offline
(xv) When a time zone becomes active or inactive
(xvi) When the on-screen lockdown is activated or deactivated
(xvii) When a low battery status is reported
(xviii) When a critical battery status is reported
(xix) When a keypad is reported as being hacked (too many attempts)
(xx) When an event occurs on a Net2 Entry system

b. An action can be any of the following:
(i) Send an email
(ii) Send a SMS text message
1. Activate or deactivate a relay on an I/O controller indefinitely either until trigger is off or for one of the following time periods:
a. 1000 Milliseconds
b. 1000 Seconds
c. 1000 Minutes
d. 1000 Hours
(iii) Activate a WAV file on specific computers of the network
(iv) Affect an I/O board relay
(v) Control system lockdown
(vi) Execute a .exe file
(vii) Control a separate door

c. A trigger can be further parsed by any of the following:
(i) Department
(ii) Specific person
(iii) Group of persons
(iv) Everyone
(v) Specific door
(vi) Open a door
(vii) Hold the door open
(viii) Close the door
(ix) Specific time zone

7. Site graphics
a. The software shall allow for multiple site graphics to be imported in either .jpg or .bmp format.
b. The site graphics shall show the live status of doors including door open/closed, valid token, invalid token and alarm conditions.
c. In the event of an alarm, the site graphic shall display the appropriate information.
d. The ACS shall support IP based cameras. Cameras can be opened directly from the site graphic.
e. The software shall allow for real-time video monitoring display on the workstation computer.
8. Video management
a. The software shall be provided with integration to key CCTV manufacturers for this project. The following shall be required as a minimum:
(i) Milestone

(ii) JVC
(iii) Dedicated Micros
(iv) Exacq Vision

b. The software shall retrieve all pre-programmed cameras from the video system and automatically implement them in the doors sections for selection.
c. Up to four cameras can be assigned to each door in the software.
d. A link with date/time to the video system shall be created under the following conditions:
(i) Card events
(ii) Alarm events
(iii) Controller system events
e. Each event-related item shall include a camera link within that event string that when pressed will retrieve the video from the video management system and display it on the access workstation.
f. If the event is a card event then the stored photo shall be displayed as part of the video to allow a stored image to stored video comparison.
g. The ACS shall support multiple video management systems simultaneously.

9. Basic Intruder alarm
a. The software shall have the ability to integrate with an intruder alarm system. Integration shall be achieved by using an intruder alarm momentary key switch input and status output.
b. The ACS shall distinguish users who can arm or disarm the intruder alarm system by a check box in the user record.
c. The ACS shall automatically arm the alarm system if an authorised user presents his/her token at the alarm setting reader.
d. The ACS shall deny access to unauthorised users if they attempt to set an alarm.
e. The ACS shall deny access to building entry even if the access privileges permit, when the alarm is active. Once the alarm is disarmed, access privileges shall be followed.
f. The system shall have the ability to have multiple alarm arming and disarming reader locations.

10. Lift control
a. An access control reader shall be able to call an elevator and, if necessary, take the user to their specific floor (denying access to unauthorised floors).
b. Integration shall be achieved by using a TCP/IP input/output module. The configuration of this feature shall be achieved using the software.
c. The software shall support the creation of departments or groups that are used in programming to simplify large quantities of people access rights to floors.

11. User Image Verification
a. Any controller can be configured as an image verify door that retrieves the users photo from the ACS and displays on selected workstations automatically.
b. A minimum of 5 windows can be opened and assigned different doors, per workstation.
c. An operator can manually open the door selected from the User Image window.
d. The event message shall be displayed within the User Image window.

12. Intercom / Access Entry Station
a. The software shall support an intercom station capable of allowing access entry from a remote monitor and/ or an integrated access control reader.
b. The reader will be built-in to the entry panel so that it is not visible accept by a label or graphical representation so the user knows where to present their credential.
c. An LCD screen will be used to display and communicate verbally with the specified employee. Up to 1000 names can be displayed.
d. Once communications channel is open, the employee shall be able to view the visitor through the desktop station display monitor. An internal camera is included in the entry station.
e. All communications, audio, video and power shall be via a single cable using TCP/IP and Power-over-Ethernet, using IPV6 technology.

f. The remote display station shall include a CCTV monitor to view who is at the entrance.
g. The remote display station can initiate the communications to the entry station and make an announcement or to view video, as well as unlock the door.
h. Up to 100 stations can be on a single system and up to 1000 monitors.
i. The intercom station shall allow configuration of which controller it uses to unlock a door when access is permitted.
j. A low-light colour camera will be included with the unit as default, and be housed internally to avoid damage due to vandalism.
k. A series of LED's shall be included to illuminate the immediate area for night time viewing.
l. If only one intercom station and one monitor are on the system – no configuration shall be required.
m. The unit shall not require an IP address to be configured. All units within the same LAN shall auto-detect each other on power up.
n. Where a keypad is present, the number five button shall have a unique design for touch reference.
o. The intercom station shall not require any external power, other than what is provided via POE to the main processor board. All power for the cameras, intercom and access panels shall be included.
p. A flush mount housing shall be available.
q. Any smart phone, computer, tablet can be used with the Entry system using SIP Compliance and an industry standard SIP (session initiation protocol) Server.

2.10 SPECIFIC REQUIREMENTS FOR 'PRO' SOFTWARE

A. The manufacturer shall provide a 'Pro' version of the software.
B. The manufacturer of the software shall provide updates and upgrades free of charge.
C. The software shall offer all features available in the 'Lite' software.
D. At minimum, the 'Pro' software shall provide in addition the following features:
   1. Anti-passback
      a. The software shall provide functionality of denying a user repeat access through the same access point within a specified time period. This shall prevent the same user's card being handed back to an unauthorised user for use.
      b. It shall be possible to permit certain users to override the anti-passback rules.
      c. Readers shall be required on both sides of any access point that is expected to employ anti-passback rules.
   2. Time and attendance
      a. The software shall be able to monitor time and attendance of staff, through use of dedicated 'clocking in' and 'clocking out' readers. The software shall be capable of operating with multiple 'clocking in' and clocking out' readers.
      b. The software shall be able to cope with different hourly rates for staff and overtime rates such as 'time and a half'.
      c. The software shall produce reports showing hours worked for users and departments over different date ranges.
      d. The software shall support the importing of vacation and holiday schedules.
      e. The software shall produce a report that shows total hours worked, remaining vacation time and holidays planned.
      f. A graphical image shall be used in the software to display a user as clocked in, clocked out, holiday, vacation, out sick, off-site but working. Each setting shall support a customer defined colour to represent the location of user.
      g. The time and attendance graphic shall be displayed by time of day/month for easy recognition.
      h. The software can be segmented to display by person, department, or all users.
   3. Roll call/muster

a. The software shall be able to generate a roll call report. This roll call report shall be able to be generated either manually using the software or automatically via a direct input from the fire alarm system.
b. The roll call report shall document User name, Department, Last known location, time of last access transaction and status (such as Safe or Missing).
c. Any reader on the system shall be able to be designated as a muster reader. Users shall present their token to a muster reader to be marked as 'Safe' on a report subsequently generated.
d. To use the roll call function, the controllers shall be required to be split into sections called "areas".

4. Areas
   a. The software shall have the ability to group doors together into defined areas. Once the system is split into areas, users given access into an area shall automatically be validated through all the doors of that area.
   b. It shall be possible to collect several areas into an area group (for example, the areas of Reception, Factory and Cafeteria could comprise the area group of Main Building).
   c. If a user is in one area the access attempt with that credential at another area shall be denied.
   d. Unlimited areas can be defined with up to 50 doors per area.
5. Card Design & Printing
   a. The card designer program shall allow unlimited configurations, with multiple templates saved for each user group. The ability to import company logos and background images, overlay watermarks, static text fields and layers shall all be required components.
   b. The software shall include a card designer application for the design of custom badges.
   c. The designer shall support static text, shapes, and colours.
   d. The designer shall support automatically generated text based on information entered into the user record.
   e. The designer shall support the creation of single or double sided designs. Each design shall be labelled a template that can be entered into a user record.
   f. All user defined fields shall be available for inclusion on the card design.
   g. The software shall have the ability to print cards using a standard Windows card printer.
6. Intruder alarm
   a. The 'Pro' version of software shall contain the same functionality as the 'Lite' version with at minimum the following additions:
      (i) The software shall support multi-zone / partition based alarm systems integrated so that a user's card can automatically arm/disarm the appropriate locations.
7. Landlord Tenant
   a. The software shall allow the partitioning of a system, giving operators access to specific department groups and access levels only.
8. Energy Control
   a. The ACS shall use an energy controller to be able to switch lighting on and off as required by the movement of users.
   b. Integration shall be achieved by using a controller with a proximity reader designed to hold an ISO access credential. When the credential is inserted the output of the controller shall remain energised. When the credential is removed the output of the controller shall be turned off.
   c. User control of the energy management function shall follow standard access level assignments.
9. Remote access
   a. Remote access to the system configuration and reporting shall be available by means of:
      (i) A mobile application

(ii) A browser web user interface

b. Remote access shall be restricted to core functionality, including the below:
   (i) User administration
   (ii) Reporting
   (iii) Roll call
   (iv) Open door functionality

2.11 SPECIFIC REQUIREMENTS FOR MOBILE APPLICATION

A. The manufacturer shall provide a mobile application.
B. The application will be available for Android and iOS devices.
C. The application shall be free of charge.
D. The manufacturer shall provide updates and upgrades free of charge.
E. Only valid operators of the ACS shall be able to login via the mobile application.
F. The application shall be responsive and scalable to various screen sizes and devices.
G. At minimum, the application shall provide the following features:
   1. Remote access
      a. The mobile application will allow an operator of the system to access the system from outside of the ACS network.
      b. It shall be possible to disable remote access to the system, forbidding login from a remote location and via the application.
   2. Open door
      a. It shall be possible to unlock a specified door remotely from the application.
      b. The application shall remember the doors most used and display these to the user for convenience of future use.
         (i) The list of most used doors shall be specific to each operator.
   3. User administration
      a. It shall be possible to create a new user.
      b. It shall be possible to browse existing users and view their details.
      c. It shall be possible to manage existing users and change their details.
      d. It shall be possible for an operator to bar a user
      e. It shall be possible for an operator to manage a user's access permissions
      f. It shall be possible to manage a user's credentials. The following controls shall be supported:
         (i) Add a new PIN
         (ii) Add new token
         (iii) Delete token
         (iv) Change token type
         (v) Mark token as lost
         (vi) Mark token as found
      g. It shall be possible to add a new token using the following methods:
         (i) Manual entry of a token number
         (ii) Retrieving the token number automatically from an access denied event
      h. It shall be possible to upload a user image to a user's record using the following methods:
         (i) Selecting an existing image file from the device
         (ii) Using the device camera to take a new photo
   4. Events and Reports
      a. It shall be possible to view live system and access events within the mobile app.
      b. It shall be possible to view pre-configured reports of events.
      c. It shall be possible to filter events by a keyword or phrase.
   5. Roll call
      [illegible] nerate a new roll call report for a pre-configured area.

b. It shall be possible to view an existing roll call report.
c. Roll call reports shall be timestamped.
d. It shall be possible to interact with a roll call report. The following actions shall be supported:
   (i) Mark a user as safe
   (ii) Mark a user as missing
   (iii) View a user's contact details
   (iv) View a user's image
e. While connection to the ACS is maintained, roll call reports shall sync across all devices running the mobile application.
f. Once opened, a roll call report shall remain available when internet or connection to the ACS is lost.
   (i) Once connection is returned, any changes to the roll call report will sync across all devices.

2.12 SPECIFIC REQUIREMENTS FOR DESKTOP READER

A. Features
1. The desktop reader shall read multiple types and formats of proximity tokens.
2. The desktop reader shall facilitate assigning tokens to users,
3. The desktop reader shall identify tokens/credentials that have already been assigned to users.
4. The desktop reader shall eliminate the need to know each token's number.
5. In systems with several client PCs, the system shall be able to support multiple desktop readers.
6. The desktop reader shall output token data of a variety of formats and lengths.

B. User interaction
1. The desktop reader shall operate in an intuitive mode:
2. When an unassigned token/credential is presented, the ACS software shall automatically create the user record and user screen for entering user information as well as other security settings.
3. When the operator is already in a user record, and an unassigned token/credential is presented, the software shall display the option to add the token/credential to the current record.
4. When an existing token/credential is presented to the desktop reader, the software shall automatically retrieve and display the user record associated with that user. If there are multiple tokens/credentials assigned to that user, the software shall highlight the specific one presented.
5. The reader shall be plug & play.

C. Product variations
1. The ACS manufacturer shall provide 2 types of reader for enrolling credentials:
   a. Proximity desktop reader
   b. Proximity and Magstripe desktop reader

D. Proximity reader
1. The item shall contain a proximity reader.
   a. At a minimum, the following token technology shall be supported:
      (i) Paxton HiTag2 125KHz
      (ii) HID 125KHz **{UK/EU only - may require activation}**
   b. The Proximity desktop reader shall also support:
      (i) EM4100
      (ii) MIFARE® Classic
      (iii) MIFARE® DESFire® EV1
      (iv) MIFARE® Ultralight®
      (v) MIFARE® Ultralight C®
      (vi) SmartMX
      (vii) R5
   c. The Proximity and Magstripe desktop reader shall also support:

d. All of the above token technology shall be supported concurrently.
e. The following formats of credential shall be supported:
   (i) ISO card
   (ii) Clamshell
   (iii) Minifob / keyfob
   (iv) Proxidisc
   (v) Watchprox
   (vi) Hands free token
   (vii) Magstripe card (Proxiimity and Magstripe product variant only)

E. Power supply
1. The item shall be powered via USB.
2. Maximum current consumption while in use shall not exceed 100mA.

F. Communication
1. The desktop reader shall connect to a PC running the Client or Server software via a USB port.

G. Display
1. The item shall house a stylish LED display.
2. The LEDs shall indicate the following states:
   a. Item powered / ready to use
   b. Credential being read

H. Temperature
1. The item shall meet the required temperature standards for an internal product
   a. The item shall operate reliably within the temperature range of 0°C to 55°C (32°F to 131°F)

I. Housing
1. The item shall be stylish and modern.
2. The product shall be available in black

J. Dimensions
1. The Proximity desktop reader dimensions shall not exceed:
   a. A width of 115mm (4.5")
   b. A height of 19mm (0.7")
   c. A depth of 75mm (3")

2. The Proximity and Magstripe desktop reader dimensions shall not exceed:
   a. A width of 145mm (5.7")
   b. A height of 37mm (1.5")
   c. A depth of 90mm (3.5")

END OF SECTION

Addendum no. 6

to the

Contract Documents

April 25, 2022

General

1. Bidders are cautioned to examine the Addendum in detail, allowing for all changes, additions or deletions as set forth below. All other conditions remain the same.

2. Acknowledge receipt of this Addendum on the Bid Form.

3. The Bid Date remains.

Project Manual

The following pages of the Project Manual are revised by this Addendum and are enclosed herewith as revised for immediate insertion to replace pages originally issued. Revised text, which may consist of additions to, deletions of, or other modifications of the text originally issued, is marked with an asterisk and superscript ["A1" (*A1)] as is the corresponding Addendum designation (number and date) at the bottom of the reissued page. Previously issued addendum or revision designations remain as does the modified text.

Document Title	Page Number(s)

Bidding Requirements

The following pages of the Contract Conditions are revised by this Addendum and are enclosed herewith as revised for immediate insertion to replace pages originally issued. Revised text, which may consist of additions to, deletions of, or other modifications of the text originally issued, is marked with an asterisk and superscript ["A1" (*A1)] as is the corresponding Addendum designation (number and date) at the bottom of the reissued page. Previously issued addendum or revision designations remain as does the modified text.

Document Title	Page Number(s)

Bidding Requirements

The following pages of the Contract Conditions are issued by this Addendum and are enclosed herewith for immediate insertion into the Bidding Documents

Document Title	Page Number(s)

Specifications

The following Specification sections are revised by this Addendum and are enclosed herewith as revised for immediate insertion to replace pages originally issued. Revised text, which may consist of additions to, deletions of, or other modifications of the text originally issued, is marked with an asterisk and superscript ["A1" (*A1)] as is the corresponding Addendum designation (number and date) at the bottom of the reissued page. Previously issued addendum or revision designations remain as does the modified text.

Specification Section	Revision Description
00 10 10	Added 21 13 13 and 23 21 13.
22 40 00	Updated Section 2.4.
32 90 00	1.05 – J, section has been deleted to correct conflict with section 1.11-A.

The following Specifications sections were omitted from the originally issued set and are enclosed herewith as issued new by this Addendum.

Specification Section	Section Title
21 13 13	Wet-Pipe Sprinkler Systems
23 21 13	Hydronic Piping

Drawings

The following Contract Drawings are revised by this Addendum and are transmitted herewith as revised to replace immediately the respective original drawings.

Sheet	Revision Description
G0.01	Updated Alternate #5 to accommodate revised PV layout. Deleted Add Alternate #6 water meter.

L1.1	Updated Construction Callout 7.
L1.2	Updated Construction Callout 7.
L2.1	Updated details D, E, & F.
L2.5	Added detail D.
L3.1	Updated Callout 7. Deleted Subsurface Dripline Notes. Revised Piping note.
L3.2	Revised Piping note.
L4.1	Revised Planting note 5.
A2.02	Updated roof plan to accommodate revised PV layout per Electrical Drawings
A3.12	Deleted roof monitor alternate along gridline C.
A3.21	Deleted roof monitor alternate along gridline C.
A3.22	Deleted roof monitor alternate along gridline C.
A9.01	Detail 11: Deleted fire-rated requirement.
M2.01	Revised ducting at North Entry and Infant Classroom.
M2.02	Revised ducting at North Entry and Infant Classroom.
M3.01	Revised piping at North Entry and Infant Classroom.
M3.02	Revised piping at North Entry and Infant Classroom.
M4.01	Moved Condenser.
P0.01	Deleted Add Alternate water meter. Added info for building water meter.
P1.02	Deleted Add Alternate water meter.
E6.1	Various changes to photovoltaic panel sizes, quantities, and configuration. Minor adjustment to condensing unit at roof.
E7.1	Update to panel quantities per Sheet E6.1 and string and inverter ratings.

The following Contract Drawings are added by this Addendum and are transmitted herewith as new to be inserted immediately in the drawing set.

Sheet	**Reference Title**
XXX	XXX

+ + End of Addendum No. 6 + +

SECTION 00 01 10

TABLE OF CONTENTS

DIVISION 22 – PLUMBING

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

DIVISION 25 – INTEGRATED AUTOMATION – NOT USED

DIVISION 26 – ELECTRICAL

DIVISION 27 – COMMUNICATIONS

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

DIVISION 31 – EARTHWORK

END OF TABLE OF CONTENTS

[A6] SECTION 211313

WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. **Pipes, fittings, and joining methods**
2. **Fire-protection valves**
3. **Trim and drain valves**
4. **Specialty valves**
5. **Fire-department connections**
6. **Specialty fittings**
7. **Sprinklers**
8. **Alarm devices**

1.2 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened.

1.3 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

B. Sprinkler system(s) design shall be per current edition of the CFC and approved by authorities having jurisdiction.

1. **Margin of safety for available water flow and pressure shall be 10 percent, including losses through water-serving piping, fittings, valves, and backflow preventers.**
2. **Sprinkler Occupancy Hazard Classifications:**
   a. **Office and Public Areas: Light Hazard.**
   b. **Utility Areas: Ordinary Hazard, Group 1**
   c. **Storage Areas: Ordinary Hazard, Group 2**
3. **Minimum Density for Automatic-Sprinkler Piping Design:**
   a. **Light Hazard Occupancy: 0.10 GPM per sq. ft.**
   b. **Ordinary Hazard, Group 1 Occupancy: 0.15 GPM per sq. ft.**
   c. **Ordinary Hazard, Group 2 Occupancy: 0.20 GPM per sq. ft.**
4. **Maximum Protection Area per Sprinkler: Per UL listing.**

5. **Total Combined Hose-Stream Demand Requirement: According to NFPA 13.**

C. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13.

1.4 SUBMITTALS

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

B. Sprinkler Piping Shop Drawings: Working plans, prepared according to NFPA 13, shall be coordinated with the design drawings approved by the authorities having jurisdiction, including the hydraulic calculations.

C. Welding certificates.

D. "Contractor's Material and Test Certificate for Aboveground Piping."

E. "Contractor's Material and Test Certificate for Underground Piping."

F. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. **Installer's responsibilities include fabricating, and installing sprinkler systems and providing engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test conducted within twelve months.**

   a. **Engineering Responsibility: Preparation of working plans, calculations, and field test reports.**

B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. **NFPA 13, "Installation of Sprinkler Systems."**
2. **NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."**

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

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

2.2 STEEL PIPE AND FITTINGS

A. Standard Weight (schedule 40) and Light Weight (schedule 10), Black-Steel Pipe: ANSI/ASTM A53, Type E, Grade A or B; or ASTM A135; or ASTM A795. Pipe ends may be factory or field-formed to match joining method.

B. Black-Steel Pipe Nipples: ASTM A733, made of ASTM A53/A53M, standard-weight, seamless steel pipe with threaded ends per ANSI 1.20.1 (B2.1).

C. Malleable-Iron Threaded Fittings: ANSI B16.3, made of ASTM A536 malleable iron, with threaded ends per ANSI 1.20.1 (B2.1).

D. Cast-Iron Threaded Fittings: ANSI B16.4, made of ASTM A126 cast iron, with threaded ends per ANSI 1.20.1 (B2.1).

E. Cast-Iron Flanges: ANSI B16.4, made of ASTM A126 cast iron, Class 125.

F. Steel Welding Fittings: ASTM A53, Type E, Grade A or B; or ASTM A135; or ASTM A795.

G. Grooved-Joint, Steel-Pipe Appurtenances:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Victaulic Company
   b. Tyco Fire Suppression and Building Products
   c. Anvil International
2. Pressure Rating: 175 psig minimum.
3. Grooved-End Fittings for Steel Piping: ASTM A 536, ductile-iron casing; with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: Rigid pattern, unless otherwise indicated, for steel-pipe dimensions. ASTM A 536, ductile-iron housing, EPDM-rubber gasket, and bolts and nuts.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic and asbestos free.

1. Class 125, Cast-Iron Flat-Face Flanges: Full-face gaskets.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

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

2.4 LISTED FIRE-PROTECTION VALVES

A. General Requirements:

1. **Valves shall be UL listed.**
2. **Minimum Pressure Rating: 175 psig.**

B. Backflow preventer: Double check type, Ames, Wilkins or equal.

C. Indicating Valves:

1. **Body material: Cast or ductile iron.**
2. **End connections: Flanged or grooved**

D. Check Valves: Victaulic, or equal.

1. **Type: Swing check.**
2. **Body material: Cast or ductile iron.**
3. **End connections: Flanged or grooved.**

2.5 TRIM AND DRAIN VALVES

A. Angle, check and globe trim valves for fire sprinkler service: NIBCO, United Brass, or equal.

2.6 SPECIALTY VALVES

2.7 FIRE DEPARTMENT CONNECTIONS

2.8 SPECIALTY FITTINGS

2.9 SPRINKLERS

PRODUCT DATA SHEET 1 - S.

A. Sprinkler heads shall glass bulb.

B. Sprinkler head bulbs shall be color coded.

C. Sprinkler heads in areas with exposed piping shall be standard upright or pendant type. Sprinklers in Acoustical T-bar ceilings and Gypsum Board ceilings to be Concealed with white cover plates. Wood Grille Ceilings and Exterior Overhangs to receive semi-recessed sprinklers with Standard Black finish and Black escutcheon.

D. Sprinklers in T-Bar ceilings to be quarter pointed or centerline of tile with a ±¾ inch tolerance. Sprinklers in Wood Grille Ceilings to be positioned in center of slats with a ± ¼ inch tolerance.

2.10 ALARM DEVICES

A. Water flow indicator for local alarm: UL approved suitable for variable pressure, complete with instantaneous recycling retard and electrical contacts for alarm system (number as required). Potter Electric Signal, or equal.

PART 3 - EXECUTION

3.1 WATER-SUPPLY CONNECTIONS

3.2 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. **Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.**

B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.

C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.

D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 1-1/2 and larger end connections.

F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

G. Install air vent at high elevation point of system sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

I. Install sprinkler control valves, test assemblies, and drains.

J. Install alarm devices in piping systems.

K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.

L. Install pressure gages on riser.

M. Install sleeves for exposed piping penetrations of walls, ceilings, and floors.

N. Install sleeve seals for piping penetrations of concrete walls and slabs.

O. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 JOINT CONSTRUCTION

3.4 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

3.5 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. **Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.**
2. **Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.**
3. **Coordinate with fire-alarm tests. Operate as required.**

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.7 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

END OF SECTION A6

SECTION 22 40 00 - PLUMBING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of the GENERAL CONDITIONS, SUPPLEMENTAL CONDITIONS, and DIVISION 1, GENERAL REQUIREMENTS, apply to the work of this SECTION.

1.2 SUMMARY

A. Provide plumbing where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
   1. Domestic hot and cold water piping systems
   2. Drain, waste, and vent systems
   3. Plumbing fixtures and trim as shown on the Drawings
   4. Natural gas piping systems
   5. Steam / Condensate systems
   6. Roof drain piping systems

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 220500.

B. Record Drawings: At project closeout, submit Record Drawings of installed ductwork, duct accessories, and outlets and inlets in accordance with the requirements of Division 1.

C. Sterilization certificate:
   1. Upon completion of water line sterilization, deliver to the Architect two copies of an acceptable “Certificate of Performance” for that activity.

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Codes and regulations:
   1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.
   2. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirement will govern when so directed by the Architect.

PART 2 PRODUCTS

2.1 EQUIPMENT

1. Provide plumbing equipment and appurtenances as shown on the “Plumbing Equipment Schedule” on the drawings.

2.2 FIXTURES

1. Provide fixtures and trim as shown on the “Plumbing Fixture Schedule” on the drawings.

2.3 PIPE SCHEDULE

1. Provide pipe materials and joints as shown on the “Plumbing Material Schedule” on the drawings.

A6 [A6]2.4 MATERIALS

A. ABS Pipe
   1. Acrylonitrile Butadiene Styrene (ABS)/Solvent-fused (Welded) Joints: Pipe shall be manufactured from virgin rigid acrylonitrile butadiene styrene compounds with a minimum cell class of 42222 as identified in ASTM D 2661. Fittings shall be manufactured from virgin ABS compounds with a cell class of 32222 as identified in ASTM D 2661. Pipe and fittings shall be manufactured as a system and be the product of one manufacturer. Pipe and fittings shall conform to National Sanitation Foundation Standard 14.

B. Copper Water Pipe
   1. Pipe above grade shall be Type L hard drawn copper tubing per ASTM B 88, plain ends.
   2. Fittings shall be solder type, wrought copper per ANSI Standard B16.22 or cast red bronze per ANSI Standard B16.18. Do not use T-drill.
   3. Unions shall be solder type, cast red bronze.
   4. Joining Materials/Methods
      a. Canfield, Silvabrite or equal lead-free solder with a non-corrosive water-based flux.
      b. Fifteen percent silver brazing alloy, water-based silver brazing flux. Silver content must be clearly identified on the brazing rod.
   5. Connections
      a. Copper to dissimilar metals shall have a dielectric connector.
      b. Copper to threaded connections shall have cast brass adapters.

C. Galvanized or black steel pipe:
   1. Provide standard weight complying with ASTM A12.

D. Fittings:
   1. For copper lines, provide wrought copper fittings.
   2. For cast iron lines, provide service weight cast iron type fittings.
   3. For steel lines, provide malleable iron fittings

E. Unions:
   1. For copper lines, provide copper fittings.
   2. For connections in iron pipe lines 2-1/2” and smaller, provide ground joint brass-to-iron fittings.

F. Strainers: Provide Y-pattern, 200# WOG, 20 mesh monel screen:

1. 3” and smaller: Provide Crane #988-1/2 or equal, screwed.

G. Pressure regulators: Provide Mueller H-9000, or Wilkins series 500, all bronze.

H. Balancing cocks: Provide Bell & Gossett or equal.[A6]

2.5 FLASHING

A. Where pipes of this Section pass through the roof, flash with 24 gauge galvanized sheet metal, counter-flashing to be 24 gauge sheet metal.

2.6 PIPE HANGERS – see Section 220529 PIPE HANGERS AND SUPPORTS

2.7 CLEANOUTS

A. Exterior:
1. Provide Smith #4253, Josam #8860 or equal with XH cast iron top in concrete areas.

B. Floors:
1. Provide Smith #4023, Josam #8330 or equal with round nickel-bronze top in finished room floors.
2. Provide Smith #4223, Josam #8090-CAL or equal with round cast iron top in unfinished room floors.
3. Provide “flush-with-floor” type cleanouts, with adjustable watertight covers and integral anchorage flange with clamping collar where waterproofing membrane is used.

C. Finished walls:
1. Provide Smith #4532, Josam #8790-4 or equal with round stainless steel access plate and screw.

D. Provide cleanout plugs of ABS indoors or bronze outdoors.

2.8 ACCESS BOXES

A. Walls:
1. Provide Smith #4730 or Josam #8650 with polished chrome plate face in tile walls.
2. Provide Smith #4760-AKL OR #4765-AKL, Josam #SLA or #SLB or equal paint-grade steel face and with Allen lock in walls of other finished rooms.

B. Ceilings:
1. Provide Acorn #8211-3-AKL, Josam #SLA or equal paint-grade steel face with Allen lock.

C. Floors:
1. Provide Smith #4910, Josam #8630-5 or equal with XH plain aluminum or nickel-bronze non-skid top.
2. Provide Smith #4920 or equal for floors covered with vinyl reinforced or pure vinyl tile.

D. Yard boxes:
   1. Provide Brooks 36 HF, Frazer #2 or equal cast concrete boxes with cast iron rim and hinged self-closing cast iron lid marked GAS SHUTOFF or WATER, size 12" x 18" x 12".

2.9 PRESSURE GAGES AND THERMOMETERS

A. Provide Marsh Quality Gages with 4-1/2" dial, gage cock, in type required. For pump suction, provide compound type.

B. Provide Trerice 9" BX series thermometers, straight, angle, or oblique as required, equipped with separable sockets and well. Provide extension necks as required on insulated line.

C. Arrange thermometers for easy reading from the floor.

2.10 TRAPS

A. For lavatories and sinks, except service sinks, provide Los Angeles pattern cast brass traps with brass nuts.

2.11 INSULATION FOR ACCESSIBLE FIXTURES

A. Where shown on the Drawings or required by governmental agencies having jurisdiction, at lavatories for handicapped persons insulation on hot water supply, tailpiece, and trap. TRUEBRO or equal.

2.12 PIPE WRAPPING

A. Steel piping in concrete or underground:
   1. Wrap with 20 mil tape
   2. Fittings and other joints: Wrap in the field with 20 mil tape and primer.
   3. Provide 50% overlap on tape weld rubber coating.

B. Testing:
   1. Secure inspection and testing by an independent agency approved in advance by the Architect.

2.13 PIPE INSULATION

A. Provide domestic hot water supply and return piping with insulation to meet or exceed the latest Title 24 California Energy Code requirements.

2.14 VALVES

A. Valves shall be the same size as upstream piping unless otherwise noted. All valves within insulated pipe shall be provided with an extended operating handle or rising stem to ensure operation without disturbing insulation.

B. Shutoff Valves:

1. 2” and smaller: Gate valves or ball valves. Bronze or brass valves, Class 125.
2. 2-1/2” and larger: Gate valves. Iron valves, Class 125

C. Check valves:
1. 2” and smaller: Swing type. Bronze or brass valves, Class 125.
2. 2-1/2” and larger: Swing type. Iron valves, Class 125

2.15 SLEEVES

A. Where pipes pass through concrete, masonry, or stud walls, or pass through ceilings, provide sleeve of the size required.

2.16 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PLUMBING SYSTEM LAYOUT

A. Lay out the plumbing system in careful coordination with the Drawings, determining proper elevations for all components of the system and using only the minimum number of bends to produce a satisfactorily functioning system.

B. Follow the general layout shown on the Drawings in all cases except where other work may interfere.

C. Lay out pipes to fall within partition, wall, or roof cavities, and to not require furring other than as shown on the Drawings.

3.3 TRENCHING AND BACKFILLING

A. Perform trenching and backfilling associated with the work of this Section

B. Cut bottom of trenches to grade. Make trenches 12” wider than the greatest dimension of the pipe.

C. Bedding and backfilling:
1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.
2. Under the building, install pipes on a 6” bed of damp sand. Backfill to bottom of slab with damp sand.

3. Outside the building, install underground piping on a 6” bed of damp sand. Backfill to within 12” of finish grade with damp sand. Backfill remainder with native soil.
4. Do not backfill until installation has been approved and until Project Record Documents have been properly annotated.

3.4 INSTALLATION OF PIPING AND EQUIPMENT, GENERAL

A. General:
1. Proceed as rapidly as the building construction will permit.
2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
3. Cut pipe accurately, and work into place without springing or forcing, properly clearing windows, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.
4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
5. Make changes in directions with fittings; make changes in main sizes with eccentric reducing fittings. Unless otherwise noted, install water supply and return piping with straight side of eccentric fittings at top of the pipe.
6. Run horizontal sanitary and storm drainage piping at a uniform grade of 1/4” per foot, unless otherwise noted. Run horizontal water piping with an adequate pitch upwards in direction of flow to allow complete drainage.
7. Provide sufficient swing joining, ball joining, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
8. Support piping independently at pumps, coils, tanks, and similar locations, so that the equipment will not support weight of pipe.
9. Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar locations, to spill over an open sight drain, floor drain, or other acceptable discharge point, and terminate with a plain end un-threaded pipe 6” above the drain.
10. Securely bolt all equipment, isolators, hangers, and similar items in place.
11. Support each item independently from other pipes. Do not use wire for hanging or strapping pipes.
12. Provide complete dielectric isolation between ferrous and non-ferrous metals.
13. Provide union and shut off valves suitably located to facilitate maintenance and removal of equipment and apparatus.

B. Equipment access:
1. Install piping, equipment, and accessories to permit access for maintenance. Relocate items as necessary to provide such access, and without additional cost to the Owner.
2. Provide access doors where valves, motors or equipment requiring access for maintenance are located in walls or chases or above ceilings. Coordinate location of access doors with other trades as required.

3.5 PIPE JOINTS

A. Copper tubing:
1. Cut square, remove burrs, and clean inside of female fitting to a bright finish.

a. Apply solder flux with brush to tubing.
b. Remove internal parts of solder-end valves prior to soldering.

2. Provide dielectric unions at points of connection of copper tubing to ferrous piping and equipment.
3. For joining copper tubing, use:
   a. Water piping 3” and smaller: “lead free solder”;
   b. Water piping larger than 3”: “Sil-fos” brazing;
   c. Underground: “sil-fos” brazing.

B. Screwed piping:
1. Deburr cuts.
   a. Do not ream exceeding internal diameter of the pipe.
   b. Thread to requirements of ANSI B2.1.
2. Use teflon tape on male thread prior to joining other services.

C. Leaky joints:
1. Remake with new material.
2. Remove leaking section and/or fitting as directed.
3. Do not use thread cement or sealant to tighten joint.

3.6 PIPE SUPPORTS

A. For Installation Guidelines, see Section 220529 PIPE HANGERS AND SUPPORTS

B. Provide seismic bracing as required per B-Line’s Seismic Restraint Design Booklet.

C. Provide hard insulation inserts at hangers and rollers. Protect insulation inserts with galvanized steel shields.

3.7 SLEEVES AND OPENINGS

A. Provide sleeves for each pipe passing through walls, partitions, floors, roofs, and ceilings.
1. Set pipe sleeves in place before concrete is placed.
2. For un-insulated pipe, provide sleeves two pipe sizes larger than the pipe passing through, or provide a minimum of 1/2” and maximum of 1” clearance between inside and outside of the pipe.
3. For insulated pipe, provide sleeves of adequate size to accommodate the full thickness of pipe covering, with clearance for packing and caulking.

B. Caulk the space between sleeve and pipe or pipe covering, using a noncombustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack with noncombustible asbestos cotton, rope, or fiberglass to within 1/2” of both wall faces, and provide the waterproof compound described above.

C. Finish and escutcheons:
1. Smooth up rough edges around sleeves with plaster or spackling compound.
2. Provide 1” wide chrome or nickel plated escutcheons on all pipes exposed to view where passing through walls, floors, partitions, ceilings, and similar locations.

a. Size the escutcheons to fit pipe and covering.
b. Hold escutcheons in place with setscrew.

3.8 INSULATION

A. Install insulation products in accordance with manufacturer's directions.

B. Provide equivalent thickness insulation for all fittings, flanges, strainers, and valves and finish with pre-molded PVC fitting covers, and for piping below 60F, ensure the vapor barrier remains properly sealed.

C. Finish insulation neatly at hangers, supports and other protrusions.

D. Terminate insulation neatly with mastic troweled on bevel.

E. Do not insulate flexible connections, expansion joints, or seismic joints except on chilled water systems.

3.9 CLEANOUTS

A. Secure the Architect's approval of locations for cleanouts in finished areas prior to installation.

B. Provide cleanouts of same nominal size as the pipes they serve; except where cleanouts are required in pipes 4" and larger provide 4" cleanouts.

C. Make cleanouts accessible. After pressure tests are made and approved, thoroughly graphite the cleanout threads.

3.10 VALVES

A. Provide valves in water, air, and gas systems in at least the following locations:
1. In branches and/or headers of water piping serving a group of fixtures.
2. On both sides of apparatus and equipment.
3. For shutoff of risers and branch mains.
4. For flushing and sterilizing the system.
5. Where shown on the Drawings.

B. Locate valves for easy accessibility and maintenance.

3.11 WATER HAMMER ARRESTORS

A. Provide water hammer arrestors on hot water lines and cold water lines.
1. Install in upright position at all quick closing valves, solenoids, isolated plumbing fixtures, and supply headers at plumbing fixture groups.
2. Locate and size as specified or as shown on the Drawings.
3. Install water hammer arrestors behind access panels.

3.12 BLACKFLOW PREVENTION

A. Protect plumbing fixtures, faucets with hose connections, and other equipment having plumbing connection, against possible back-siphonage.

B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

3.13 DISINFECTION OF WATER SYSTEMS

A. Disinfect hot and cold water systems.
   1. Perform disinfection under the Architect's observation. Notify the Architect at least 48 hours prior to start of the disinfection process.
   2. Upon completion of disinfecting, secure and submit the Certificate of Performance required under Article 1.3 of this Section, stating system capacity, disinfectant used, time and rate of disinfectant applied, and resultant residuals in ppm at completion.
   3. Use disinfectant method approved by the Architect.

B. When disinfection operation is completed, and after final flushing, secure an analysis by a laboratory approved by the Architect, based on water samples from the system, showing test negative for coli-aerogene organisms. Provide a total plate count of less than 100 bacteria per cc, or equal to the control sample.

C. If analysis results are not satisfactory, repeat the disinfection procedures and retest until specified standards are achieved.

3.14 OTHER TESTING AND ADJUSTING

A. Provide personnel and equipment, and arrange for all required tests and inspections required by governmental agencies having jurisdiction.

B. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

C. Adjust the system to optimum standards of operation.

END OF SECTION 22 40 00

[A6] SECTION 23 21 13 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of the GENERAL CONDITIONS, SUPPLEMENTAL CONDITIONS, and DIVISION 1, GENERAL REQUIREMENTS, apply to the work of this SECTION.

1.2 SUMMARY

A. Section Includes:
   1. Piping
   2. Special Duty Valves
   3. Hydronic Specialties for chilled water
   4. Hydronic Specialties for hot water
   5. Condensate drain piping
   6. Plastic pipe and fittings.
   7. Insulation

1.3 ACTION SUBMITTALS

A. Product Data: For the following:
   1. For each type of special-duty valve indicated. Include flow and pressure drop curves based on manufacturer's testing for diverting fittings, calibrated balancing valves, and automatic flow-control valves
   2. Pipe insulation
   3. Pre-insulated piping
   4. Hydronic piping
   5. Substitutions acceptable.

1.4 INFORMATIONAL SUBMITTALS

A. Profile Drawings: Show system piping in elevation. Show types, sizes, materials, and elevations of other utilities crossing hydronic piping.

B. Qualification Data: For qualified Installer.

C. Maintenance Data: For hydronic specialties and special-duty valves to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Fusion piping: Certify that each installer has been trained by the manufacturer’s representative for fusion piping installation.

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

C. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with the ASME Boiler and Pressure Vessel Code, Section Vlll, Division 1.

1.6 COORDINATION

A. Coordinate layout and installation of hydronic piping and suspension system components with other construction, including light fixtures, HVAC equipment, fire suppression system components, and partition assemblies.

B. Coordinate pipe sleeve installations for foundation wall penetrations.

C. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations.

D. Coordinate pipe fitting pressure classes with products specified in related Sections.

E. Coordinate size and location of concrete bases.

F. Coordinate installation of pipe sleeves for penetrations through exterior walls and floor assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Calibrated Balancing Valves:
      a. Armstrong Pumps, lnc.
      b. Flow Design, lnc.
      c. Nexus.
      d. Griswold Controls.
      e. lTT Bell & Gossett; lTT Fluid Technology Corp.
      f. Taco, lnc.
      g. Or equal.
   2. Pressure-Reducing Valves:
      a. Amtrol, lnc.
      b. Armstrong Pumps, lnc.
      c. Conbraco lndustries, lnc.
      d. lTT Bell & Gossett; lTT Fluid Technology Corp.
      e. Spence Engineering Company, lnc.
      f. Watts lndustries, lnc.; Watts Regulators.

g. Or equal.

3. Safety Valves:
   a. Amtrol, lnc.
   b. Armstrong Pumps, lnc.
   c. Conbraco lndustries, lnc.
   d. lTT McDonnell & Miller Div.; lTT Fluid Technology Corp.
   e. Kunkle Valve Division.
   f. Spence Engineering Company. lnc.
   g. Or equal.
4. Expansion Tanks:
   a. Amtrol, lnc.
   b. Armstrong Pumps, lnc.
   c. lTT Bell & Gossett; lTT Fluid Technology Corp.
   d. Taco, lnc.
   e. Wessels & Elbi
   f. Or equal.
5. Air Separators and Air Purgers:
   a. Amtrol, lnc.
   b. Armstrong Pumps, lnc.
   c. lTT Bell & Gossett; lTT Fluid Technology Corp.
   d. Taco, lnc.
   e. Or equal.
6. Strainers
   a. Keckley
   b. Muller Brass Company
   c. Or equal.

2.2 PIPING MATERIALS

A. COPER TUBE AND FITTINGS
   1. Drawn-Temper Copper Tubing: ASTM B 88, Type L.
   2. Annealed-Temper Copper Tubing: ASTM B 88, Type K.
   3. Wrought-Copper Fittings: ASME B16.22.
   4. Wrought-Copper Unions: ASME B16.22.
   5. Solder Filler Metals: ASTM B 32, 95-5 tin antimony.
   6. Viega ProPress.

B. STEEL PIPE AND FITTINGS
   1. Steel Pipe, NPS 2 and Smaller: ASTM A 53, grade B, Schedule 40, black steel, plain ends.
   2. Steel Pipe, NPS 2-1/2 through NPS 12: ASTM A 53, grade B, Schedule 40, black steel, plain ends.
   3. Cast-lron Threaded Fittings: ASME B16.4; Classes 125 and 250.
   4. Malleable-lron Threaded Fittings: ASME B16.3; Classes 150 and 300.
   5. Malleable-lron Unions: ASME B16.39; Classes 150, 250, and 300.
   6. Cast-lron Pipe Flanges and Flanged Fittings: ASME B16.1; Classes 25, 125, and 250, raised ground face, and bolt holes spot faced.
   7. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.

8. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
   a. Material Group: 1.1.
   b. End Connections: Butt welding.
   c. Facings: Raised face.
9. Welding Materials: Comply with Section ll, Part C. of the ASME Boiler and Pressure Vessel Code for welding materials appropriate for wall thickness and for chemical analysis of pipe being welded.
10. Gasket Material: Thickness, material, and type suitable for fluid to be handled; and design temperatures and pressures.

C. POLYPROPYLENE (PP-R) PIPE AND FITTINGS FOR WATER DISTRIBUTION AND WATER SERVICE
1. Pipe shall be manufactured from a PP-R resin (Fusiolen) meeting the short-term properties and long-term strength requirements of ASTM F 2389. The pipe shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipe shall be made in an extrusion process. Domestic hot water shall contain a fiber layer (faser) to restrict thermal expansion. All pipe shall comply with the rated pressure requirements of ASTM F 2389. All pipe shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11.
2. Pipe shall be Aquatherm® Blue Pipe® MF® available from Aquatherm or equal manufacturer.
3. Fittings shall be manufactured from a PP-R resin (Fusiolen) meeting the short-term properties and long-term strength requirements of ASTM F 2389. The fittings shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All fittings shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11.
4. Polypropylene Fittings: socket fusion, butt fusion, electrofusion, or fusion outlet fittings shall be used for fusion weld joints between pipe and fittings.
5. Mechanical fittings and transition fittings shall be used where transitions are made to other piping materials or to valves and appurtenances.
6. Polypropylene pipe shall not be threaded. Threaded transition fittings per ASTM F 2389 shall be used where a threaded connection is required.
7. Polypropylene pipe used for hot water distribution shall include a fiberglass-reinforced layer to reduce thermal expansion/contraction.
8. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.
9. Plastic-to-Metal Transition Fittings shall be the following:
   a. PP-R one-piece fitting with threaded stainless steel, brass, or copper insert and one PP-R fusion weld joint end.

2.3 VALVES

A. Gate, globe, check, ball, and butterfly valves are specified in Section 23 0523 "General- duty Valves for HVAC Piping."

B. Refer to Part 3 "Valve Applications" Article for applications of each valve.

C. Calibrated Balancing valves, N PS 2 and Smaller: Bronze body, ball type, 125-psig working pressure, 250 deg F maximum operating temperature, and having threaded ends. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

D. Calibrated Balancing Valves, NPS 2-1/2 and Larger: Cast-iron or steel body, ball type, 125- psig working pressure, 250 deg F maximum operating temperature, and having flanged connections. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

E. Pressure-Reducing Valves: Diaphragm-operated, bronze or brass body with low inlet pressure check valve, inlet strainer removable without system shutdown, and noncorrosive valve seat and stem. Select valve size, capacity, and operating pressure to suit system. Valve shall be factory set at operating pressure and have capability for field adjustment.

F. Safety Valves: Diaphragm-operated, bronze or brass body with brass and rubber, wetted, internal working parts shall suit system pressure and heat capacity and shall comply with the ASME Boiler and Pressure Vessel Code, Section lV.

2.4 HYDRONlC SPEClALTlES

A. Manual Air Vent: 1-piece 1/4 turn ball valve with 1/2" threaded connections.

B. Automatic Air Vent: Designed to vent automatically with float principle, bronze body and nonferrous internal parts, 150-psig working pressure, 240 deg F operating temperature with NPS 1/4 discharge connection and NPS 1/2 inlet connection.

C. Expansion Tanks: Welded carbon steel, rated for 125-psig working pressure and 240 deg F maximum operating temperature. Separate air charge from system water to maintain design expansion capacity by a flexible bladder securely sealed into tank. lnclude drain fitting and taps for pressure gage and air-charging fitting. Support vertical tanks with steel legs or base; support horizontal tanks with steel saddles. Factory fabricate and test tank

D. with taps and supports installed and labeled according to the ASME Boiler and Pressure Vessel Code, Section Vlll, Division 1.

E. Air Purgers: Cast-lron body with internal baffles that slow the water velocity to separate the air from solution and divert it to the vent for quick removal; Maximum working pressure of 150 psig and temperature of 250 deg F.

F. Bypass Chemical Feeder: Welded steel construction, 125-psig working pressure, 2 gallon capacity, with inlet, outlet, and drain valves.

G. Chemicals: Specially formulated, based on analysis of makeup water, to prevent accumulation of scale and corrosion in piping and connected equipment.

H. Strainers shall be Keckley, Mueller Brass Company, Or equal, installed where shown on drawings or as required by the specifications.

I. Strainers 2 inches and smaller shall be a wye-type, basket strainer. With 1/16- iinch mesh. Provide bronze body with soldered or threaded connections as required.

J. Strainers 2-1/2-inch and larger shall be wye-type basket strainer with cast iron body, and type 304 stainless steel cylindrical removable baskets with 1/1-inch diameter perforations. Provide with grooved or flanged connections.

2.5 INSULATION

A. Underground Piping
   1. Spray-on Pipe Insulation
      a. Insulation shall be polyurethane foam or polyisocyanurate foam spray applied to the surface of the pipe with a minimum thickness of one inch. Insulation shall be rigid when dried, 90-95% closed cell polyurethane or polyisocyanurate with a 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K- Factor) of 0.16 and shall conform to ASTM C-591.
   2. Pre- or post-insulated Pipe
      a. Pre-insulated pipe shall be a complete system of factory pre-insulated polypropylene piping for the specified service.

      b. Carrier pipe shall be polypropylene PP-R by Aquatherm, conforming to ASTM F-2389 as previously specified herein.

      c. Insulation shall be polyurethane foam with a minimum thickness per material specifications on plans. Insulation shall be rigid, 90-95% closed cell polyurethane with a 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K- Factor) of 0.16 and shall conform to ASTM C-591.

      d. Manufacturers: Subject to compliance with requirements,

         i. Aquatherm TI Pipe
         ii. Thermacor Process, L.P..
         iii. Or equal.
   3. Jacketing

      a. Jacketing material shall be high density polyethylene (HDPE) or polyvinyl chloride (PVC), having a minimum wall thickness of 60 mils. Seams to be sealed with pressure sensitive wrap, 30 mils thick.

B. Above Ground Piping
   1. General:

a. All insulation material shall have a mold, humidity, and erosion resistant face that has met the requirements of the latest CMC.
b. Insulation applied to the exterior surface of pipes located in buildings shall have a flame spread of no more than 25 and a smoke developed rating of not more than 50.

2. Rigid Molded Sectional Indoor/Concealed Jacket
   a. Molded sectional, factory fabricated of heavy density resin bonded fibrous glass, with integral factory applied all service jacket of Kraft paper/aluminum foil & glass fiber reinforcement.
   b. Insulation shall have a thermal conductivity k factor of 0.23 at 75 degrees Fahrenheit mean temperature and be suitable for direct application and service on piping having operating surface temperatures of minus 60 degrees to 450 degrees Fahrenheit.
   c. Jacket shall:
      1) Extend 1 1/2 inches (minimum) along one edge of longitudinal joint to form a sealing lap which shall be faced inside with a paper protected pressure sensitive adhesive.
      2) Have a permanence rating of 0.02 perm per inch and a Beach puncture resistance of 50 units
   d. Have an exterior suitable for painting with latex or water base paint.
   e. All insulation shall have composite (insulation, jacket, tape seal and adhesive used to adhere jacket to the insulation) Fire and Smoke Hazard ratings as tested under procedure ASTM E-84, NFPA 255 and UL 723, not exceeding Flame Spread of 25 and a Smoke Developed of 50. PVC fitting covers and accessories, such as adhesives, mastics, cements and cloth for fittings shall have the same component ratings.
   f. Paper laminate jackets shall be permanently flame and smoke resistant. Chemicals used for treating paper in jacket laminates shall not be water soluble and shall be unaffected by water and humidity.
   g. Fiberglass Schuler Manville Micro Lok, or equal.
   h. Irregular shape (fittings, flanges, valves, etc.):
      1) Fibrous glass of same density, thickness, and other properties or characteristics as the adjacent regular shape insulation either pre-molded or field forged to fit the item being insulated. The pre-molded insulation shall be provided with weather protection cover.

3. Rigid Molded Sectional Outdoor Jacket
   a. Molded sectional, factory fabricated of heavy density resin bonded fibrous glass, with integral factory applied all service jacket of Kraft paper and aluminum foil and glass fiber reinforcement.
   b. Insulation shall have a thermal conductivity k factor of 0.23 at 75 degrees Fahrenheit mean temperature and be suitable for direct application and service on piping having operating surface temperatures of minus 60 degrees to 450 degrees Fahrenheit.
   c. Jacket:
      1) Straight runs: .016-inches thick smooth sheet aluminum finish.
   d. Irregular shapes:
      1) Surefit Aluminum Pipe Fitting Covers for pipes up to 6-inches.
      2) Mitered aluminum sheet matching straight run jacketing for pipes over 6-inches.
      3) Alternative jacketing: Schuler Manville Type ML, metal jacketing system.

e. All insulation shall have composite (insulation, jacket, tape seal and adhesive used to adhere jacket to the insulation) Fire and Smoke Hazard ratings as tested under procedure ASTM E-84, NFPA 255 and UL 723, not exceeding Flame Spread of 25 and a Smoke Developed of 50. PVC fitting covers and accessories, such as adhesives, mastics, cements and cloth for fittings shall have the same component ratings.

f. Paper laminate jackets shall be permanently flame and smoke resistant. Chemicals used for treating paper in jacket laminates shall not be water soluble and shall be unaffected by water and humidity.
Fiberglass Schuler Manville Micro Lok, or equal.

PART 3 - EXECUTION

3.1 EARTHWORK

A. See Section 31 21 16 "Trenching" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Underground Piping
1. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
2. Installers shall be trained and certified to install the pipe per the manufacturer’s guidelines. Contact your local Aquatherm representative for training.
3. Remove standing water in the bottom of trench.
4. Do not backfill piping trench until field quality-control testing has been completed and results approved.
5. Install piping at minimum uniform grade of 0.2 percent. Install manual air vents at high points with concrete yard boxes.
6. Install components with pressure rating equal to or greater than system operating pressure.
7. Install piping free of sags and bends.
8. Install fittings for changes in direction and branch connections.
9. Thrust blocks shall not be required with PP-R piping.
10. Expansion loops shall not be required for direct buried underground PP-R piping.

B. Above Ground Piping
1. lnstall groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
2. lnstall drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS ¾ threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
3. Reduce pipe sizes using reducer fitting.
4. Unless otherwise indicated, install branch connections to mains using tee fittings or mechanical formed tees in main pipe.

5. Install piping free of sags and bends.
6. Install fittings for changes in direction and branch connections.

3.3 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment." Comply with requirements below for maximum spacing of supports. Add additional hangers as required to comply with California Building Codes and as directed by the Authority having jurisdiction.

B. Support vertical runs at roof, at each floor.

3.4 PIPE JOINT CONSTRUCTION

A. Refer to Section 22 05 00 "Basic Mechanical Materials and Methods" for joint construction requirements for soldered and brazed joints in copper tubing; grooved, threaded, welded and flanged joints in steel piping.

B. Fusion Piping
1. Ream ends of pipes and tubes and remove burrs.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Fusion Joints: Fusion join polypropylene pipe in accordance with ASTM D2657, ASTM F 2389, and the manufacturer’s instructions.
4. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
5. Insulation joints made for pre-insulated pipe shall be done in accordance with the insulation manufacturer’s instructions.

3.5 HYDONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents in mechanical equipment rooms only at high points of system piping, and elsewhere as required for system air venting.

C. Install air separator or air scoop in closed hydronic systems where indicated on the drawings.

D. Install bypass chemical feeders in each hydronic system where indicated, in upright position. Install feeder in bypass line, off main, using ball valves on each side of feeder and in the main between bypass connections. Pipe drain with ball valve.

E. Install expansion tanks where indicated. Vent and purge air from hydronic system and ensure tank is properly charged with air to suit system design requirements.

3.6 TERMINAL EQUIPMENT CONNECTIONS

A. Size for supply and return piping connections shall be same as for equipment connections.

B. Install control valves in accessible locations close to connected equipment.

C. Install ports for pressure and temperature gages at coil inlet connections.

3.7 FIELD APPLIED THERMAL INSULATION INSTALLATION

A. Do not disturb the bottom of trench; otherwise, compact and stabilize it to ensure proper support.

B. Remove standing water in the bottom of trench.

C. Bed the pipe on a minimum 6-inch layer of granular fill material (sand) with a minimum 6-inch clearance between the pipes.

D. Insulation and jacketing shall be applied to the piping in 10’ segments (maximum)

E. After completion, the segments are rotated 180o and the bottom of the jacketing and butt strips are inspected. Any defects or damage shall be replaced with new insulation.

F. Jacketing and insulations joints shall be staggered.

G. In larger diameter piping shorter segments can be insulated and jacketed if more practical.

H. Where conditions permit, insulation and jacketing may be applied outside of the trench to sections of piping. Pipe lengths should be insulated in segments. Length of insulation segment should not exceed 10' (3 m).

I. Backfill per manufacturer’s instructions.

3.8 IDENTIFICATION

A. Refer to Section 22 05 00 "Basic Mechanical Materials and Methods"

B. Install continuous metallic/plastic underground warning tapes during back filling of trenches for underground hydronic piping. Locate tapes 6 to 8 inches below finished grade, directly over piping. Alternatively install 8 – 10 gage copper wire at 6” – 8” directly over the pipeline. Provide warning tapes above the wire at 6” to 8” below the finished grade directly over the pipeline.

3.9 FIELD QUALITY CONTROL

A. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing, another liquid that is safe for workers and compatible with piping may be used.

B. While filling system, use vents installed at high paints of system to release trapped air. Use drains installed at low paints for complete draining of liquid.

C. Check expansion tanks to determine that they are not air bound and that system is full of water.

D. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the design pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed either 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A of ASME B31.9, "Building Services Piping."

E. After hydrostatic test pressure has been applied for at least 4 hours, examine piping, joints, and connections for leakage, eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.

F. Prepare written report of testing.

3.10 ADJUSTING

A. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.

B. Perform these adjustments before operating the system:
   1. Open valves to fully open position. Close all bypass valves.
   2. Check pump for proper direction of rotation.
   3. Set automatic fill valves for required system pressure.
   4. Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).

END OF SECTION 23 21 13 [A6]

SECTION 32 90 00

PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. Trees.

B. Shrubs.

C. Ground covers.

D. Plants.

E. Topsoil and soil amendments.

F. Fertilizers and mulches.

G. Stakes and guys.

H. Landscape edgings.

1.03 MEASUREMENT AND PAYMENT

A. Payment of the various Construction Items described in the Schedule of Values shall be considered full compensation for work of this Section.

B. Unit prices for soil preparation and for items that include backfill mixes shall be adjusted to reflect changes due to the requirements of soil lab recommendation.

1.04 RELATED SECTIONS

A. Section 32 80 00 – Irrigation: Coordination with head, pipe, and equipment locations.

B. Section 31 22 19 – Finish Grading: Topsoil

1.05 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Materials List:

1. Within 15 days of Award, submit documentation that specified plants have been ordered. Include names and addresses of suppliers.
2. Submit requests for substitutions with materials list.

C. Delivery Tickets:

1. Submit for all plants installed as part of the Project.

2. Include full botanical and common names of all plants.

D. Product Data - Submit data on the following:
   1. Soil amendments.
   2. Herbicides.
   3. Fertilizers.
   4. Substitutions for specified accessories.
   5. Root Barrier.

E. Product certificates signed by manufacturers certifying that their products comply with specified requirements.
   1. Manufacturer's certified analysis for standard products.
   2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
   3. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.

F. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
   1. Analysis of existing surface soil.
   2. Analysis of imported topsoil.

G. Samples of each of the following:
   1. 1 lb of mineral mulch for each color and texture of stone required for Project, in labeled plastic bags.
   2. Submit a 1 quart sample of the following. Indicate supplier.
      A) Organic matter.
      B) Mulch.
      C) Edging materials and accessories to verify color selection.

H. Planting schedule indicating anticipated dates and locations for each type of planting.

A6 I. Test Reports: Submit soil test results and recommendations. 6 A

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

B. Provide quality, size, genus, species, and variety of trees and shrubs indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."

C. Plant nomenclature shall conform to that used in New Sunset Western Garden Book, 2000 edition or later, published by Sunset Publishing Corporation. Names and varieties not listed in this reference shall be those most commonly used in the nursery trade.

D. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce satisfactory topsoil.

E. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

F. Herbicides shall be applied by licensed applicator. Submit name, address, and license number of application firm.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Trees and Shrubs: Deliver trees and shrubs in sizes as indicated in the drawings. Do not prune before delivery, except as approved by Landscape Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery.

C. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.

1. Do not remove container-grown stock from containers before time of planting.
2. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.08 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before planting.

C. Planting operations shall not be conducted under the following conditions:

1. Freezing weather.
2. Excessive heat.
3. High winds.
4. Excessively wet conditions.

1.09 SEQUENCING AND SCHEDULING

A. Coordinate planting operations with other construction to avoid damage to plants by other trades.

1.10 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant the following living planting materials for the following specified time period after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

1. Trees – 1 year.
2. Shrubs – 1 year.
3. Ground covers – Length of maintenance period.

C. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

D. Replace planting materials that are in a substantially unhealthy condition (more than 25 percent of the plant dead or removed due to death of branches, etc.) at end of warranty period.

E. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

1.11 MAINTENANCE

A. Maintain trees, shrubs, groundcovers, and lawns by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Time period of the maintenance periods as specified on the drawings, or if not specified then a minimum of 3 months (90 days).

PART 2 - PRODUCTS

2.01 TREE AND SHRUB MATERIAL

A. General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully-branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Grade: Provide trees and shrubs of sizes and grades conforming to ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Landscape Architect.

C. Label at least 1 tree and 1 shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.

2.02 GROUND COVERS AND PLANTS

A. Provide ground covers and plants established and well rooted in removable containers or integral peat pots and with not less than the minimum number and length of runners required by ANSI Z60.1 for the pot size indicated.

2.03 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth. Any topsoil added shall be thoroughly mixed with the existing site soil to a depth of 12” minimum (unless otherwise noted on drawings).

1. Topsoil Source: Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.

2.04 SOIL AMENDMENTS

A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.

1. Provide lime in the form of dolomitic limestone.

B. Aluminum Sulfate: Commercial grade, unadulterated.

C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.

F. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

G. Manure: Well-rotted, un-leached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.05 HERBICIDES

A. EPA registered and approved, of type recommended by manufacturer.

B. Post-emergent: Roundup or approved equal.

C. Pre-emergent: Ronstar G, Dimension 270 TG or approved equal.

2.06 FERTILIZER

A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the compositions as indicated on the drawings or as recommended by the soil test (soil test recommendation to take precedence over drawings).

2.07 MULCHES

A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Wood and bark chips – refer to drawings.

B. Mineral Mulch: Hard, durable stone, washed free from loam, sand, clay, and other foreign substances, of following type, size range, and color:

1. Rounded riverbed gravel or smooth faced stone.
2. Crushed stone or gravel. – per plans.

2.08 STAKES AND GUYS

A. Upright: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches by length indicated, pointed at one end.

B. Hose Chafing Guard: Reinforced rubber or plastic hose at least 1/2 inch in diameter, black, cut to lengths required to protect tree trunks from damage.

2.09 LANDSCAPE EDGINGS

A. Edging: Refer to drawings.

2.10 ROOT BARRIER

A. Deep Root - Refer to drawings

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Start of work shall indicate Contractor's acceptance of existing conditions.

3.02 PREPARATION

A. Conduct weed control measures as specified in the drawings.

B. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Landscape Architect's acceptance before the start of planting work. Make minor adjustments as may be required.

3.03 PLANTING SOIL PREPARATION

A. Soil Testing: confirm that required soil testing has been completed and that soil mixes and soil preparation specifications have been revised to reflect the recommendations of the soils laboratory as approved by Landscape Architect.

B. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

C. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

D. For tree pit or trench backfill, mix planting soil before backfilling and stockpile at site.

E. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

3.04 GROUND COVER AND PLANT BED PREPARATION

A. Till soil in beds to a minimum depth of 12 inches and mix with specified soil amendments and fertilizers.

3.05 EXCAVATION FOR TREES AND SHRUBS

A. Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation.

1. Container-Grown Trees and Shrubs: Excavate pits twice the width of the container.

B. Mix subsoil removed from landscape excavations with soil amendment to use as backfill.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.

E. Fill excavations with water and allow to percolate out before placing setting layer and positioning trees and shrubs.

3.06 PRE-EMERGENT HERBICIDE

A. Apply herbicides in accordance with manufacturer's recommended rates and procedures.

B. Apply to soil of all planting bed areas prior to placement of mulch.

3.07 PLANTING TREES AND SHRUBS

A. Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.

1. Carefully remove containers so as not to damage root balls.
2. Place stock on setting layer of compacted planting soil.
3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

B. Dish and tamp top of backfill to form a 3-inch-high mound around the rim of the pit (not in turf). Do not cover top of root ball with backfill.

3.08 TREE AND SHRUB PRUNING

A. Prune, thin, and shape trees and shrubs as directed by Landscape Architect.

3.09 TREE AND SHRUB GUYING AND STAKING

A. Upright Staking and Tying: Use a minimum of 2 stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 72 inches above grade. Set vertical stakes and space to avoid penetrating balls or root masses. Support trees with 2 strands of tie wire encased in hose sections at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree. Refer to staking detail in the drawings.

3.10 PLANTING GROUND COVER AND PLANTS

A. Space ground cover and plants as indicated on the drawings.

B. Dig holes large enough to allow spreading of roots, and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.11 MULCHING

A. Mulch backfilled surfaces of pits, trenches, planted areas, and other areas indicated.

B. Mulch: Apply the following average thickness of mulch per plans and finish level with adjacent finish grades. Do not place mulch against trunks or stems.

1. Thickness: As indicated on drawings.

3.12 INSTALLATION OF EDGINGS

A. Steel Edging: Install steel headers or edgings where indicated and per the manufacturer’s specifications.

3.13 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION

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DECEMBER 15, 2021

ALTERNATES

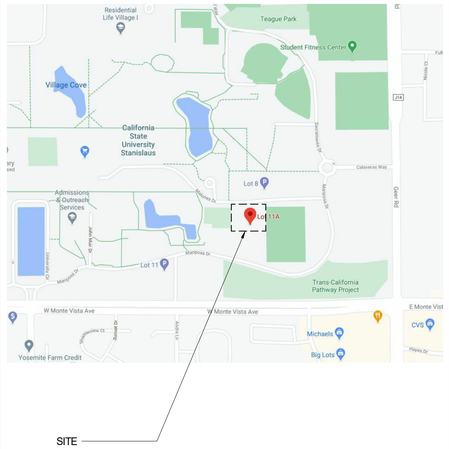
SITE ALTERNATES:

1. Addition of fire lane extension as shown on C3.1.
2. Alternate fence construction – Replace custom steel fences and gates at all yards with pre-fabricated steel fence shown on callout #17 on Sheets L1.1 and L1.2. Shape and layout of fences and gates to conform to original design.
3. Not used.

BUILDING ALTERNATES:

4. Change Eomac Veneered Linear Plank Wood ceiling to: Armstrong Wood Works Grille Tegular 663008 2x4 for 9/16" tegular, Light Cherry.
5. Increase PV scope from 72kW system to 157kW, see E6.1. (6 / A)
6. Not used.
7. Add 77 SF of dichroic glazing panels at truss of north roof monitor, see 2/A3.11, A6.01, 7/A9.41, & 08 80 00.

VICINITY MAP



PROJECT TEAM

ARCHITECT

EHDD ARCHITECTURE
PIER 1 BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111
T: (415) 285-9193

CIVIL ENGINEER

NORTHSTAR ENGINEERING GROUP, INC.
620 12TH ST.
MODESTO, CA 95354
T: (209) 524-3525

LANDSCAPE ARCHITECT

KLA, INC.
151 N. NORLIN ST.
SONORA, CA 95370
T: (209) 532-2856

FOOD SERVICE DESIGNER

CINI•LITTLE INTERNATIONAL, INC.
156 2ND STREET
SAN FRANCISCO, CA 94105
T: (415) 922-5900

STRUCTURAL ENGINEER

MAR STRUCTURAL DESIGN
2332 5TH ST., SUITE D
BERKELEY, CA 94710
T: (510) 991-1102

MECHANICAL / PLUMBING / FIRE PROTECTION ENGINEER

NEXUS ENGINEERING
1400-A LONE PALM AVE,
MODESTO, CA 95351
T: (209) 572-7399

ELECTRICAL/ AV / IT / FIRE ALARM ENGINEER

PEZONNI ENGINEERING, INC.
1150 9TH ST., #1415
MODESTO, CA 95354
T: (209) 554-4602

STATE FIRE MARSHAL & DSA STAMP

DSA APPLICATION NO. 02-119316

STATE FIRE MARSHAL PERMIT 21-N-0498-CP-DR

SHEET INDEX

(171 SHEETS TOTAL)

Division of the State Architect

Office of the State Fire Marshal

CSUS CHILD DEVELOPMENT CENTER

CALIFORNIA STATE UNIVERSITY, STANISLAUS
ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

ehdd.

PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

Stamp

LICENSED ARCHITECT
JENNIFER K. DEVLIN
No. C-27647
Ren. 5-31-23
STATE OF CALIFORNIA

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Revisions and Description			Date
2	A	Addendum 2	04.13.2022
6	A	Addendum 6	04.25.2022

Scale
12" = 1'-0"

Drawn by
Author

EHDD Job Number
20020

Sheet Title
COVER SHEET AND INDEX

Sheet Number
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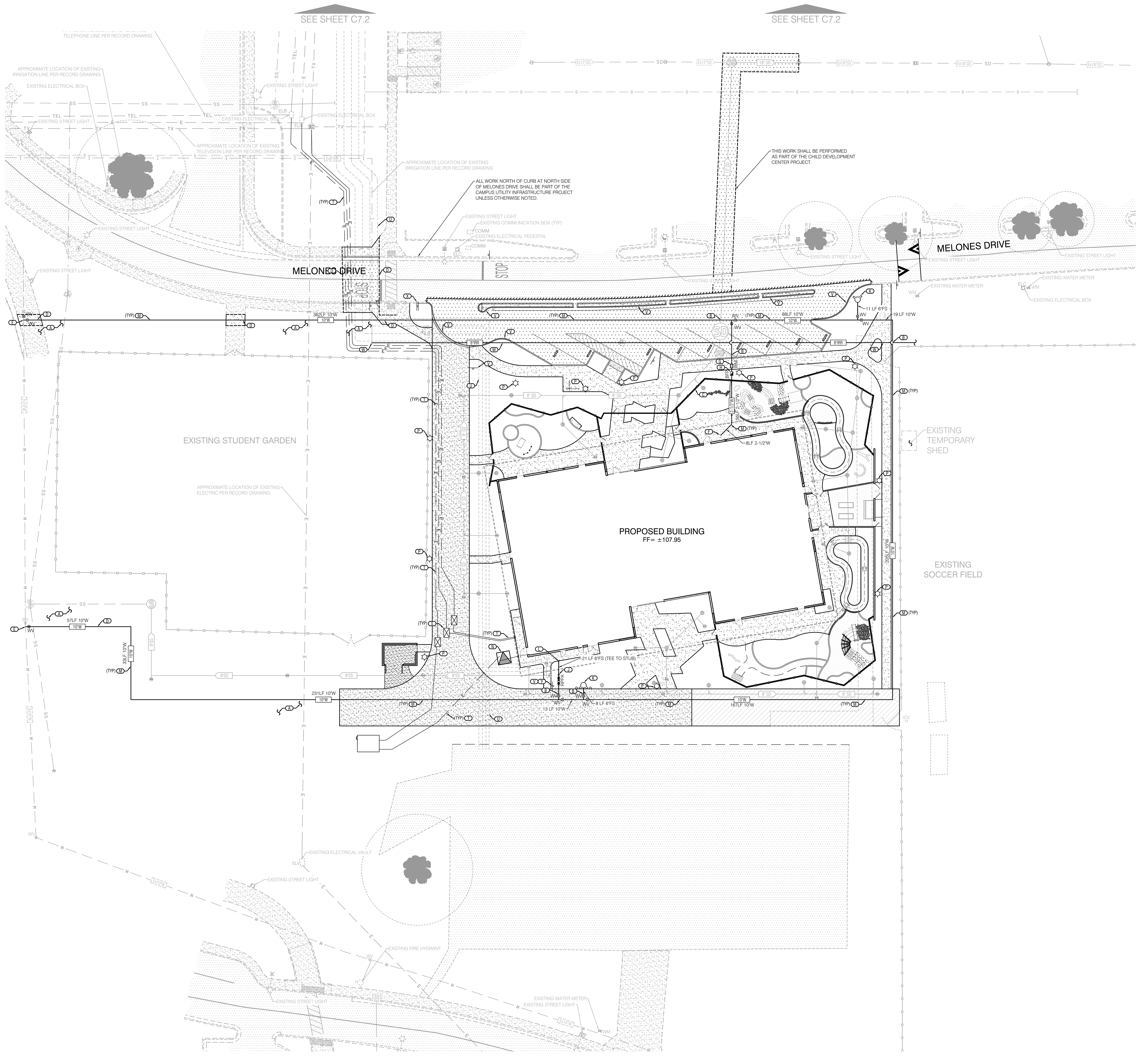

KEY NOTES

REFER TO APPLICABLE NOTES ON SHEET C1.2 AND APPLICABLE DETAILS ON SHEETS C1.3-C1.5.

SEE TOPOGRAPHIC AND DEMOLITION SHEET C2.1 FOR ADDITIONAL REMOVAL, REPLACEMENT AND PROTECTION NOTES.

(A) CONTRACTOR SHALL *USE EXTREME CAUTION* THROUGHOUT THE COURSE OF CONSTRUCTION AS TO AVOID EXISTING UNDERGROUND LINES AND STRUCTURES THAT MAY CONFLICT WITH PROPOSED IMPROVEMENTS.

(B) CONTRACTOR SHALL *USE EXTREME CAUTION* AT ALL UTILITY CROSSINGS AND SHALL COMPLY WITH ALL APPLICABLE STANDARDS. IF A CONFLICT IS FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.

(C) CONTRACTOR SHALL *USE EXTREME CAUTION* TO AVOID UNDERGROUND UTILITIES WHEN INSTALLING FOOTINGS FOR WALLS AND FENCES AT ALL UTILITY WALL/FENCE CROSSINGS.

(D) CONTRACTOR SHALL REPLACE CURB, TRENCH AND PATCH PAVEMENT AND/OR CONCRETE SECTION PER DETAILS 10-12 ON SHEET C1.5 TO ALLOW FOR CONNECTION. DAMAGED CURB, GUTTER AND/OR SIDEWALK SHALL BE REMOVED AND REPLACED TO THE NEAREST SCORE LINE OR CONSTRUCTION JOINT OR AS DETERMINED BY THE CITY ENGINEER.

(E) PROPOSED PRIVATE UNIVERSITY WATER MAIN POINT OF CONNECTION. PER UNIVERSITY STANDARDS CONTRACTOR SHALL EXCAVATE EXISTING WATER PIPE TO VERIFY THE HORIZONTAL AND VERTICAL ALIGNMENT PRIOR TO THE INSTALLATION OF THE WATER PIPE AND REMOVE/EXTEND AS REQUIRED. CONTRACTOR SHALL INFORM THE ENGINEER IF THE ALIGNMENTS ARE DIFFERENT THAN SHOWN. CONTRACTOR SHALL CONNECT TO EXISTING WATER PIPE LINE PER UNIVERSITY STANDARDS AND SPECIFICATIONS. HOT TAP TO BE PERFORMED UNDER SUPERVISION OF UNIVERSITY PERSONNEL. CONTRACTOR TO EXPOSE MAIN AND PROVIDE MATERIALS FEES.

(F) PROPOSED DOMESTIC WATER WITH SHUT OFF VALVE TO BE STUBBED 5 FEET FROM THE FACE OF THE BUILDING. CONTRACTOR SHALL VERIFY THE LOCATIONS OF THE UTILITY CONNECTIONS WITH THE PLUMBING PLANS PRIOR TO CONSTRUCTION OF PROPOSED STUBS.

(G) CONTRACTOR SHALL INSTALL 2-1/2" WATER METER FOR DOMESTIC SERVICE PER UNIVERSITY STANDARDS AND SPECIFICATIONS. WATER METER SHALL BE ONICON F-1000 SERIES TURBINE FLOW METER OR EQUAL. *USE EXTREME CAUTION* WHEN INSTALLING DEVICES TO AVOID EXISTING UNDERGROUND UTILITIES THAT MAY EXIST. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION. CITY PERSONNEL WILL DROP METER FOR FEE. △6

(H) CONTRACTOR SHALL INSTALL 2-1/2" REDUCED PRESSURE BACKFLOW PREVENTER FOR DOMESTIC SERVICE PER DETAIL 8 ON SHEET C1.5 AND UNIVERSITY STANDARDS AND SPECIFICATIONS. *USE EXTREME CAUTION* WHEN INSTALLING DEVICES TO AVOID EXISTING UNDERGROUND UTILITIES THAT MAY EXIST. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.

(J) CONTRACTOR SHALL INSTALL 6" REDUCED PRESSURE PRINCIPLE ASSEMBLY WITH OS&Y VALVES, TAMPER SWITCH, FDC, AND ASSOCIATED CONDUITS PER UNIVERSITY STANDARDS AND SPECIFICATIONS AND PER FIRE PROTECTION PLANS. SEE DETAIL 9 ON SHEET C1.5. *USE EXTREME CAUTION* WHEN INSTALLING DEVICES TO AVOID EXISTING UNDERGROUND UTILITIES THAT MAY EXIST. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.

(K) CONTRACTOR SHALL INSTALL FIRE HYDRANT ASSEMBLY PER DETAIL 5 ON SHEET C1.5, MAINTAINING A 3 FEET MINIMUM CLEARANCE SPACE. *USE EXTREME CAUTION* WHEN INSTALLING FOOTINGS TO AVOID UNDERGROUND UTILITIES.

(L) PROPOSED FIRE WATER WITH SHUT OFF VALVE TO BE STUBBED 5 FEET FROM THE FACE OF THE BUILDING. CONTRACTOR SHALL VERIFY THE LOCATIONS OF THE UTILITY CONNECTIONS WITH THE PLUMBING PLANS PRIOR TO CONSTRUCTION OF PROPOSED STUBS.

(M) CONTRACTOR SHALL INSTALL WATER PIPES WITH SUFFICIENT ENOUGH DEPTH TO MAINTAIN 1' MINIMUM VERTICAL CLEARANCE FROM OUTSIDE DIAMETER OF PIPES AND COMPLY WITH THE MOST CURRENT STATE HEALTH CODE AND THE CALIFORNIA BUILDING AND PLUMBING CODE STANDARDS. CONTRACTOR SHALL DEEPEN WATER PIPES AS NECESSARY AND USE EXTREME CAUTION WHEN PLACING THRUST BLOCKS AS TO AVOID CONFLICTS WITH OTHER UTILITY PIPES. CONTRACTOR SHALL INSTALL REDUCERS AS REQUIRED. WATER VALVES SHALL BE INSTALLED ON 4" WATER PIPES OR LARGER AND BALL VALVES/CORP STOPS SHOULD BE INSTALLED ON 3" WATER PIPES OR SMALLER. THRUST BLOCKS SHALL BE INSTALLED AT FIRE HYDRANTS, BLOW-OFFS, TEES, CAPS, BENDS, ENDS, AND CHANGES IN SIZE AND/OR DIRECTION. WATER SEPARATION SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 720.0 AND TABLE 7-7 OF THE CALIFORNIA PLUMBING CODE. SEE DETAIL 6 ON SHEET C1.5 FOR THRUST BLOCK DETAILS AND SPECIFICATIONS.

(N) CONTRACTOR SHALL INSTALL TRANSFORMER PER ELECTRICAL PLANS AND SPECIFICATIONS.

(P) CONTRACTOR SHALL INSTALL LIGHT PER ELECTRICAL PLANS AND SPECIFICATIONS.

(R) CONTRACTOR SHALL INSTALL PAD MOUNTED NETWORK SWITCH PER ELECTRICAL PLANS AND SPECIFICATIONS.

(S) CONTRACTOR SHALL INSTALL VAULTS PER ELECTRICAL PLANS AND SPECIFICATIONS.

(T) CONTRACTOR SHALL INSTALL ELECTRICAL CONDUIT PER ELECTRICAL PLANS AND SPECIFICATIONS. CONTRACTOR SHALL *USE EXTREME CAUTION* AT ALL UTILITY CROSSINGS AND SHALL COMPLY WITH ALL APPLICABLE STANDARDS. IF A CONFLICT IS FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. ELECTRICAL CONDUIT NORTH OF MELONES DRIVE TO BE INSTALLED AS PART OF SITE INFRASTRUCTURE PROJECT.

(U) APPROXIMATE LOCATION OF MECHANICAL UTILITY TRENCH EDGE SHOWN. CONTRACTOR SHALL REFERENCE MECHANICAL UTILITY PLANS FOR EXACT LOCATION. CONTRACTOR SHALL *USE EXTREME CAUTION* AT ALL UTILITY CROSSINGS AND SHALL COMPLY WITH ALL APPLICABLE STANDARDS. IF A CONFLICT IS FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. MECHANICAL UTILITY NORTH OF MELONES DRIVE TO BE INSTALLED AS PART OF SITE INFRASTRUCTURE PROJECT.

(V) ALL AREAS INDICATED SHALL BE MARKED WITH RED CURB AND WHITE STENCILS "NO PARKING - FIRE LANE" INCLUDING THE PROPER SIGNAGE IN ACCORDANCE WITH THE REQUIREMENTS OF THE OFFICE OF THE STATE FIRE MARSHALL AND FIRE DEPARTMENT. SEE FIRE LANE DETAIL 11 ON SHEET C1.3. IN LIEU OF PAINTING "NO PARKING" RED CURB CONTRACTOR SHALL INSTALL "NO PARKING" SIGNAGE AS DIRECTED BY THE FIRE DEPARTMENT AND PER DETAIL 11 ON SHEET C1.3. *USE EXTREME CAUTION* WHEN INSTALLING POST AND FOOTINGS TO AVOID UNDERGROUND UTILITIES.

(W) CONTRACTOR SHALL RELOCATE EXISTING IRRIGATION LINE PER LANDSCAPE ARCHITECTURAL PLANS.

(X) CONTRACTOR SHALL INSTALL LEFT ARROW AND RIGHT ARROW FIRE DEPARTMENT CONNECTION SIGNAGE PER DETAIL 6 ON SHEET C1.4. CONTRACTOR SHALL INSTALL DOUBLE SIDED SIGNAGE TO POINT TOWARDS PROPOSED FIRE DEPARTMENT CONNECTION. *USE EXTREME CAUTION* WHEN INSTALLING POST AND FOOTINGS TO AVOID UNDERGROUND UTILITIES.

(Y) CONTRACTOR SHALL INSTALL DOWN ARROW FIRE DEPARTMENT CONNECTION SIGNAGE PER DETAIL 6 ON SHEET C1.4. CONTRACTOR SHALL INSTALL SIGNAGE TO POINT TOWARDS PROPOSED FIRE DEPARTMENT CONNECTION. *USE EXTREME CAUTION* WHEN INSTALLING POST AND FOOTINGS TO AVOID UNDERGROUND UTILITIES.

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ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

ehdd.

PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

NorthStar Engineering Group, Inc.
CIVIL ENGINEERING • SURVEYING • PLANNING
620 12th Street, Modesto, CA 95354
(209) 524-3525 Phone (209) 524-3526 Fax

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Revisions and Description	Date
△ WATER METER SPEC	04/26/22

Scale
As Shown

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BEC

EHDD Job Number
20020

Sheet Title
COMPOSITE UTILITY PLAN

Sheet Number
C7.1

Wood Structure Notes

1. Wood structures such as fences, colonnades, trellis, etc. shall be installed to meet the design intent of the plans and details. The contractor shall submit shop drawings for review and approval by the owner and/or landscape architect.
2. Sizes of components as shown on the plans and details are referential and shall be installed in commonly avail. sizes.
3. Wood assemblies shall not be attached to buildings unless specifically shown on the landscape or architectural plans.
4. Contractor shall include all posts, beams, joists, rafters, rails, pickets, brackets, fasteners, etc. (whether shown on the details or not) as needed to install the elements per the intent of the plans and details.
5. Fasteners shall be ornamental iron or countersunk and painted as shown on the plans and details. No fasteners shall be located where they can catch or injure someone.
6. All components shall be completely painted with one coat primer and min. two coats final exterior grade paint or stain as specified. Color coat to completely cover all visible portions of wood structure. Ornamental fasteners may be left in their standard color, or painted a different color. Coordinate with Landscape Architect prior to painting. Color and finish per the plans or to be selected by the owner and/or landscape architect.
7. Attachment at footing to be installed per the plan or details with secure connection to meet CBC and local building codes.

Tubular Steel Notes

1. Contractor shall install the fence, handrails, guard rails, gates, etc. per the design intent of the plans. Contractor shall review the details and plans and shall notify the landscape architect if any modifications are needed for structural reasons.
2. Amenities shall meet all codes and requirements of specific use such as pool fence, guardrail, handrail, etc. If codes conflict with the plans and details, the codes shall take precedence; notify the landscape architect immediately in each case.
3. Contractor shall include all posts, rails, pickets, brackets, fasteners, gate hardware, etc. (whether shown on the details or not) as needed to install the fence per the intent of the plans and details.
4. Sizes of components as shown on the plans and details are referential and shall be installed in commonly avail. sizes. Use prefabricated components to meet the design intent whenever possible unless specifically stated otherwise.
5. Tubular steel amenities shall not be attached to buildings unless specifically shown on the landscape or architectural plans.
6. All welds shall be ground smooth. No fasteners shall be located where they can catch or injure someone.
7. Exposed ends of pipes/tubes and hollow sections shall be sealed with a cap plate and ground smooth unless noted otherwise.
8. All components shall be completely painted with two coats rust-resistant primer and minimum one coat final semi-gloss rust-resistant enamel. All galvanized metal to receive a vinegar or diluted muriatic acid wash prior to priming. Color coat to completely cover all visible portions, including undersides of railings. Color per the plans or to be selected by the owner and/or landscape architect.
9. Gates to meet ADA and Code exit requirements including exit bar ("panic bar") hardware, self-closing hinges and kick-plate. Exit bar shall be for exterior use equal to model V40xW by Detex and shall include all accessory hardware for a complete installation. Hinges shall be for exterior use equal to Tru-Close self-closing hinges use, TruClose.net, size as required by gate weight and use.
10. For projects with gate operators the gate operator installer shall be properly licensed and in good-standing with the State of California (license C-61, D-28).

General Construction Notes

1. All dimensions are taken from curb face, building face, or edge of paving, unless otherwise noted on the plan. The dimensions are shown for approximate line and all radii and curves are to have continuous and smooth transitions without abrupt changes or bends.
2. All forms and alignment of paving shall be reviewed and approved by the landscape Architect and/or owner prior to pouring (provide a minimum of 48 hours notice).
3. For site grading see Civil Engineer's plans.
4. Contractor shall verify location of all utilities prior to construction and shall be liable for all damages incurred.
5. Contractor shall note and install all sleeve locations as noted on the Irrigation Plans prior to installation of paving.
6. All construction and workmanship shall conform to the applicable edition of the California Building Code and all other governing codes, ordinances, and laws.
7. These notes shall be used in conjunction with the plans and any discrepancies shall be brought to the attention of the Landscape Architect.
8. The contractor must check all dimensions, framing conditions, and the condition of the site prior to commencing with work. The Landscape Architect is to be notified immediately of any discrepancies or deficiencies.
9. Conditions not specifically shown shall be constructed similar to the details for the respective materials.
10. The drawings and specifications represent the finished structure. All bracing, temporary supports, shoring, etc. is the sole responsibility of the contractor.
11. Observation visits to the job site by the Landscape Architect do not include inspection of construction methods and safety conditions of the worksite. These visits shall not be construed as continuous and detailed inspections.
12. Design, materials, equipment, and products other than those described on the drawings or in the specifications may be considered for use, provided prior approval has been obtained from the owner, Landscape Architect, and applicable governing authority.

Construction Callouts

No.	Detail	Item Description
1	Per Civil	Concrete median per Civil Engineer's plans.
2	Per Civil	Concrete vertical curb per Civil Engineer's plans.
3	Per Civil	Concrete rolled curb per Civil Engineer's plans.
4	Per Civil	Emergency vehicle access lane paving per Civil Engineer's Plans.
5	Per Civil	Curb ramp and truncated domes per Civil Engineer's plans and applicable CBC accessibility code requirements.
6	A and B, Sheet L2.1	Natural gray medium broom finish concrete paving. Install troweled score joints and expansion joints as shown on plans. Expansion joints shall be maximum 20' on center.
7	A-C, Sheet L2.1 and D, Sheet L2.5	Colored concrete with light sandblast finish by means of top-surface finish retarder such as Topcast or approved equal. Color to be integrally mixed pigment by Davis Colors. Two colors to be provided in random pattern as shown in detail. Colors per Detail. Provide product cut sheets and mix ratio for approval. Install saw cut score joints in enhanced pattern as shown on plans. Provide expansion joints as shown on plans. Expansion joints shall be maximum 20' on center. (6A)
8	D, Sheet L2.1	At grade wood deck to be installed flush with adjacent paving.
9	E, Sheet L2.1	Install stabilized decomposed granite paving. 'Stabilizer' soil binder by Stabilizer Solutions, (800)336-2468. www.stabilizersolutions.com. Mix ratio shall be per manufacturer's recommendations. Install per manufacturer's recommendations. Granite color: tan. Submit product information and stabilizer mix ratio for approval.
10	F, Sheet L2.1	3" layer of 3/4" chip aggregate at maintenance pathway.
11	G, Sheet L2.1	Surface mount bike rack.
12	H-N, Sheet L2.1	Split Face CMU trash enclosure with corrugated steel access doors.
13	O, Sheet L2.1	Low ornamental fence at entry. Tube steel post and frame with laser cut architectural metal panels
14	A, Sheet L2.2	Entry gate at low entry fence. Gate to match fence.
15	B and C, Sheet L2.2	Play yard enclosure fence and wall system at North entrance. Uniform base wall height to match building wall below window.
16	D, Sheet L2.2	Single leaf egress gate at north entrance play yard enclosure fence.
17	F, Sheet L2.2 and A-C, Sheet L2.3	Play yard enclosure fence and wall system. Tube steel fence system on top to be consistent 48" height, base wall varies from 12"-60". Portions at play mounds have retaining condition. **ALTERNATE:** Provide Alternate pricing for tube steel fence portion of fence system - Base wall has no alternate. Provide line item in bid to replace tube steel fence and pickets with pre-manufactured fence system by Fortress Building Products - Architectural fence - Flat Top/Flat Bottom two rail panels with manufacturer's 2.5" posts and pressed dome caps. Install per manufacturer's specifications
18	D and E, Sheet L2.2	Single leaf egress and fire access gate at play yard enclosure fence.
19	H, L2.2	5'-6" tall CMU wall with precast concrete cap and stucco veneer to match the building.
20	F, L2.3	Double leaf maintenance access and egress gate at full height wall. Gate design to match tube steel fence with vertical pickets - see Detail C L2.2 for reference
21	E, Sheet L2.3	Low tube steel separation fence at shared garden.
22	F, Sheet L2.3	Double leaf gate at low tube steel separation fence. Gate to match fence design. Single leaf to be equipped with proper egress hardware. Second leaf to have heavy duty cane bolt to be used for maintenance access.
23	G, Sheet L2.3	8" tall raised garden bed
24	A, Sheet 12.4	12" tall raised garden bed with built in bench
25	A and B, Sheet L2.1	Natural gray medium broom finish concrete paving. Install saw cut score joints in enhanced pattern as shown on plans. Provide expansion joints as shown on plans. Expansion joints shall be maximum 20' on center.
26	A and B, Sheet L2.1 and B, Sheet L2.4	Colored concrete bike path with medium sandblast finish by means of top-surface finish retarder such as Topcast or approved equal. Color to be integrally mixed pigment by Davis Colors. Color to be selected. Provide product cut sheets and mix ratio for approval. Provide troweled score joints at 5' on center and expansion joints at 20' on center. Striping as shown in plan and per typical striping detail
27	C, Sheet L2.4	Concrete mow curb.
28	D or E, Sheet L2.4	Concrete curb edging at play area and sand pit
29	D, Sheet L2.4	Downturn edge of sidewalk around play area.
30	I, Sheet L2.2	Tube steel play yard enclosure fence.
31	D, Sheet L2.4	Poured in place playground surfacing. Surfacing to be Corkeen product supplied by SPEC Play - see also detail A-C, Sheet L2.3.
32	E, Sheet L2.4	Play sand. Contractor to provide custom fabric cover with eye hooks in perimeter curb
33	A, Sheet L2.5	Infant Play Yard - Poured in place play surface and equipment by SPEC play equipment. Contact Caroline O'Neal - 650.769.0761.
34	B, Sheet L2.5	Toddler Play Yard - poured in place play surface playground mounds and equipment by SPEC play equipment. Contact Caroline O'Neal - 650.769.0761.
35	C, Sheet L2.5	Preschool Play Yard - poured in place play surface playground mounds and equipment by SPEC play equipment. Contact Caroline O'Neal - 650.769.0761.
36	F, Sheet L2.4	Play hut. Product to be Kompan Robinia Play hut model NRO-Custom 897616.
37	G, Sheet L2.4	Farm pump by Goric play. Provide switch for faculty to turn on/off water supply - See Irrigation for water supply
38	H, Sheet L2.4	Natural wood log steps by Columbia Cascade or approved equal
39	I, Sheet L2.4	Precast concrete seating stones - Soma Stones by Concreteworks or approved equal.
40	No Detail	Location for surface mount bench. Bench shown for reference only - FFE
(hatch symbol)		Landscape Area - see Planting and Irrigation Plans
(boulder symbol)		Boulders - see Planting Plan

Concrete Joints

- Score joint - see detail A, L2.1
- Expansion joint - see detail A, L2.1
- Cold joint - see detail A, L2.1

NOTE:
Contractor to provide min. 36" square mock-ups of each type of paving color and texture. Sample to be approved by Owner and Landscape Architect prior to pour. Sample to remain on-site as approved standard of quality.

NORTH
Scale: 1" = 10'-0"
0' 5' 10' 20'

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CSUS CHILD DEVELOPMENT CENTER

CALIFORNIA STATE UNIVERSITY, STANISLAUS
ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

ehdd.
PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111
INFO@EHDD.COM
+1 415-285-9193

Consultant
KLA LANDSCAPE ARCHITECTURE PLANNING
KLA, Inc.
151 N. Norlin St.,
Sonora Ca, 95370
(209)532-2856
www.kla-ca.com

Stamp
LICENSED LANDSCAPE ARCHITECT
MATTHEW B. HAWKS #65..
Signature
03.31.2023
Renewal Date
12.06.2021
Date
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6	A	Addendum 6	04.25.2022

Scale
1" = 10'-0"
Drawn by
MBH
EHDD Job Number
KLA 20-2266

Sheet Title
Construction Plan

Sheet Number
L1.1

Play Area and Equipment Notes

1. The plans, notes, and details shall in no way supersede play warranty or code requirements. Code and manufacturer requirements shall always take precedence over these plans.
2. The play equipment shall comply with the manufacturer and model number as specifically called out on the plans. Play equipment has been specified per the specific size of the play area. No substitutions shall be made without the express approval of the owner and/or landscape architect.
3. The contractor shall verify, prior to installation, that the play equipment and required fall zones fit within the play area surfacing and depth of surfacing (for cushioning) has been met. Utilities shall be clear of all footings and supports.
4. The contractor shall use a licensed play ground installation company with experience in similar installations and familiar with the unique requirements of play areas. The contractor shall be responsible for ensuring that the play equipment, surfacing, and edging are installed per the project and local code requirements (contractor to verify).
5. The play area surfacing shall be installed per the specifications of the manufacturer. Installation must be certified correct by the manufacturer to ensure that the warranty and insurances are valid. Verify depth of material as needed for specific fall-zones associated with the play equipment.
6. Color combinations shall be selected or approved by the owner and/or landscape architect prior to ordering.
7. Paving shall drain away from play surfacing unless specifically noted on the plans. Fibar surfacing shall be installed with a drain at the bottom.
8. ADA access to play surface shall be installed per the plans or local code requirements.
9. Ground Surfaces on accessible routes, clear floor or ground spaces, and turning spaces shall comply with CBC Section 11B-1008.2.6

   11B-1008.2.6.1 Accessibility. Ground surfaces shall comply with ASTM F 1951. Ground surfaces shall be inspected and maintained regularly and frequently to ensure continued compliance with ASTM F 1951.

   11B-1008.2.6.2 Use zones. Ground surfaces located within use zones shall comply with ASTM F 1292 (1999 edition or 2004 edition).

Construction Callouts

No.	Detail	Item Description
1	Per Civil	Concrete median per Civil Engineer's plans.
2	Per Civil	Concrete vertical curb per Civil Engineer's plans.
3	Per Civil	Concrete rolled curb per Civil Engineer's plans.
4	Per Civil	Emergency vehicle access lane paving per Civil Engineer's Plans.
5	Per Civil	Curb ramp and truncated domes per Civil Engineer's plans and applicable CBC accessibility code requirements.
6	A and B, Sheet L2.1	Natural gray medium broom finish concrete paving. Install troweled score joints and expansion joints as shown on plans. Expansion joints shall be maximum 20' on center.
7 (6 A)	A-C, Sheet L2.1 and D, Sheet L2.5	Colored concrete with light sandblast finish by means of top-surface finish retarder such as Topcast or approved equal. Color to be integrally mixed pigment by Davis Colors. Two colors to be provided in random pattern as shown in detail. Colors per Detail. Provide product cut sheets and mix ratio for approval. Install saw cut score joints in enhanced pattern as shown on plans. Provide expansion joints as shown on plans. Expansion joints shall be maximum 20' on center.
8	D, Sheet L2.1	At grade wood deck to be installed flush with adjacent paving.
9	E, Sheet L2.1	Install stabilized decomposed granite paving. 'Stabilizer' soil binder by Stabilizer Solutions, (800)336-2468. www.stabilizersolutions.com. Mix ratio shall be per manufacturer's recommendations. Install per manufacturer's recommendations. Granite color: tan. Submit product information and stabilizer mix ratio for approval.
10	F, Sheet L2.1	3" layer of 3/4" chip aggregate at maintenance pathway.
11	G, Sheet L2.1	Surface mount bike rack.
12	H-N, Sheet L2.1	Split Face CMU trash enclosure with corrugated steel access doors.
13	O, Sheet L2.1	Low ornamental fence at entry. Tube steel post and frame with laser cut architectural metal panels
14	A, Sheet L2.2	Entry gate at low entry fence. Gate to match fence.
15	B and C, Sheet L2.2	Play yard enclosure fence and wall system at North entrance. Uniform base wall height to match building wall below window.
16	D, Sheet L2.2	Single leaf egress gate at north entrance play yard enclosure fence.
17	F, Sheet L2.2 and A-C, Sheet L2.3	Play yard enclosure fence and wall system. Tube steel fence system on top to be consistent 48" height, base wall varies from 12"-60". Portions at play mounds have retaining condition. <u>ALTERNATE:</u> Provide Alternate pricing for tube steel fence portion of fence system - Base wall has no alternate. Provide line item in bid to replace tube steel fence and pickets with pre-manufactured fence system by Fortress Building Products - Architectural fence - Flat Top/Flat Bottom two rail panels with manufacturer's 2.5" posts and pressed dome caps. Install per manufacturer's specifications
18	D and E, Sheet L2.2	Single leaf egress and fire access gate at play yard enclosure fence.
19	H, L2.2	5'-6" tall CMU wall with precast concrete cap and stucco veneer to match the building.
20	F, L2.3	Double leaf maintenance access and egress gate at full height wall. Gate design to match tube steel fence with vertical pickets - see Detail C L2.2 for reference
21	E, Sheet L2.3	Low tube steel separation fence at shared garden.
22	F, Sheet L2.3	Double leaf gate at low tube steel separation fence. Gate to match fence design. Single leaf to be equipped with proper egress hardware. Second leaf to have heavy duty cane bolt to be used for maintenance access.
23	G, Sheet L2.3	8" tall raised garden bed
24	A, Sheet l2.4	12" tall raised garden bed with built in bench
25	A and B, Sheet L2.1	Natural gray medium broom finish concrete paving. Install saw cut score joints in enhanced pattern as shown on plans. Provide expansion joints as shown on plans. Expansion joints shall be maximum 20' on center.
26	A and B, Sheet L2.1 and B, Sheet L2.4	Colored concrete bike path with medium sandblast finish by means of top-surface finish retarder such as Topcast or approved equal. Color to be integrally mixed pigment by Davis Colors. Color to be selected. Provide product cut sheets and mix ratio for approval. Provide troweled score joints at 5' on center and expansion joints at 20' on center. Striping as shown in plan and per typical striping detail
27	C, Sheet L2.4	Concrete mow curb.
28	D or E, Sheet L2.4	Concrete curb edging at play area and sand pit
29	D, Sheet L2.4	Downturn edge of sidewalk around play area.
30	I, Sheet L2.2	Tube steel play yard enclosure fence.
31	D, Sheet L2.4	Poured in place playground surfacing. Surfacing to be Corkeen product supplied by SPEC Play - see also detail A-C, Sheet L2.3.
32	E, Sheet L2.4	Play sand. Contractor to provide custom fabric cover with eye hooks in perimeter curb
33	A, Sheet L2.5	Infant Play Yard - Poured in place play surface and equipment by SPEC play equipment. Contact Caroline O'Neal - 650.769.0761.
34	B, Sheet L2.5	Toddler Play Yard - poured in place play surface playground mounds and equipment by SPEC play equipment. Contact Caroline O'Neal - 650.769.0761.
35	C, Sheet L2.5	Preschool Play Yard - poured in place play surface playground mounds and equipment by SPEC play equipment. Contact Caroline O'Neal - 650.769.0761.
36	F, Sheet L2.4	Play hut. Product to be Kompan Robinia Play hut model NRO-Custom 897616.
37	G, Sheet L2.4	Farm pump by Goric play. Provide switch for faculty to turn on/off water supply - See Irrigation for water supply
38	H, Sheet L2.4	Natural wood log steps by Columbia Cascade or approved equal
39	I, Sheet L2.4	Precast concrete seating stones - Soma Stones by Concreteworks or approved equal.
40	No Detail	Location for surface mount bench. Bench shown for reference only - FFE
		Landscape Area - see Planting and Irrigation Plans
		Boulders - see Planting Plan

NORTH
Scale: 1" = 10'-0"
0 5' 10' 20'

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THE EMBARCADERO
SAN FRANCISCO, CA 94111
INFO@EHDD.COM
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Renewal Date
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Revisions and Description / Date

6	A	Addendum 6	04.25.2022

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1" = 10'-0"
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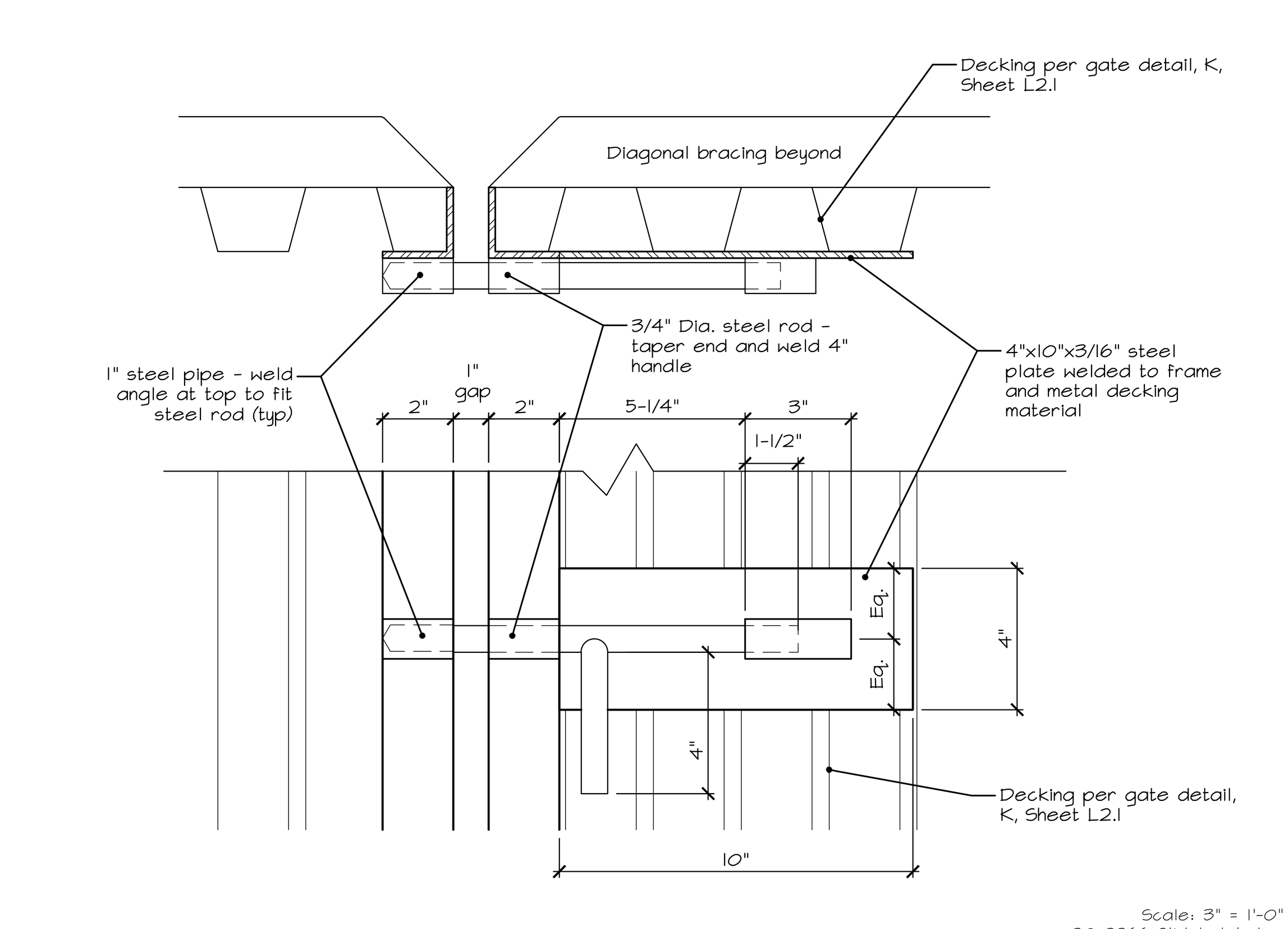
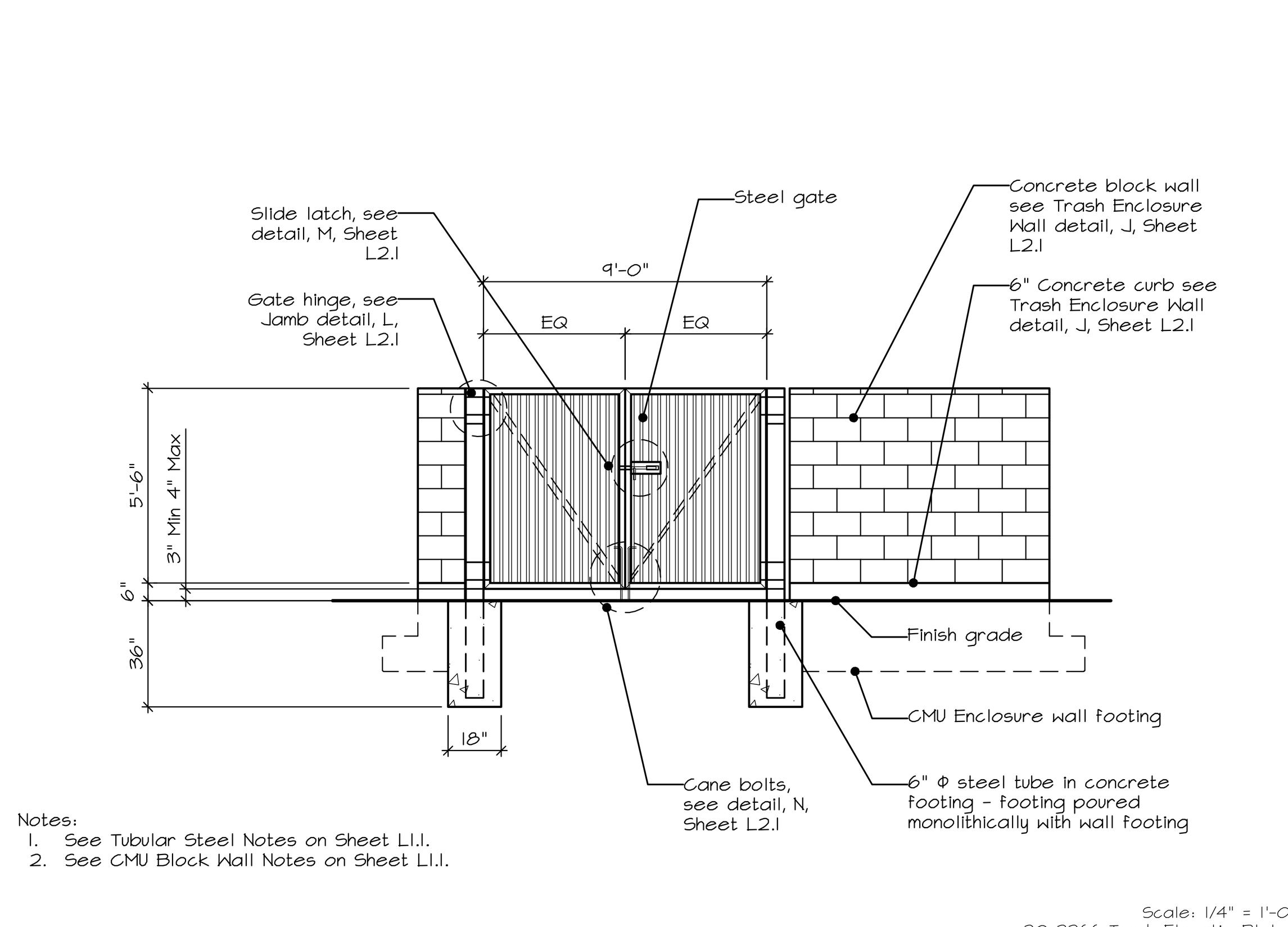
Sheet Title
Construction Plan

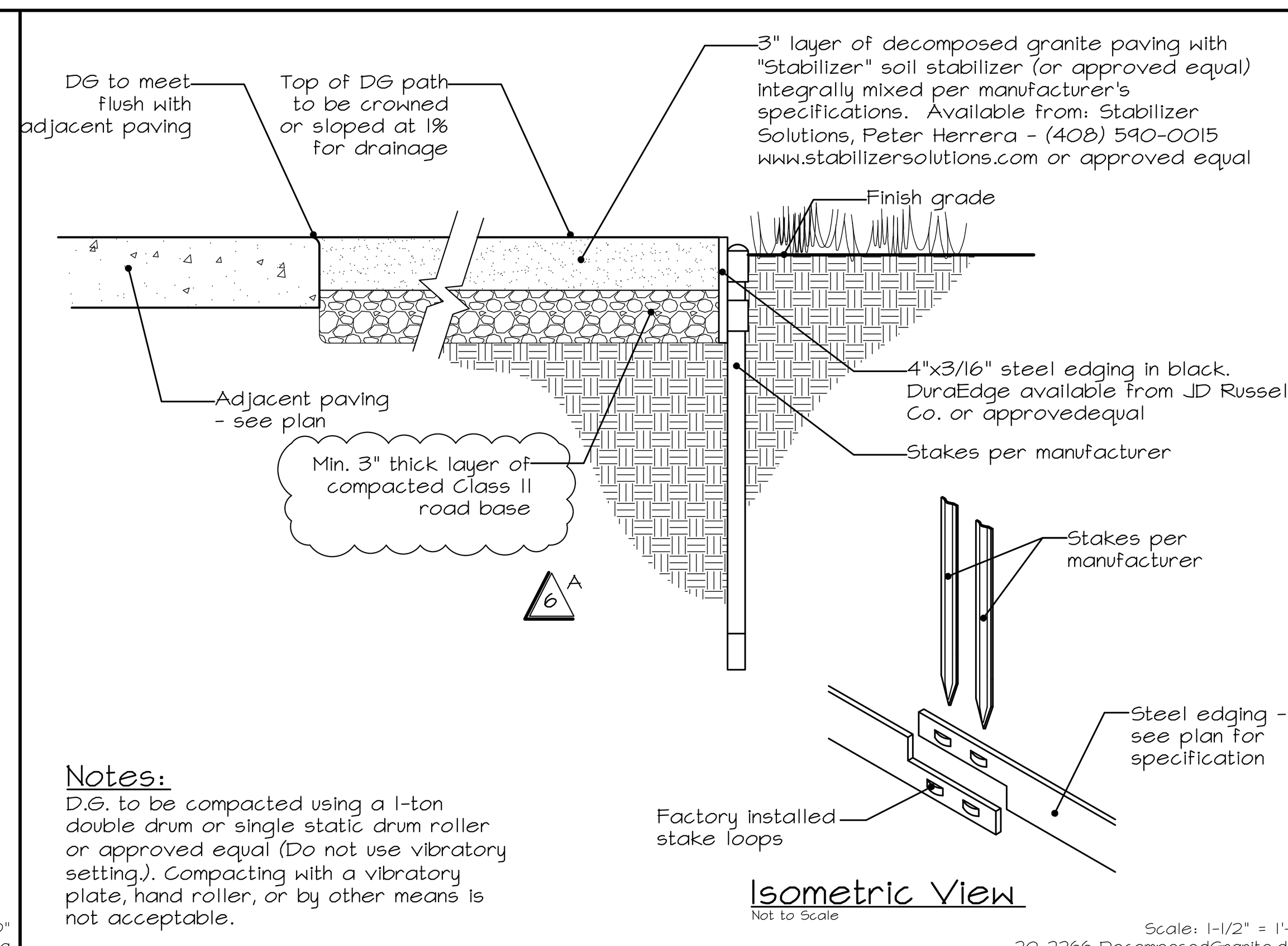
Sheet Number
L1.2


Decking per gate detail, K, Sheet L2.1
Diagonal bracing beyond
1" steel pipe - weld angle at top to fit steel rod (typ)
3/4" Dia. steel rod - taper end and weld 4" handle
4"x10"x3/16" steel plate welded to frame and metal decking material
Decking per gate detail, K, Sheet L2.1
Scale: 3" = 1'-0"
20-2266 SlideLatch.dwg

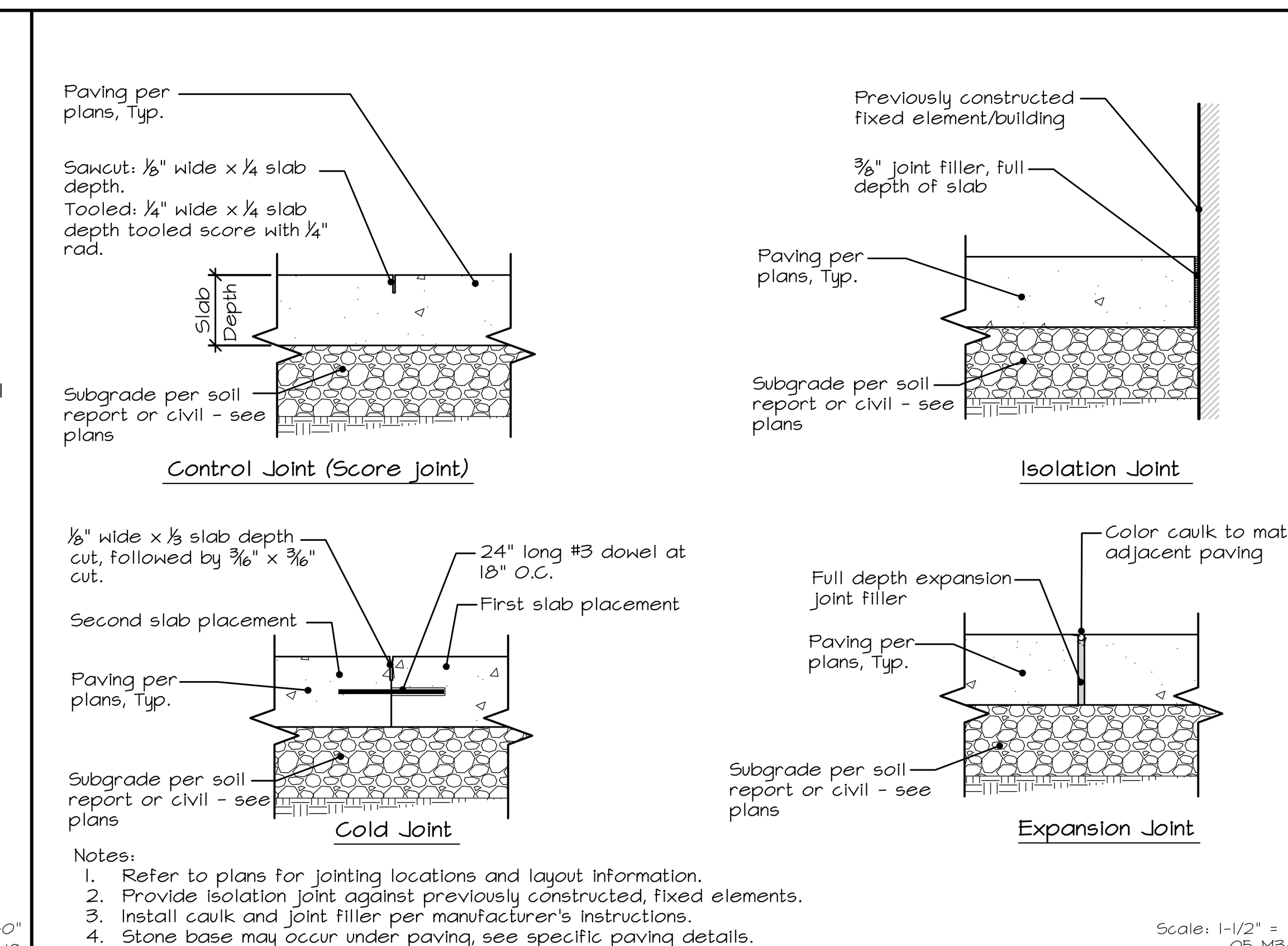
Slide Latch Detail | M


Slide latch, see detail, M, Sheet L2.1
Gate hinge, see Jamb detail, L, Sheet L2.1
Steel gate
Concrete block wall see Trash Enclosure Wall detail, J, Sheet L2.1
6" Concrete curb see Trash Enclosure Wall detail, J, Sheet L2.1
Finish grade
CMU Enclosure wall footing
Cane bolts, see detail, N, Sheet L2.1
6" ø steel tube in concrete footing - footing poured monolithically with wall footing
Notes:
1. See Tubular Steel Notes on Sheet L1.1.
2. See CMU Block Wall Notes on Sheet L1.1.
Scale: 1/4" = 1'-0"
20-2266 Trash-ElevationRl.dwg

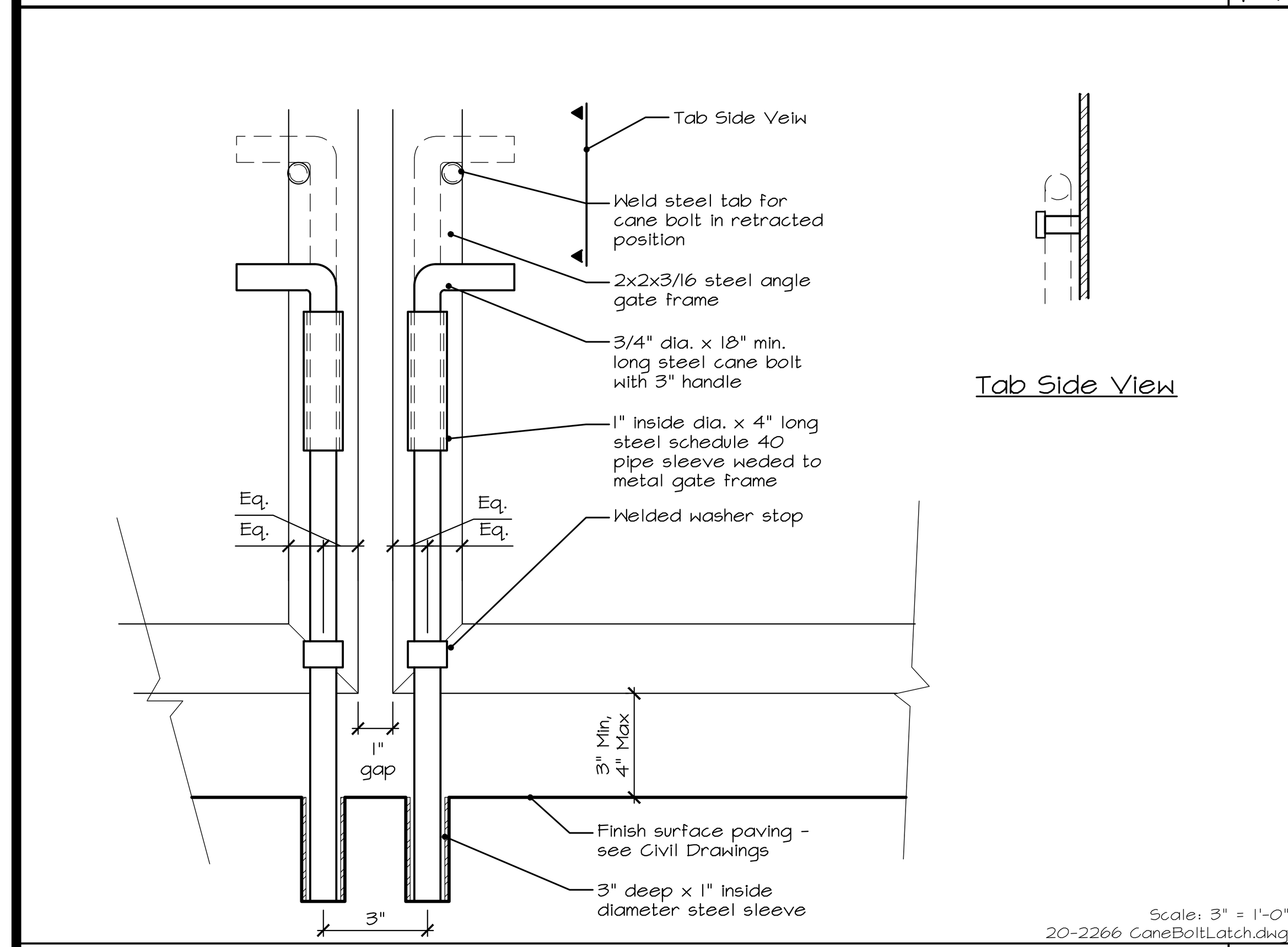
Trash Enclosure - Elevation | I


DG to meet flush with adjacent paving
Top of DG path to be crowned or sloped at 1% for drainage
3" layer of decomposed granite paving with "Stabilizer" soil stabilizer (or approved equal) integrally mixed per manufacturer's specifications. Available from: Stabilizer Solutions, Peter Herrera - (408) 590-0015 www.stabilizersolutions.com or approved equal
Finish grade
Adjacent paving - see plan
Min. 3" thick layer of compacted Class II road base
4"x3/16" steel edging in black, DuraEdge available from JD Russell Co. or approved equal
Stakes per manufacturer
Stakes per manufacturer
Steel edging - see plan for specification
Factory installed stake loops
Isometric View
Notes:
D.G. to be compacted using a 1-ton double drum or single static drum roller or approved equal (Do not use vibratory setting). Compacting with a vibratory plate, hand roller, or by other means is not acceptable.
Scale: 1-1/2" = 1'-0"
20-2266 DecomposedGranite.dwg

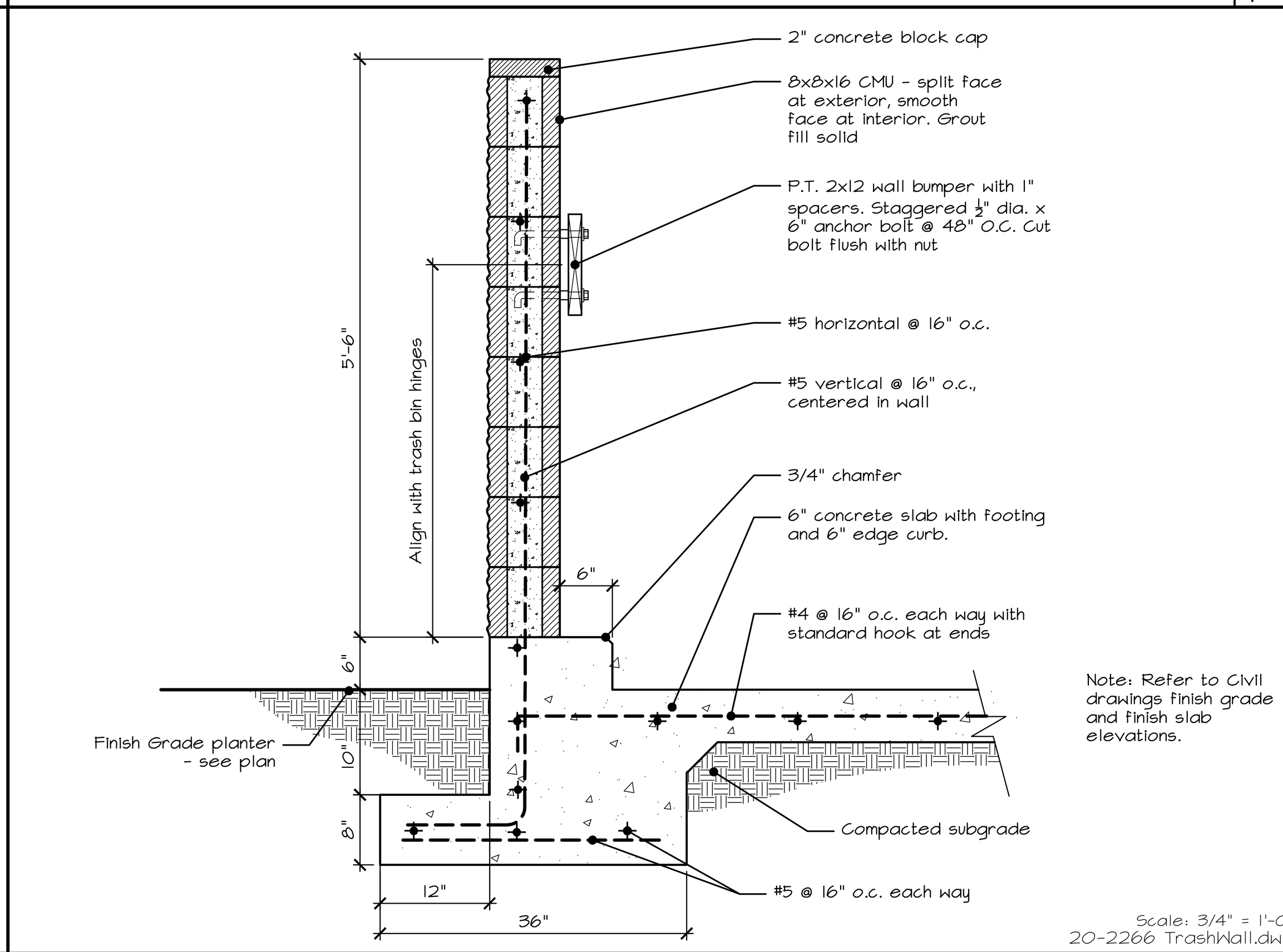
Decomposed Granite (DG) Pathway | E


Paving per plans, Typ.
Sawcut: 1/8" wide x 1/4 slab depth. Tooled: 1/4" wide x 1/4 slab depth tooled score with 1/4" rad.
Subgrade per soil report or civil - see plans
Control Joint (Score Joint)
Previously constructed fixed element/building
3/8" joint filler, full depth of slab
Paving per plans, Typ.
Subgrade per soil report or civil - see plans
Isolation Joint
1/8" wide x 1/3 slab depth cut, followed by 3/16" x 3/8" cut.
24" long #3 dowel at 18" O.C.
Second slab placement
First slab placement
Paving per plans, Typ.
Subgrade per soil report or civil - see plans
Cold Joint
Color caulk to match adjacent paving
Full depth expansion joint filler
Paving per plans, Typ.
Subgrade per soil report or civil - see plans
Expansion Joint
Notes:
1. Refer to plans for jointing locations and layout information.
2. Provide isolation joint against previously constructed, fixed elements.
3. Install caulk and joint filler per manufacturer's instructions.
4. Stone base may occur under paving, see specific paving details.
Scale: 1-1/2" = 1'-0"

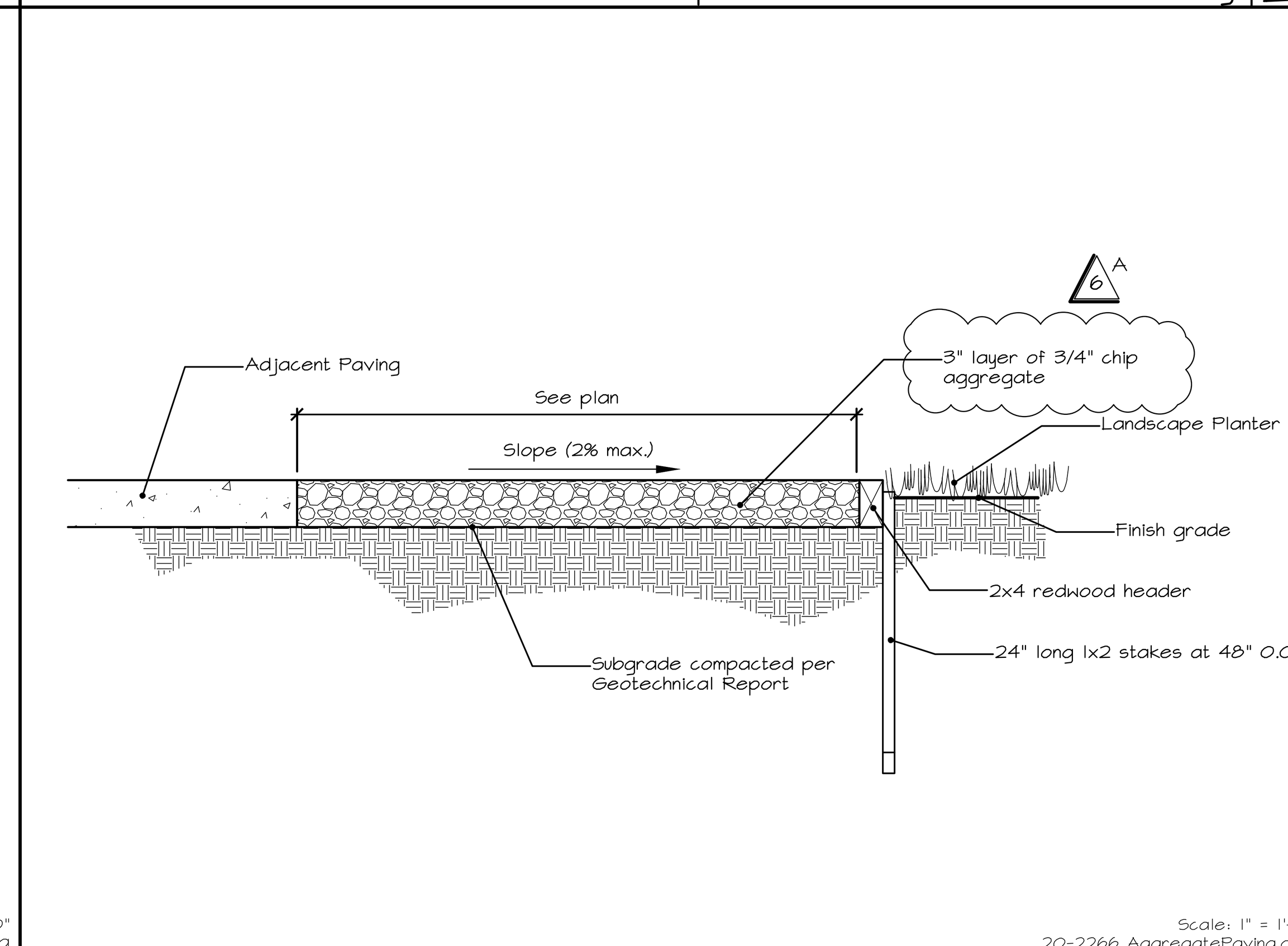
Typical Joints | A


Tab Side View
Weld steel tab for cane bolt in retracted position
2x2x3/16 steel angle gate frame
3/4" dia. x 18" min. long steel cane bolt with 3" handle
1" inside dia. x 4" long steel schedule 40 pipe sleeve welded to metal gate frame
Welded washer stop
Tab Side View
Finish surface paving - see Civil Drawings
3" deep x 1" inside diameter steel sleeve
Scale: 3" = 1'-0"
20-2266 CaneBoltLatch.dwg

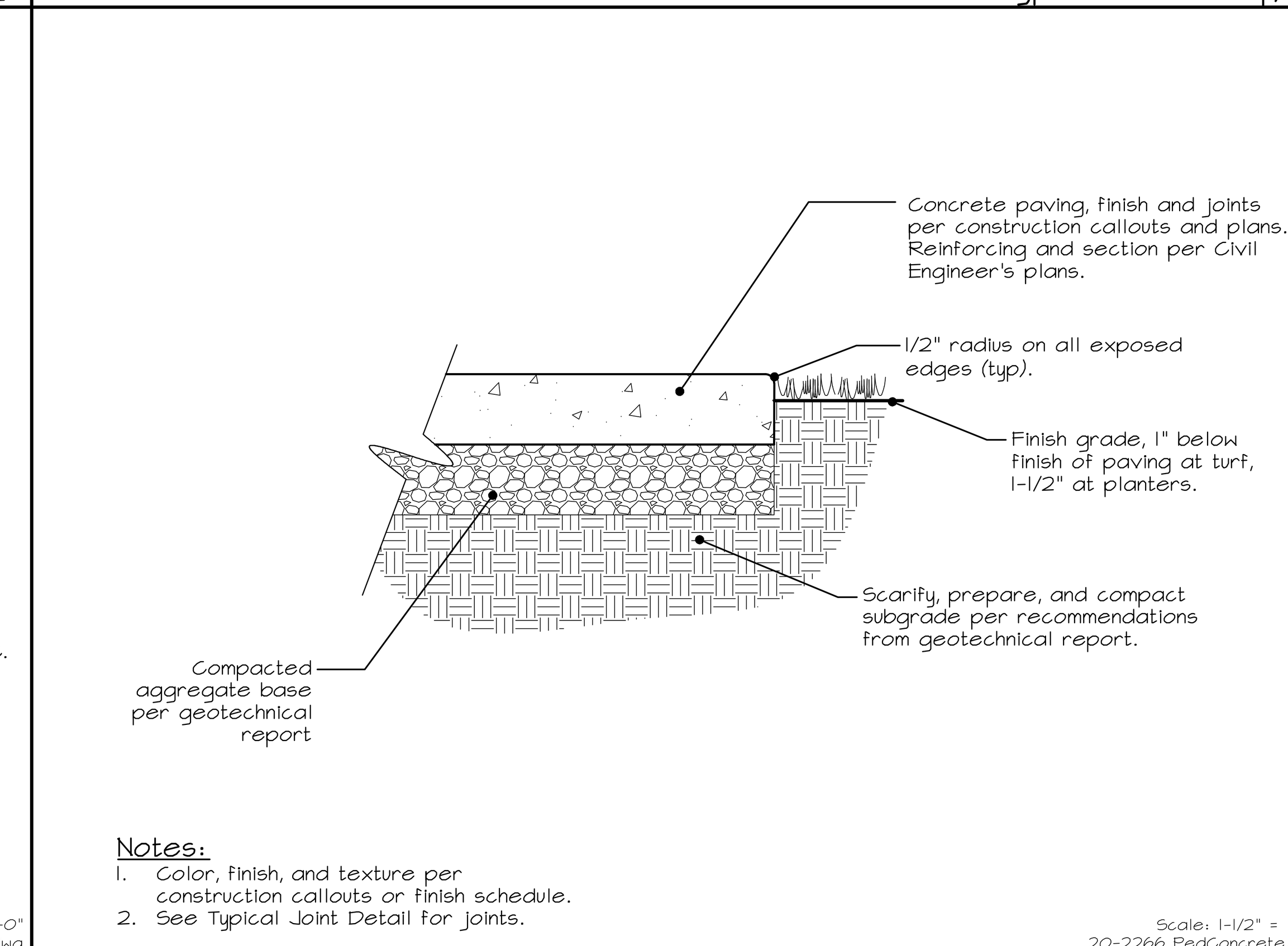
Cane Bolt Latch Detail | N


2" concrete block cap
8x8x16 CMU - split face at exterior, smooth face at interior. Grout fill solid
P.T. 2x12 wall bumper with 1" spacers. Staggered 1/2" dia. x 6" anchor bolt @ 48" O.C. Cut bolt flush with nut
#5 horizontal @ 16" o.c.
#5 vertical @ 16" o.c., centered in wall
3/4" chamfer
6" concrete slab with footing and 6" edge curb.
#4 @ 16" o.c. each way with standard hook at ends
Note: Refer to Civil drawings finish grade and finish slab elevations.
Finish Grade planter - see plan
Compacted subgrade
#5 @ 16" o.c. each way
Scale: 3/4" = 1'-0"
20-2266 TrashWall.dwg

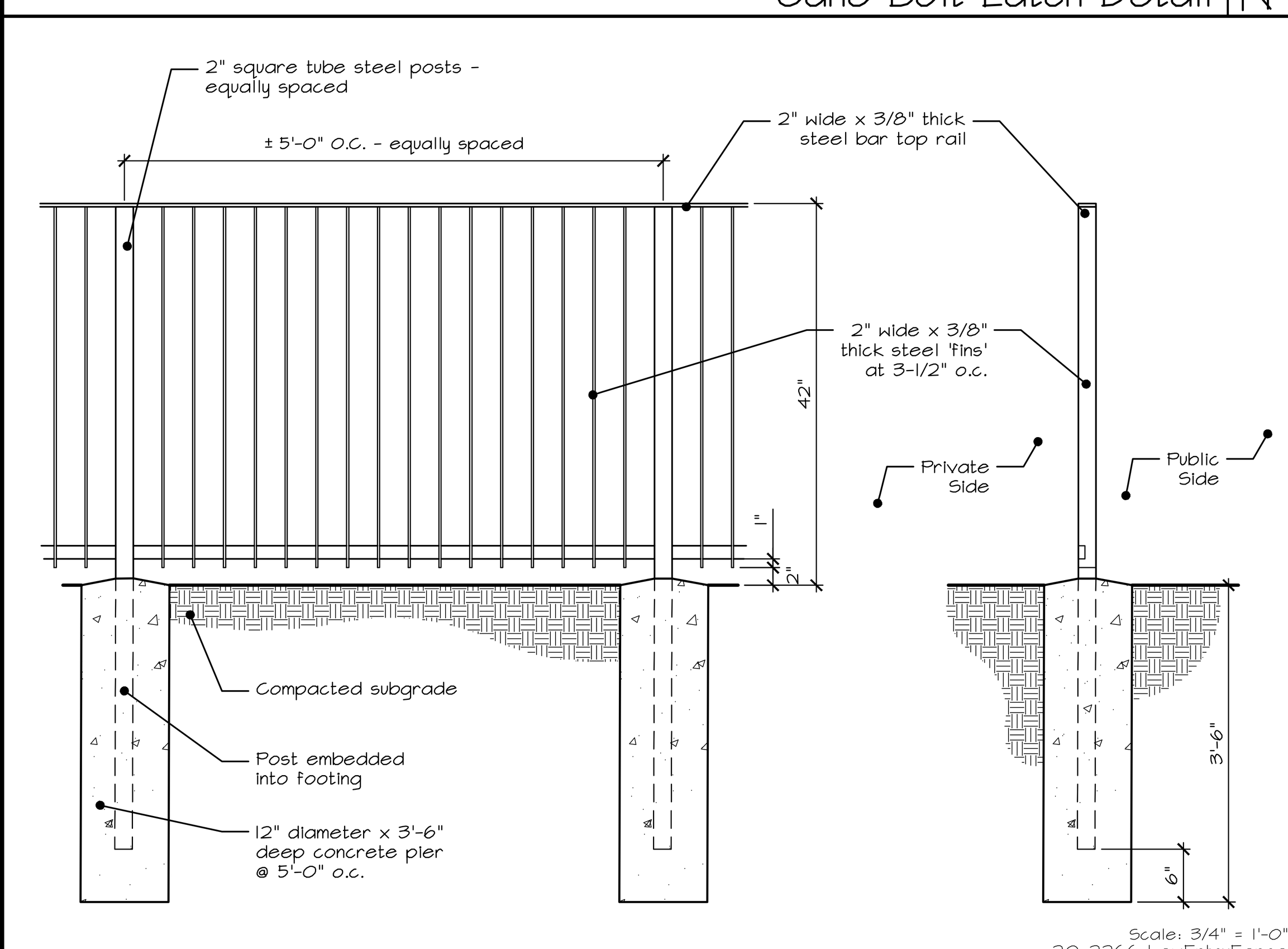
Trash Enclosure Wall | J



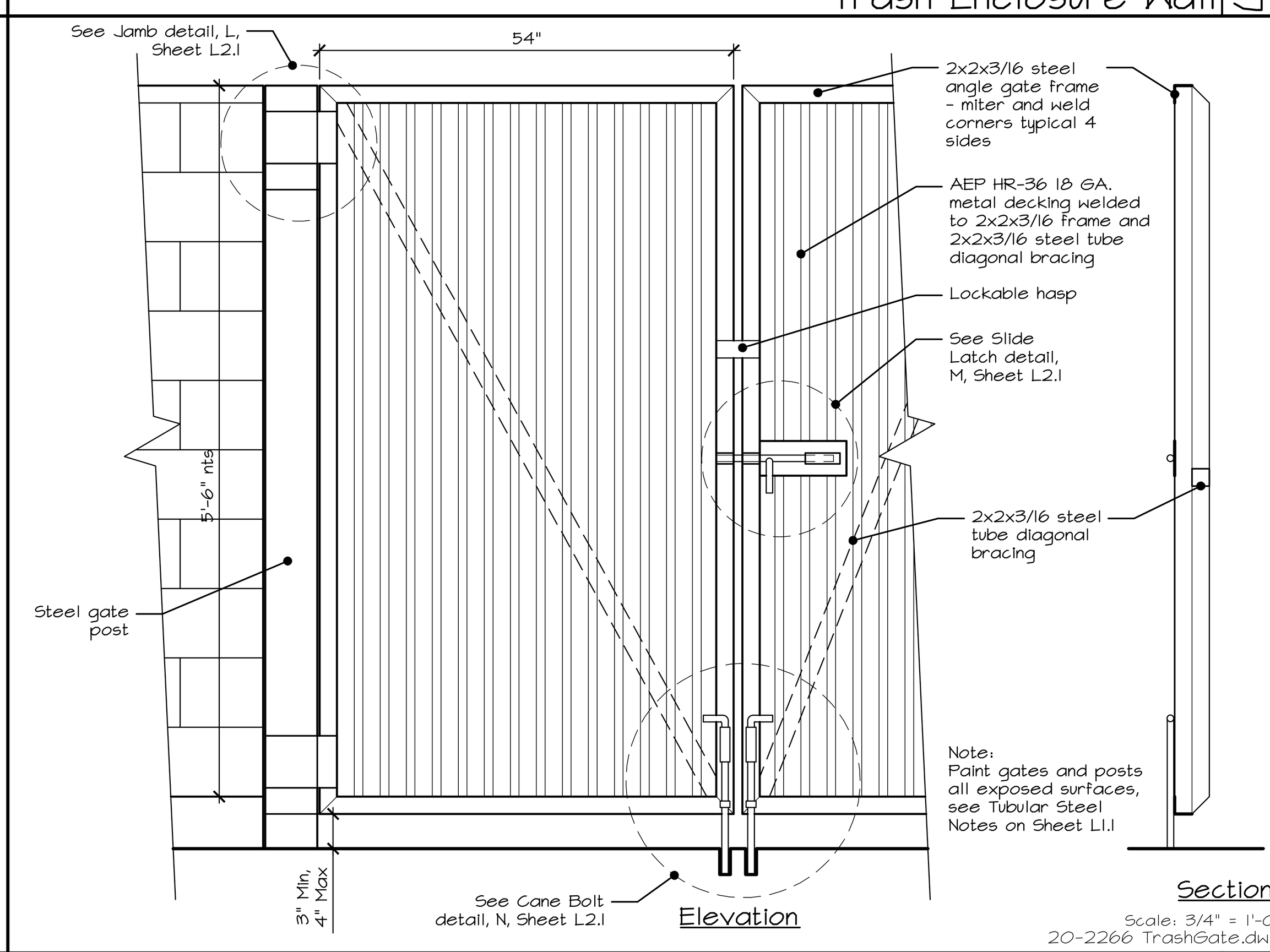
Aggregate Path | F


Concrete paving, finish and joints per construction callouts and plans. Reinforcing and section per Civil Engineer's plans.
1/2" radius on all exposed edges (typ).
Finish grade, 1" below finish of paving at turf, 1-1/2" at planters.
Scarify, prepare, and compact subgrade per recommendations from geotechnical report.
Compacted aggregate base per geotechnical report
Notes:
1. Color, finish, and texture per construction callouts and finish schedule.
2. See Typical Joint Detail for joints.
Scale: 1-1/2" = 1'-0"
20-2266 PedConcrete.dwg

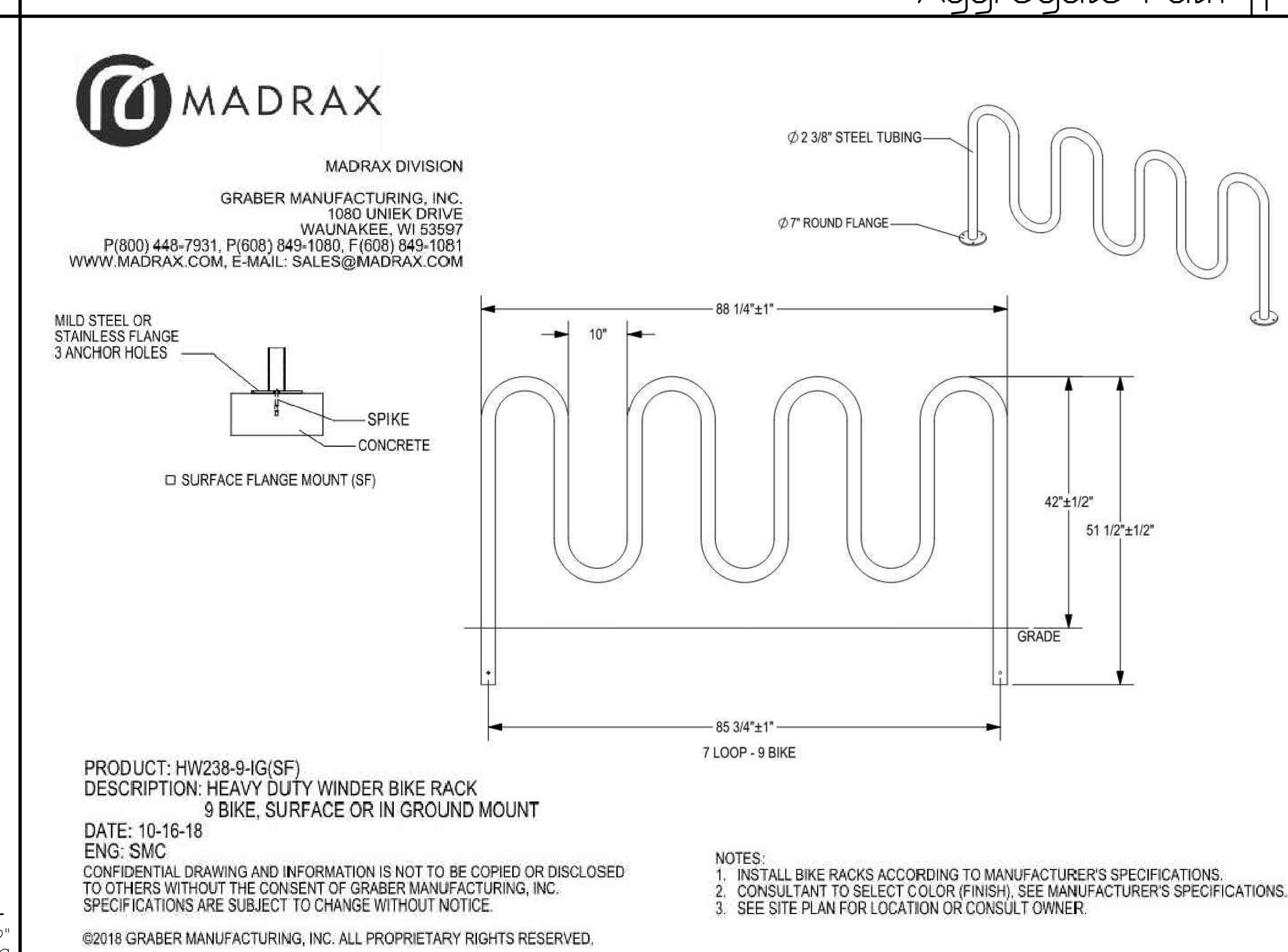
Pedestrian Concrete | B


2" square tube steel posts - equally spaced
± 5'-0" O.C. - equally spaced
2" wide x 3/8" steel bar top rail
2" wide x 3/8" thick steel 'fins' at 3-1/2" o.c.
Private Side
Public Side
Compacted subgrade
Post embedded into footing
12" diameter x 3'-6" deep concrete pier @ 5'-0" o.c.
Scale: 3/4" = 1'-0"
20-2266 LowEntryFence

Low Entry Fence | O


See Jamb detail, L, Sheet L2.1
2x2x3/16 steel angle gate frame - miter and weld corners typical 4 sides
AEP HR-36 18 GA. metal decking welded to 2x2x3/16 frame and 2x2x3/16 steel tube diagonal bracing
Lockable hasp
See Slide Latch detail, M, Sheet L2.1
2x2x3/16 steel tube diagonal bracing
Steel gate post
Note: Paint gates and posts all exposed surfaces, see Tubular Steel Notes on Sheet L1.1
See Cane Bolt detail, N, Sheet L2.1
Elevation
Section
Scale: 3/4" = 1'-0"
20-2266 TrashGate.dwg

Trash Enclosure Gate | K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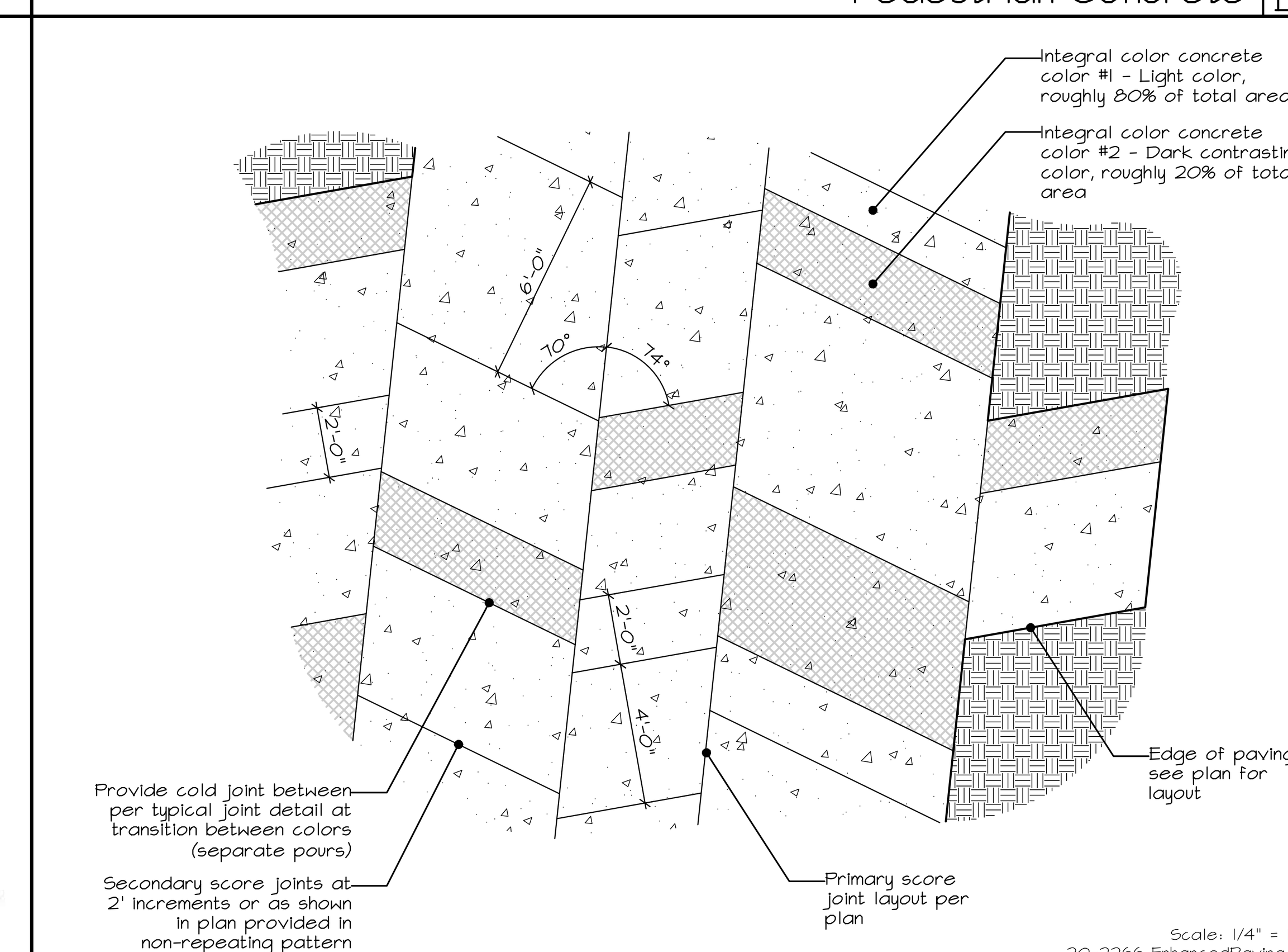
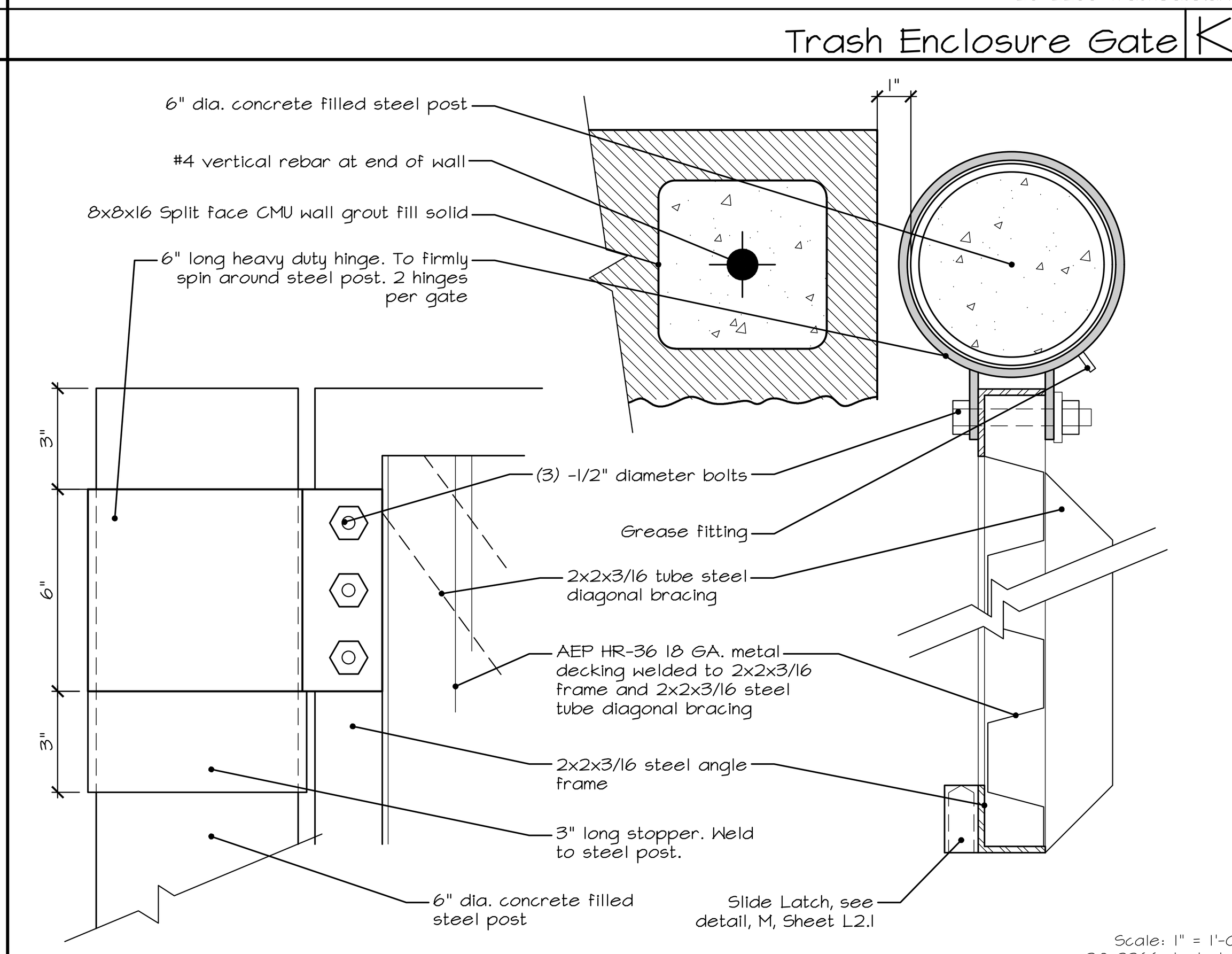
NOTES:
1. INSTALL BIKE RACKS ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
2. CONSULTANT TO SELECT COLOR (FINISH). SEE MANUFACTURER'S SPECIFICATIONS.
3. SEE SITE PLAN FOR LOCATION OR CONSULT OWNER.

Surface Mount Bike Rack | G

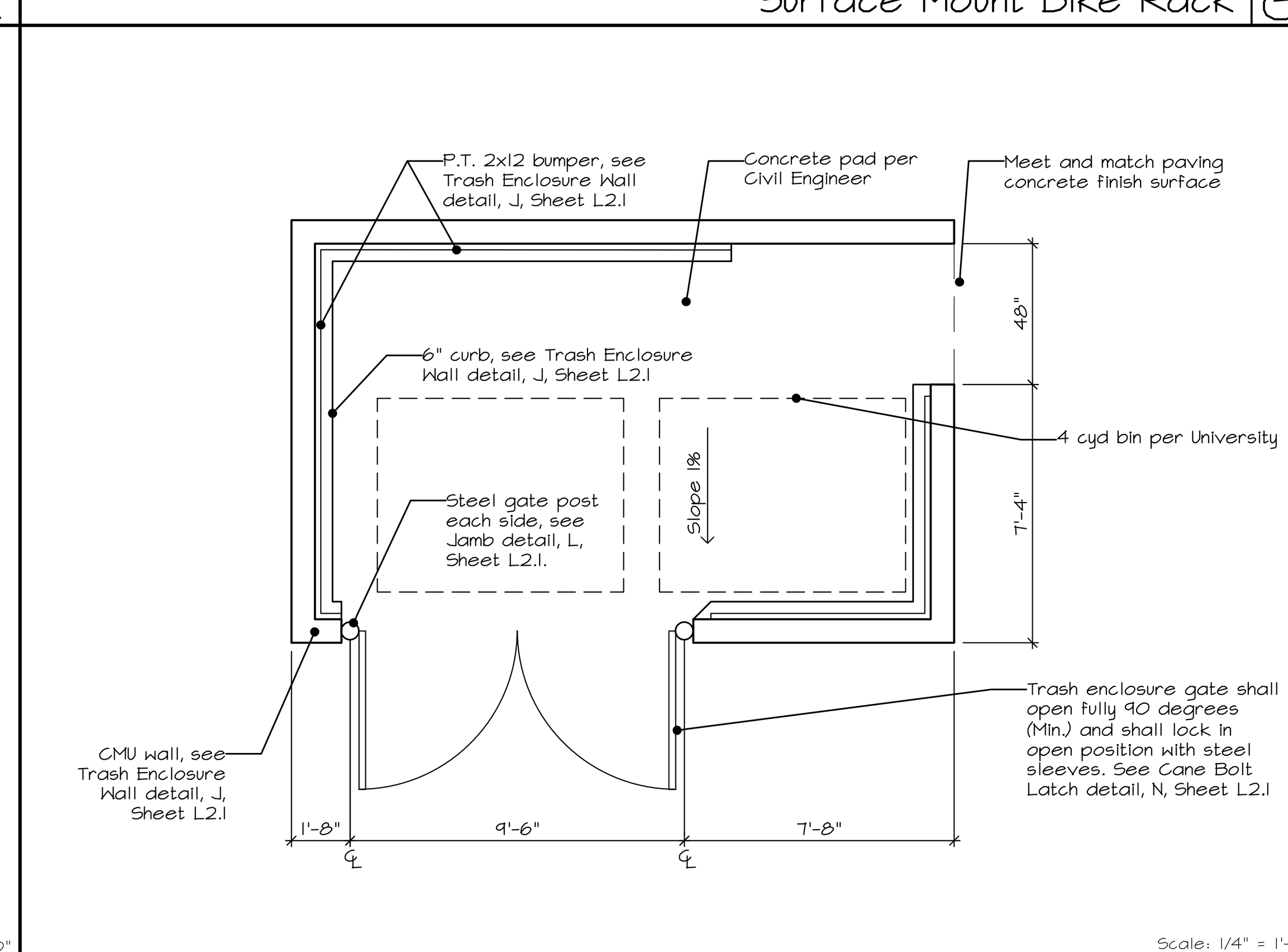

Integral color concrete color #1 - Light color, roughly 80% of total area
Integral color concrete color #2 - Dark contrasting color, roughly 20% of total area
Edge of paving - see plan for layout
Provide cold joint between per typical joint detail at transition between colors (separate pours)
Secondary score joints at 2' increments or as shown in plan provided in non-repeating pattern
Primary score joint layout per plan
Scale: 1/4" = 1'-0"
20-2266 EnhancedPaving.dwg

Enhanced Paving at Entry | C

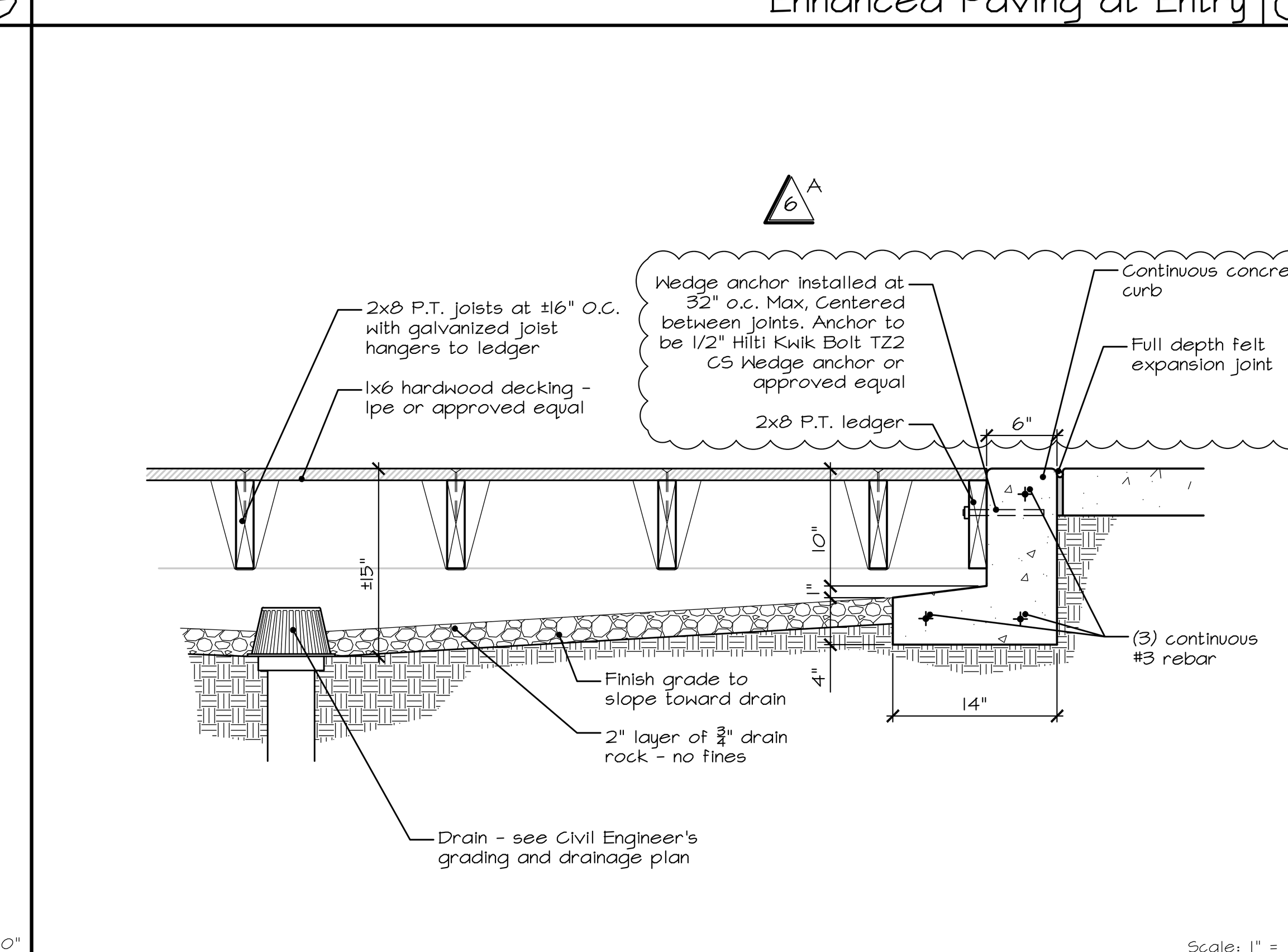
Not Used | P


6" dia. concrete filled steel post
#4 vertical rebar at end of wall
8x8x16 Split face CMU wall grout fill solid
6" long heavy duty hinge. To firmly spin around steel post, 2 hinges per gate
(3) -1/2" diameter bolts
Grease fitting
2x2x3/16 tube steel diagonal bracing
AEP HR-36 18 GA. metal decking welded to 2x2x3/16 frame and 2x2x3/16 steel tube diagonal bracing
2x2x3/16 steel angle frame
3" long stopper. Weld to steel post.
6" dia. concrete filled steel post
Slide Latch, see detail, M, Sheet L2.1
Scale: 1" = 1'-0"
20-2266 Jamb.dwg

Jamb | L


P.T. 2x12 bumper, see Trash Enclosure Wall detail, J, Sheet L2.1
Concrete pad per Civil Engineer
Meet and match paving concrete finish surface
6" curb, see Trash Enclosure Wall detail, J, Sheet L2.1
4 cyd bin per University
Steel gate post each side, see Jamb detail, L, Sheet L2.1
Slope 1%
Trash enclosure gate shall open fully 90 degrees (Min.) and shall lock in open position with steel sleeves. See Cane Bolt Latch detail, N, Sheet L2.1
CMU wall, see Trash Enclosure Wall detail, J, Sheet L2.1
Scale: 1/4" = 1'-0"
20-2266 Trash-PlanRl.dwg

Trash Enclosure - Floor Plan | H


2x8 P.T. joists at 16" O.C. with galvanized joist hangers to ledger
1x6 hardwood decking - Ipe or approved equal
Wedge anchor installed at 32" o.c. Max. Centered between joints. Anchor to be 1/2" Hilti Kwik Bolt TZ2 CS Wedge anchor or approved equal
2x8 P.T. ledger
Continuous concrete curb
Full depth felt expansion joint
(3) continuous #3 rebar
Finish grade to slope toward drain
2" layer of 3/4" drain rock - no fines
Drain - see Civil Engineer's grading and drainage plan
Scale: 1" = 1'-0"
20-2266 AtGradeDeck.dwg

At Grade Wood Deck | D

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ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

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PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
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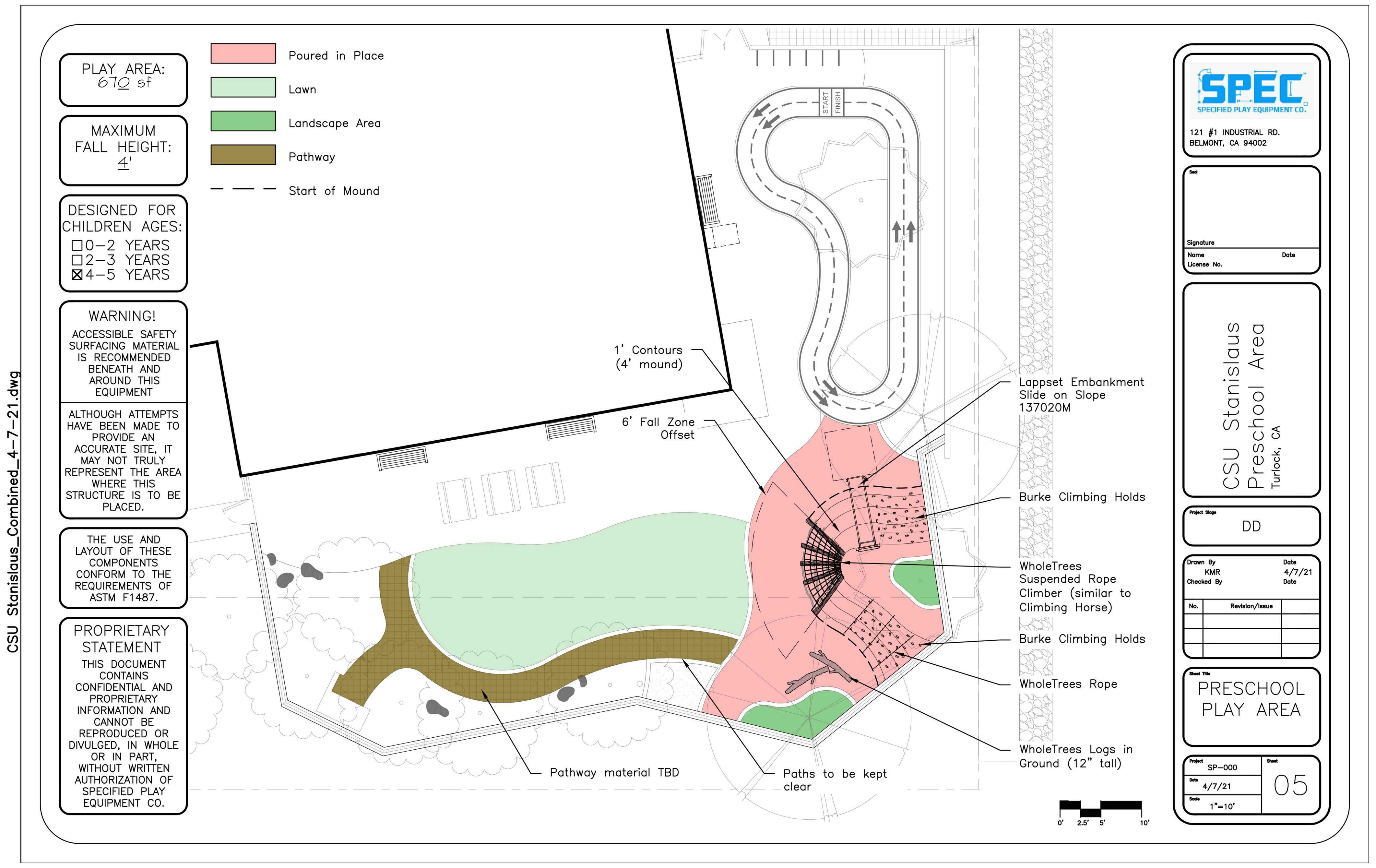
Revisions and Description			Date
6	A	Addendum 6	04.25.2022

Scale
See Details
Drawn by
MBH
EHDD Job Number
KLA 20-2266

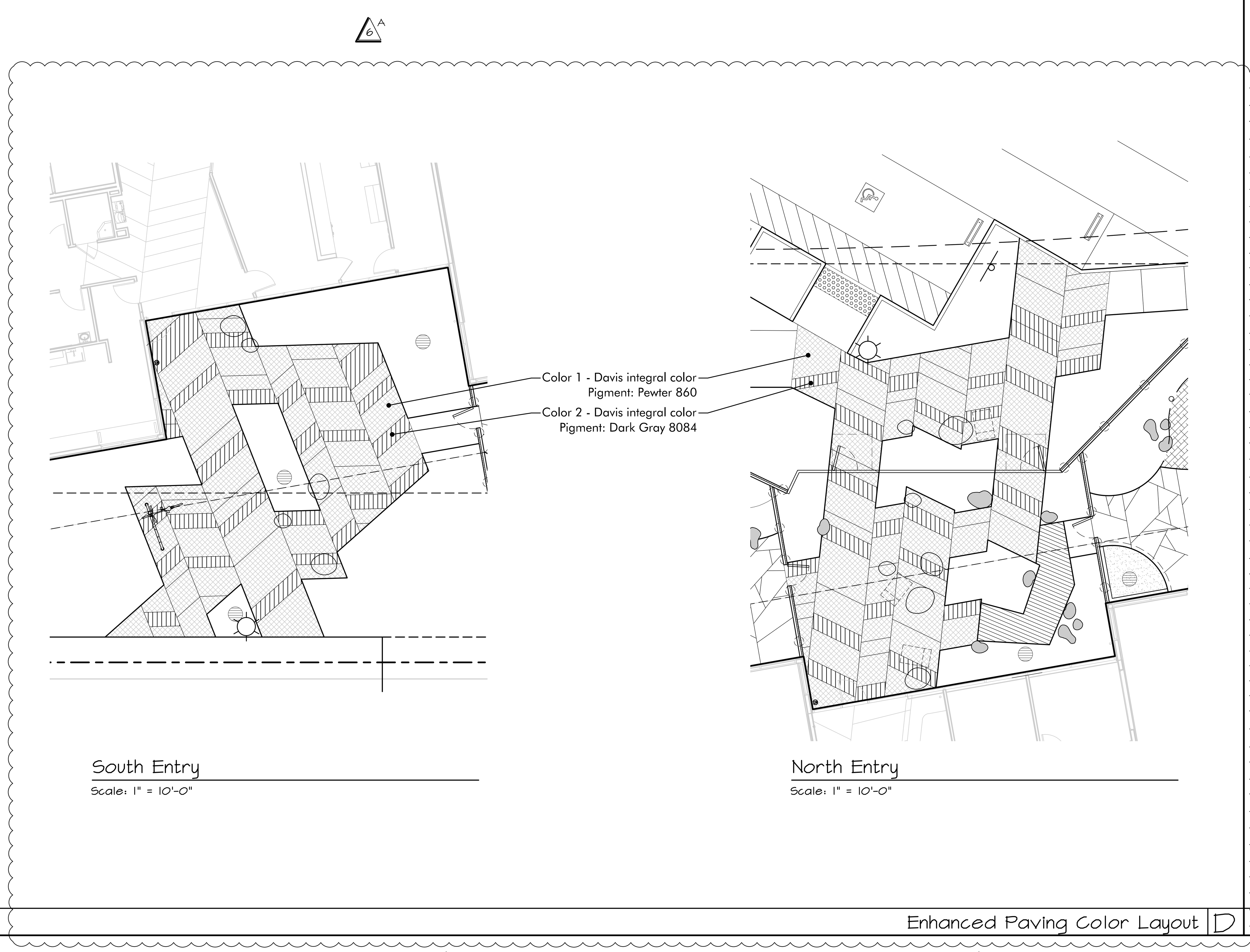
Sheet Title
Construction Details

Sheet Number
L2.1

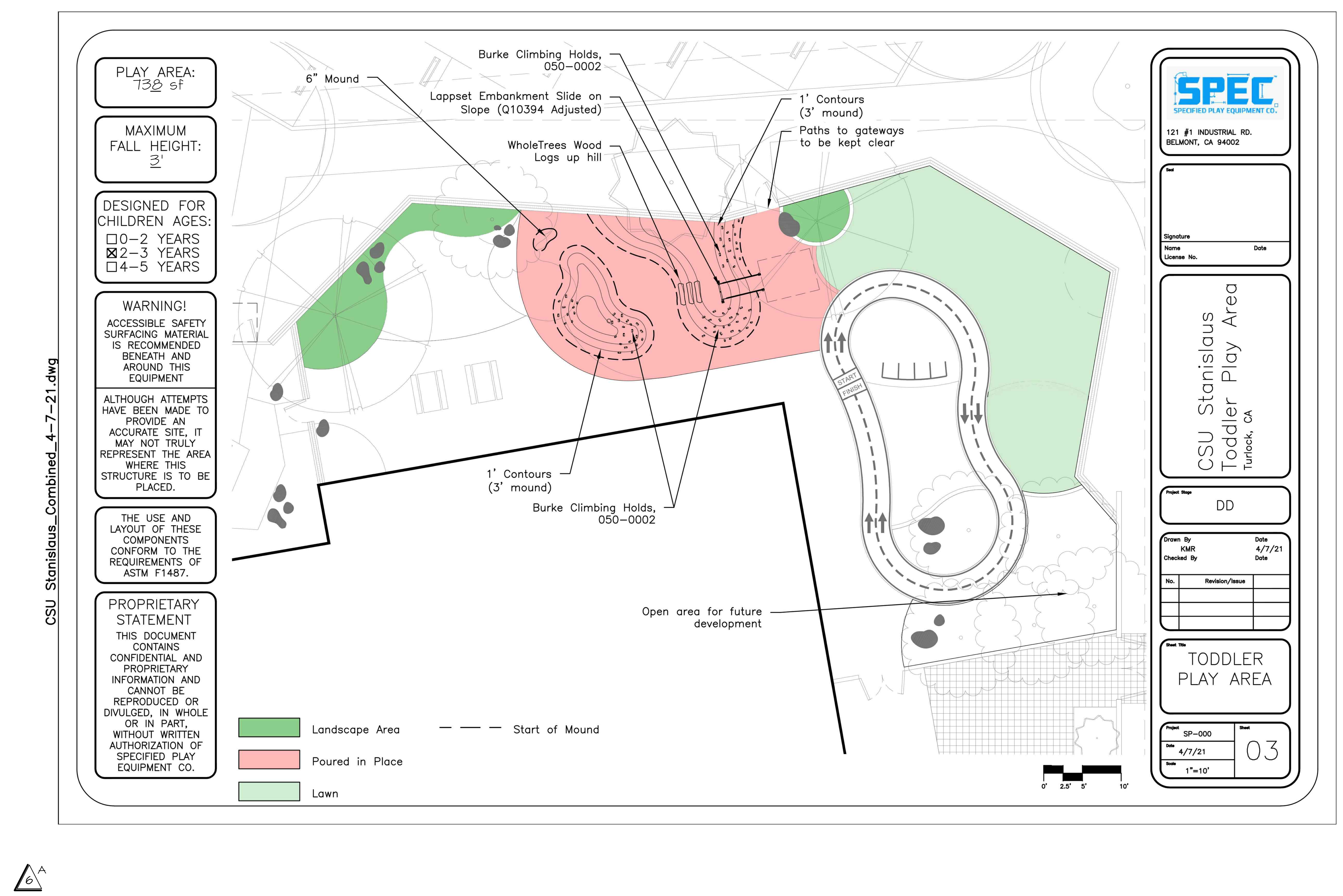


Infant Yard - Play Equipment C

Infant Yard - Play Equipment A



Enhanced Paving Color Layout D



Toddler Yard - Play Equipment B

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THE EMBARCADERO
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6	A	Addendum 6	04.25.2022

Scale
See Details
Drawn by
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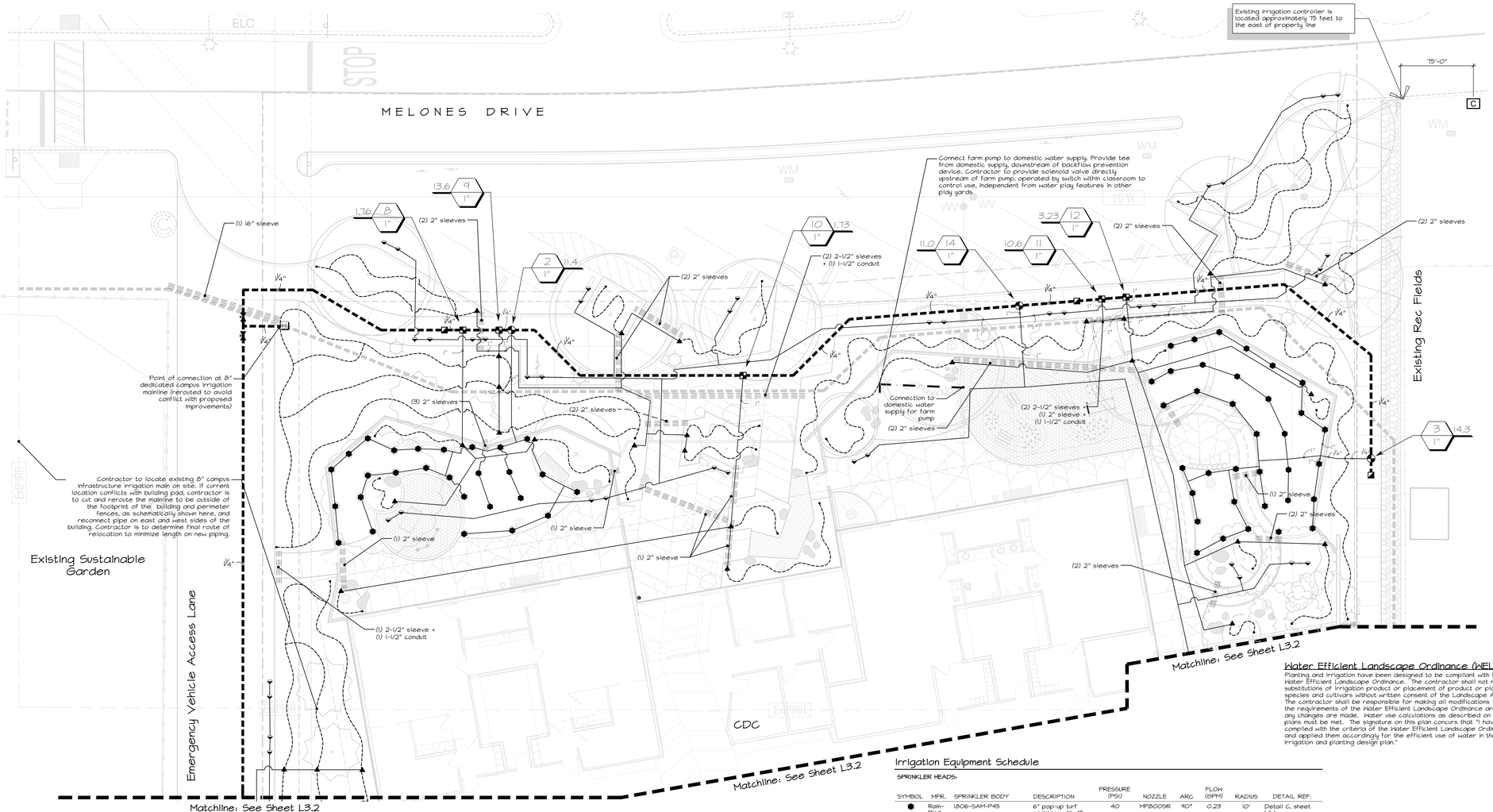
EHDD Job Number
KLA 20-2266

Sheet Title
Construction Details

Sheet Number
L2.5



Any irrigation equipment or piping shown off-site, in paved areas or within building footprint is shown schematically for graphic clarity. All equipment and piping shall be located in planter beds wherever possible and always within the project limits.

Tree bubblers and associated lateral piping is shown schematically for graphic clarity. Bubblers shall be located at the actual tree location and per the details.

All drip tubing shall be buried 3" under the soil unless otherwise noted. Drip tubing placed on the surface under the mulch is not acceptable.

Non-Potable Water Notes

The landscape irrigation system for this project is serviced by non-potable water source. Irrigation Contractor shall adhere to the following requirements regarding the use of non-potable water:

1. Piping. All piping shall be buried to the depths noted in the plans and details. All piping, including lateral and mainlines, shall be identified by the use of integrally colored purple pipe that is specifically manufactured for Non-Potable application.
2. All above ground irrigation facilities shall be purple colored (Pantone #522).
   a. Valve boxes and other at-grade boxes: Integral purple color
   b. Backflow devices: Painted with two coats of purple enamel
   c. Sprinkler heads: Integral purple color
3. All valves and other below grade equipment shall be tagged with permanent waterproof tags (T. Christy Enterprises or approved equal) in both English and Spanish that identify the use of recycled water ("Non-Potable - Do not Drink"). Tags shall be attached with stainless steel wire or plastic zip ties.
4. All irrigation controllers shall have a permanent waterproof warning sign marked with the words "Non-Potable Water - Do Not Drink".
5. Quick coupling valves shall be manufactured specifically for non-potable water use and shall include a permanently attached purple rubber vinyl cover with the words "Non-Potable" printed on the cover.
6. Remote control valves shall be equipped with purple flow-control handles.
7. Spray heads shall be equipped with purple covers.
9. Irrigation system shall be installed per all local and CBC codes and regulations regarding the use of non-potable water. Codes shall take precedence over these plans, notes, and specifications.

Sleeving Notes

1. All mainline piping and control wires under paving shall be installed in separate sleeves. Sleeves to be 4" minimum size and shall be installed at the size as indicated on the plans. If not specified, piping shall be installed in sleeves that are twice the diameter of the pipe.
2. The sleeves shown on this plan are based on mainline and lateral line routing as anticipated by the landscape architect. Irrigation contractor shall verify that sleeve locations and quantities are sufficient based on actual routing prior to installation.
3. All irrigation wires under pavement shall be sleeved in separate Schedule 40 PVC gray electrical conduits.
4. One extra (empty) sleeve shall be provided at all driveway and street crossings in the event of sleeve failure. Extra sleeve shall match the size of the largest sleeve in the grouping.
5. Sleeving sizes and quantities shown are the minimum sizes required. Contractor may install larger sleeves at their discretion.
6. For ease of irrigation system installation, it is highly recommended that all piping that occurs inside of the sleeves be installed concurrently with the sleeves.

General Irrigation Notes

1. The Irrigation Contractor shall examine the site to verify that there are no discrepancies between the site conditions and the plans prior to commencement of any work. In the event that any discrepancies are discovered, the Irrigation Contractor shall notify the Landscape Architect or Owner immediately to obtain a directive. Failure to report any such discrepancies without a directive from the Landscape Architect or Owner implies that the Irrigation Contractor has accepted the site as-is and that any changes deemed necessary will be at the sole cost of the Irrigation Contractor.
2. The irrigation system is being supplied by a non-potable water source. Refer to Non-Potable Water Notes and adhere to all details requiring the use of non-potable irrigation equipment.
3. Any irrigation piping or equipment shown in paved areas, within building footprints or off-site is shown schematically for graphic clarity. All piping and equipment shall always be located within the site boundaries and within landscape areas wherever possible.
4. See Sleeving Notes for requirements for irrigation sleeving.
5. All valves shall be grouped in planter beds wherever possible (not in turf areas or decomposed granite areas).
6. All piping shall be installed per the sizes shown on the plans. The sizes shown are the minimum sizes required; larger pipe may be substituted at the Irrigation Contractor's discretion and expense. PVC piping shall be minimum 1" size.
7. Connections between the automatic controllers and the electric control valves shall be made with #14-1 AWG UF 600-volt direct-burial wire. Pilot wires shall be red. Common wires shall be white. Irrigation Contractor shall run spare wires along the entire length of the mainline, looped into each valve box and terminated into the controller cabinet. Spare wires shall be blue. See irrigation specs for quantity.
8. Control valve wiring shall occupy the same trench as the mainline wherever possible. Any wire not installed in the mainline trench shall be installed in Schedule 40 gray PVC conduit.
9. Electrical service, meter and all associated line voltage connections for irrigation controllers, booster pumps and any other equipment requiring power shall be provided by the Electrical Contractor.
10. Irrigation Contractor shall verify the proposed controller location with Owner or General Contractor prior to installation of controller or any associated wiring or conduits.
11. The irrigation system has been designed to operate at a minimum static pressure of 55 PSI at 16 GPM at the point of connection. Irrigation Contractor shall verify pressure prior to commencing with any work and shall notify the Landscape Architect immediately of any discrepancies.
12. Where applicable, all irrigation heads shall be set perpendicular to finish grade unless otherwise specified.
13. All irrigation equipment shall be installed per the manufacturer's specifications. Irrigation Contractor shall notify the Landscape Architect immediately in the event there are any discrepancies between the plans and the manufacturer's specifications.
14. All drip tubing shall be installed 3" below grade. Emitters to be located 3" to 6" from the trunk of shrubs and equipped with a bug guard and galvanized tie-down stake.
15. Weather sensor shall be installed on an exposed wall or soffit adjacent to the controller in a location that will receive unimpeded rainfall. Weather sensor shall also be installed in a location where the device is not susceptible to theft or vandalism.
16. Prior to turnover of project, the irrigation contractor shall flush and adjust all irrigation heads and valves for optimum coverage with minimal over spray onto hardscape elements.
17. Irrigation Contractor shall submit an Irrigation Audit Report with the Certificate of Completion to the governing agency that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity (if applicable), reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule. Irrigation Audit shall be conducted by a Certified Landscape Irrigation Auditor.

Irrigation Equipment Schedule

SPRINKLER HEADS:

SYMBOL	MFR.	SPRINKLER BODY	DESCRIPTION	PRESSURE (PSI)	NOZZLE	ARC	FLOW (GPM)	RADIUS	DETAIL REF.
⬢	Rain-Bird	1806-SAM-P45	6" pop-up turf sprinkler with 45 PSI regulator	40	MP8005R	90°	0.23	10'	Detail G, sheet L6.1
⬢					MP8005R	180°	0.42	10'	
⬢					MP8005R	210°	0.43	10'	
⬢					MP8005R	360°	0.78	10'	

SHRUB AREA DRIP SYSTEM COMPONENTS:

SYMBOL	MANUFACTURER	MODEL NO.	DESCRIPTION	DETAIL REFERENCE
~~	RainBird		XT-700 5/8" (0.700" O.D.) polyethylene commercial-grade drip supply tubing with Xeri-Bug barbed point-source emitters, per the following schedule: 1-gallon shrubs (1) XB-20 (2 GPH) emitter 2 and 5-gallon shrubs (2) XB-20 (2 GPH) emitters 15-gallon shrubs (3) XB-20 (2 GPH) emitters 15-gallon trees (4) XB-20 (2 GPH) emitters 24" box trees (6) XB-20 (2 GPH) emitters 36" box trees (8) XB-20 (2 GPH) emitters	Details A-C, sheet L6.1
▲	Approved		Drip supply tubing to PVC connection	Detail A, sheet L6.1
●	NDS	CEP-700	Compression flush cap in 6" round purple valve box with Hunter ECO-ID pop-up drip system operation indicator	Detail C, sheet L6.1
~~			Indicates separation between drip zones	

TREE IRRIGATION:

SYMBOL	MANUFACTURER	MODEL NO.	DESCRIPTION	DETAIL REFERENCE
▾▾	RainBird	RWS-M-B-C-1401 & 1401	0.25 GPM root zone watering system with RWS-GRATE-P purple grate (one per tree) and 0.25 GPM supplemental surface bubbler on PVC IPS flex riser (one per tree)	Detail J, sheet L6.1

VALVES:

SYMBOL	MANUFACTURER	MODEL NO.	DESCRIPTION	DETAIL REFERENCE
◪	RainBird	XCZ-100-PRBR	1" drip control zone kit with scrubber valve and 200 mesh pressure-regulating basket filter	Detail K, sheet L6.1
◔	RainBird	100-PESB-R	1" remote control scrubber valve	Detail L, sheet L6.1
◪	RainBird	33-DNP	3/4" quick coupler valve with purple locking rubber cover	Detail M, sheet L6.1
⋈	Nibco	T-113	Threaded bronze gate valve (line size)	Detail N, sheet L6.1
⊛	Buckner/Superior	B401	3/4" garden valve at vegetable garden planters	Detail O, Sheet L6.1

P.O.C. EQUIPMENT:

SYMBOL	MANUFACTURER	MODEL NO.	DESCRIPTION	DETAIL REFERENCE
POC	N/A	N/A	Point of connection at existing 8" irrigation mainline	

CONTROL EQUIPMENT:

SYMBOL	MANUFACTURER	MODEL NO.	DESCRIPTION	DETAIL REFERENCE
C	RainMaster (Existing)	DX2 Evolution	Existing controller with 24 available stations. Contractor to connect all new control valves to existing controller.	

PIPING:

SYMBOL	MANUFACTURER	DESCRIPTION	DETAIL REFERENCE
— — —	Approved	Schedule 40 Purple pressurized PVC mainline - schematic location (size per plan)	Detail P, sheet L6.1
———	Approved	Schedule 40 Purple PVC lateral line (size per plan - 1" minimum size)	Detail P, sheet L6.1
⋯⋯	Approved	Schedule 40 PVC sleeve (size and quantity per plan)	Detail Q, sheet L6.1
— · —	Approved	3/4" PVC SCH 40 Potable water supply line from domestic service provided on Civil Engineers plans to service water play fixtures in play yards and hose bibs at vegetable gardens	Detail P, sheet L6.1

IRRIGATING WITH RECYCLED WATER DO NOT DRINK

NO BEBER AGUA PROCESADA PARA SISTEMA DE RIEGO

NORTH
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0 5' 10' 20'

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Dial 811 or 800-227-2600

Water Efficient Landscape Ordinance (WELO)

Planting and Irrigation have been designed to be compliant with the Water Efficient Landscape Ordinance. The contractor shall not make substitutions of irrigation product or placement of product or plant species and cultivars without written consent of the Landscape Architect. The contractor shall be responsible for making all modifications to ensure the requirements of the Water Efficient Landscape Ordinance are met if any changes are made. Water use calculations as described on these plans must be met. The signature on this plan concurs that "I have complied with the criteria of the Water Efficient Landscape Ordinance and applied them accordingly for the efficient use of water in the irrigation and planting design plan."

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CSUS CHILD DEVELOPMENT CENTER

CALIFORNIA STATE UNIVERSITY, STANISLAUS
ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

ehdd.

PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

KLA LANDSCAPE ARCHITECTURE PLANNING
KLA, Inc.
151 N. North St.
Sonora Ca. 95370
(209)532-2856
www.kla-ca.com

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6	A	Addendum 6	04.25.2022

Scale
1" = 10'-0"
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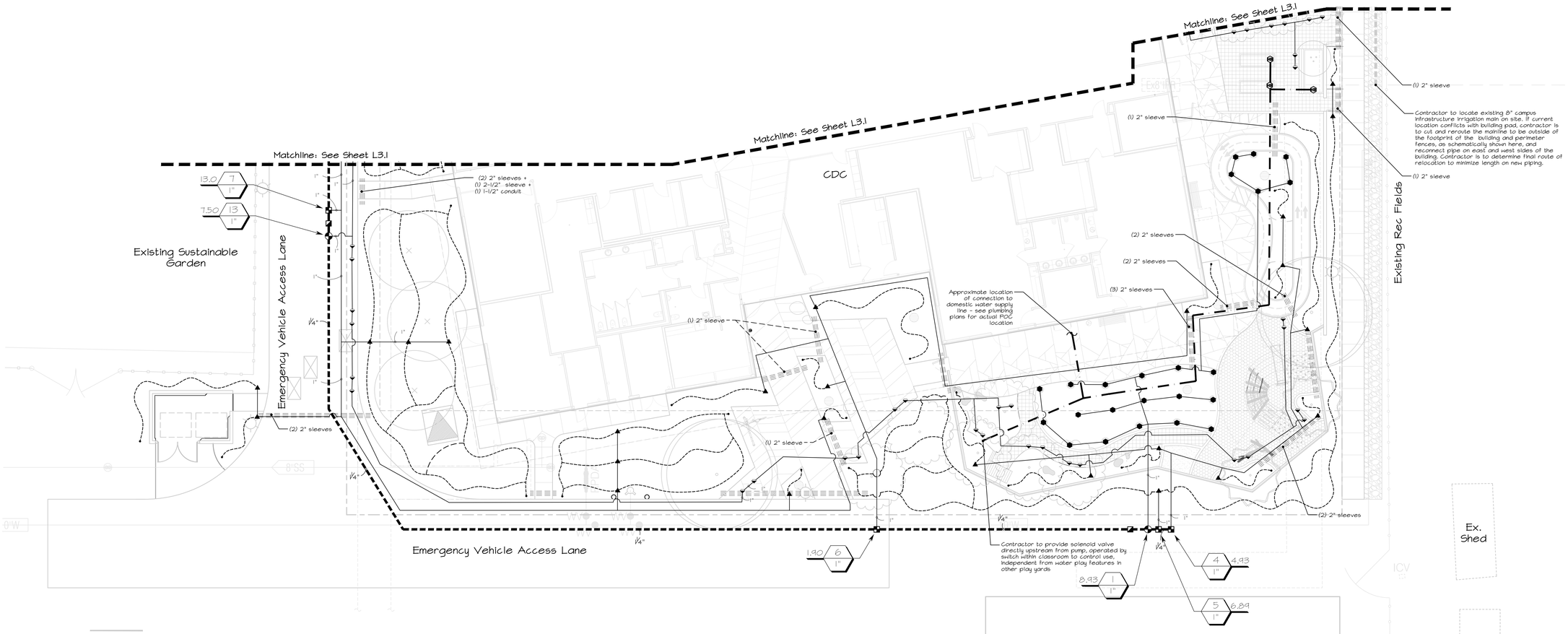
MBH
EHDD Job Number
KLA 20-2266

Sheet Title
Irrigation Plan

Sheet Number
L3.1



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▲	Approved		Drip supply tubing to PVC connection	Detail A, sheet L6.1
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6 A	Approved	3/4" PVC SCH 40 POtable water supply line from domestic service provided on Civil Engineers plans to service water play fixtures in play yards and hose bibs at vegetable gardens	Detail P, sheet L6.1

For General Irrigation Notes, see Sheet L3.1

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PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

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KLA LANDSCAPE ARCHITECTURE PLANNING
KLA, Inc.
151 N. Norlin St.,
Sonora Ca. 95370
(209)532-2856
www.kla-ca.com

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LICENSED LANDSCAPE ARCHITECT
CHRISTOPHER S. HARVEY
03.31.2023
Renewal Date
12.06.2021
Date
STATE OF CALIFORNIA

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Sheet Title
Irrigation Plan

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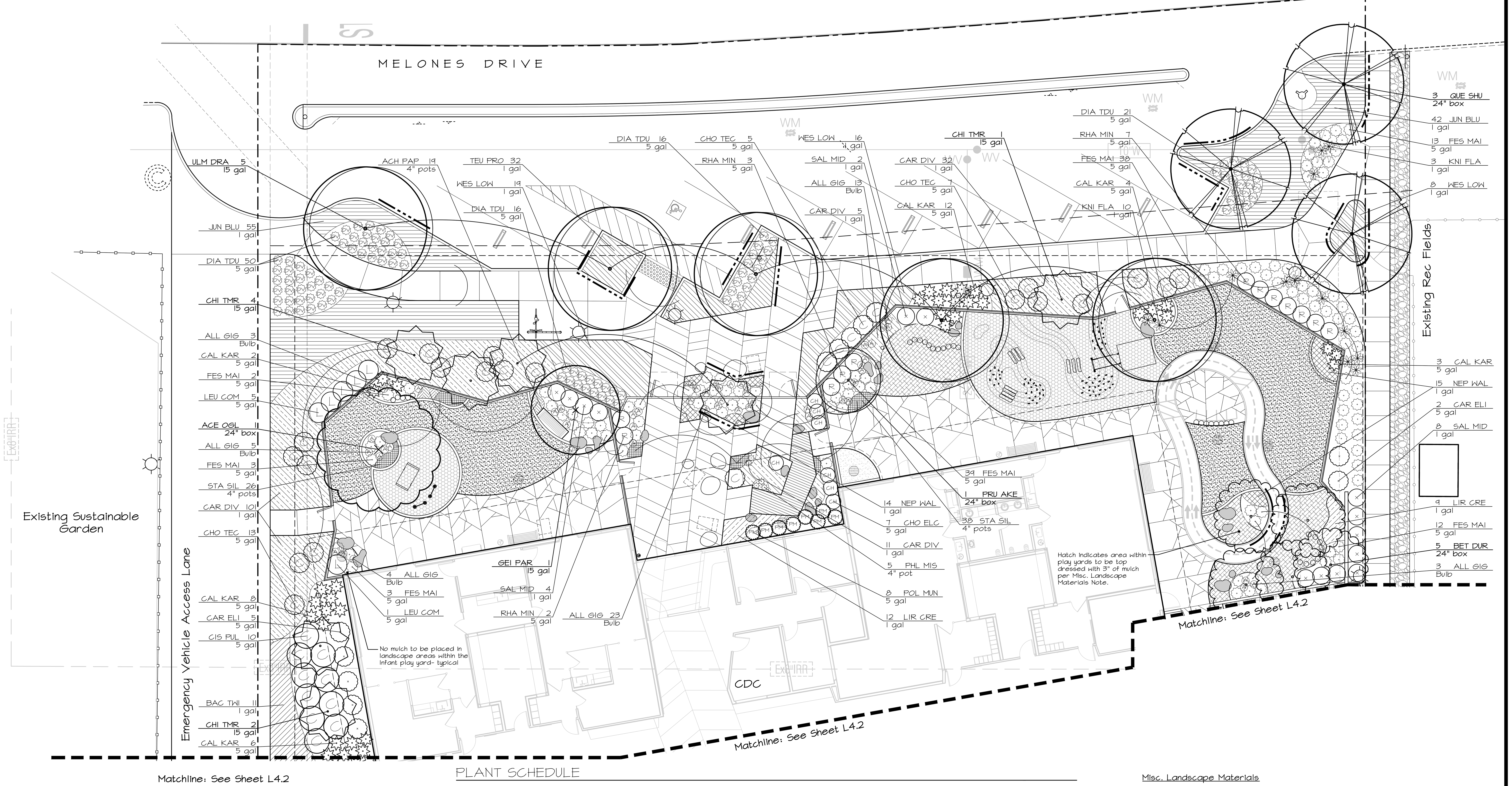

Matchline: See Sheet L4.2

General Planting Notes

1. The contractor shall examine the conditions of the site prior to commencement of work. Any conditions that differ from what is shown on the plans that will affect the installation process shall be brought to the attention of the Owner or Land. Arch. prior to work. Commencement of work implies acceptance of the conditions of the site.

2. The contractor shall verify all plant quantities prior to installation. Plant quantities are listed for the convenience of the contractor, number of symbols and groundcover spacing shall have priority over quantity given.

3. The contractor shall be responsible for the purchasing of all material to meet the specifications of the plans including plants, soil, fertilizer, stakes, and sod. The contractor shall also be responsible for the protection of these materials until the project has been completely turned over to the owner.

4. All plant material shall be subject to approval or rejection by the Landscape Architect or Owner's Representative prior to installation. Installed and then rejected material shall be replaced by the contractor at his/her expense.

6 A

5. The contractor shall include in the bid for a continued maintenance period of ninety (90) days after completion and acceptance of the project by the Owner or Owner's Rep.

6. Trees to be planted a min. of 3'-0" from edge of paving or walls (unless otherwise stated on plan). All trees in a formal group or in a row shall be matching in size and shape.

7. All trees provided in the Planting Schedule/Legend are to be installed as single "Standard Form" trees unless specifically otherwise noted in the Planting Schedule/Legend. "Multi-Trunk" and "Low-Branching" trees delivered to the site will not be accepted unless specifically noted to be installed as such.

8. All vines shall be installed with the nursery stakes removed and runners espaliered to the adjacent wall.

9. The following soil amendments specified are for bidding purposes only. The Landscape Contractor shall provide for a Soil Agronomy Report from an approved soils laboratory and/or any additional specifications provided by the Land. Arch. prior to installation of the plant material. The following amendments shall be incorporated into all planting pits and broadcast into soil to depth of 12" by means of a rototiller or equal per 1000 square feet.
   - 4 cyds nitrogen stabilized organic amendment derived from redwood sawdust, fir sawdust or cedar sawdust.
   - 15 lbs. soil sulfur
   - 15 lbs. 15-15-15 fertilizer

10. All soil preparation shall be installed per the soil agronomy report to be provided and paid for by the Landscape Contractor. The report is to be immediately forwarded to the Land. Arch. upon completion.

11. A nitrogen stabilized commercial-grade mulch with maximum 3/4" dia. chip size shall be uniformly broadcast over all shrub areas (not turf) to a depth as specified on the Planting Legend.

12. The planting pits for trees shall be excavated per the detail on the Landscape Details sheet. The backfill mix for use in all tree and shrub pits shall consist of the following:
   - 6 parts 'on-site' soil
   - 4 parts organic amendment (above)
   - 1 lb./yd. of mix 12-12-12 commercial fertilizer
   - 2 lbs./cu. yd. of mix Iron Sulfate
   - 10 lbs./cu. yd. of mix Agricultural Gypsum

13. Fertilizer tablets shall be BEST, 21 gram fertilizer tablets (20-10-5) placed in all planting pits in quantities as follows:

1 gallon	1 tablet
5 gallon	3 tablets
15 gallon	9 tablets
24"-Box	9 tablets
36"-Box	15 tablets

14. All annual color is to be blooming and locally available and adapted to the area. Plant from 4" pot size with plants touching (approx. 8" O.C.). Species to be placed in masses (min. 18" width) according to the color and height of the species.

15. Thirty (30) days after installation all landscape shall be fertilized with 16-6-8 Fertilizer applied at the rate of 6 lbs./1000 sf. Fertilizer application shall be continued thereafter at bi-monthly intervals.

16. For weed control prior to planting, the Landscape Contractor shall thoroughly irrigate the site to promote germination of weed seeds that may be in the soil. After germination has taken place spray the site with Round-Up (or equal) in the amount, and let sit for the time specified by the manufacturer. Reapply Round-Up if needed. After all green weeds have been eradicated, apply Ronstar-G (or equal) Pre-Emergent weed control in the amounts specified by the manufacturer.

17. All plant material to be nursery grown in similar climate. All plant material shall be vigorous and of normal habit of growth and shall be free of girdling roots, sun scald, abrasions, disease, insects, insect eggs and larvae. Plants shall equal or exceed the standards as outlined by the American Standards for Nursery Stock and to applicable California Agriculture Code.

PLANT SCHEDULE

TREES	BOTANICAL NAME	COMMON NAME	CONT		QTY	Water Use
ACE OGL	Acer rubrum 'October Glory'	October Glory Red Maple	24" box		1	Medium
BET DUR	Betula nigra 'BNMTF' TM	Dura Heat River Birch	24" box		11	Medium
CER OKL	Cercis canadensis texensis 'Oklahoma'	Oklahoma Texas Redbud	24" box		2	Medium
CHI TMR	Chilopsis linearis 'Timeless Beauty'	Desert Willow	15 gal		7	Low
CIT XCL	Citrus x clementina	Clementine Orange	15 gal		1	Medium
GEI PAR	Geijera parviflora	Australian Willow	15 gal		4	Medium
PRU AKE	Prunus x yedoensis 'Akebono'	Akebono Yoshino Cherry	24" box		1	Medium
QUE SHU	Quercus shumardii	Shumard Oak	24" box		3	Medium
ULM DRA	Ulmus parvifolia 'Drake'	Drake Lacebark Elm	15 gal		7	Medium
SHRUBS	**BOTANICAL NAME**	**COMMON NAME**	**SIZE**		**QTY**	**Water Use**
ALL GIG	Allium giganteum	Giant Allium	Bulb		71	Low
CAL KAR	Calamagrostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	5 gal		103	Low
CAL LJN	Callistemon viminalis 'Little John'	Little John Weeping Bottlebrush	5 gal		8	Low
CAR ELI	Carpenteria californica 'Elizabeth'	Elizabeth Bush Anemone	5 gal		37	Low
CHO TEC	Chondropetalum tectorum	Small Cape Rush	5 gal		32	Low
CHO ELC	Chondropetalum tectorum 'El Campo'	El Campo Small Cape Rush	5 gal		27	Low
CIS PUL	Cistus x pulverulentus 'Sunset'	Sunset Rockrose	5 gal		20	Low
DIA TDU	Dianella revoluta 'Little Rev'	Dianella	5 gal		103	Low
FES MAI	Festuca mairei	Atlas Fescue	5 gal		171	Low
KNI FLA	Kniphofia uvaria 'Flamenco'	Flamenco Red Hot Poker	1 gal		16	Low
LEU COM	Leucophyllum frutescens 'Compacta'	Compact Texas Ranger	5 gal		8	Low
PHL MIS	Phlox maculata 'Miss Lingard'	Miss Lingard Meadow Phlox	4" pot		5	Low
POL MUN	Polystichum munitum	Western Sword Fern	5 gal		8	Low
RHA MIN	Rhaphiolepis umbellata 'Minor'	Yedda Hawthorn	5 gal		27	Low
SAL MID	Salvia leucantha 'Midnight'	Mexican Bush Sage	1 gal		32	Low
VINES	**BOTANICAL NAME**	**COMMON NAME**	**SIZE**		**QTY**	**Water Use**
FIC PUM	Ficus pumila	Creeping Fig	5 gal		7	Medium
GROUND COVERS	**BOTANICAL NAME**	**COMMON NAME**	**CONT**	**SPACING**	**QTY**	**Water Use**
ACH PAP	Achillea millefolium 'Paprika'	Paprika Common Yarrow	4" pots	12" o.c.	41 sf	Low
BAC TWI	Baccharis pilularis 'Twin Peaks#2'	Twin Peaks #2 Coyote Brush	1 gal	48" o.c.	1,313 sf	Low
CAR DIV	Carex divulsa	European Grey Sedge	1 gal	36" o.c.	1,926 sf	Low
JUN BLU	Juniperus conferta 'Blue Pacific'	Blue Pacific Shore Juniper	1 gal	42" o.c.	1,236 sf	Low
LIR CRE	Liriope spicata	Creeping Lilyturf	1 gal	24" o.c.	208 sf	Medium
NEP WAL	Nepeta x faassenii 'Walkers Low'	Walkers Low Catmint	1 gal	20" o.c.	99 sf	Low
STA SIL	Stachys byzantina 'Silver Carpet'	Silver Carpet Lamb's Ears	4" pots	12" o.c.	68 sf	Low
TEU PRO	Teucrium chamaedrys 'Prostratum'	Prostrate Germander	1 gal	30" o.c.	260 sf	Low
WES LOW	Westringia fruticosa 'Low Horizon'	Low Horizon Coast Rosemary	1 gal	36" o.c.	561 sf	Low
TURF	**BOTANICAL NAME**	**COMMON NAME**	**CONT**	**SPACING**	**QTY**	**Water Use**
TUR BOL	Turf Sod Bolero Plus	Fescue blend	Sod		2,100 sf	Medium

Misc. Landscape Materials

All shrub and groundcover areas shall be top-dressed with a 3" layer of mulch derived from recycled wood chips or arbor chips from tree trimming. Mulch shall be 2" minus in length and not greater than 3/8" in thickness, and shall be dark brown in color. Contractor shall provide sample for approval prior to installation. Shredded redwood or cedar bark ("Gorilla-Hair") is not acceptable.

Boulders — Varied size (12"-48") moss rock boulders placed in loose random groups to appear as natural rock outcroppings. Boulders to be approved by Landscape Architect prior to installation. Install per Detail W on Sheet L6.1.

Bark Mulch Only Area — Bark mulch only areas to receive mulch treatment per Misc. Landscape materials note above.

Tree Root Barriers

All trees denoted with the root barrier symbol and/or within five (5) feet of hardscape are to have DeepRoot Model #UB 18-2 root barriers installed along the inside edge of the adjacent sidewalk or curb. Length of linear root barrier shall be 16 linear feet (8 panels) and shall be centered on tree.

Root Solutions RS-18 may be used as an alternate. Use the same quantities per tree sizes as listed above. 1(800)554-0914

See detail V, sheet L6.1

Planting Detail References

For Trees, refer to Detail R, sheet L6.1
For Shrubs, refer to Detail S, Sheet L6.1
For Groundcovers, refer to Detail T, Sheet L6.1 for layout and Detail S, Sheet L6.1 for installation

Note:

Contractor to include in the bid (as separate line item) for the purchase and installation of the following plant quantities. Plants will be selected by Landscape Architect and installed by contractor after substantial completion of the landscape planting. Plant species will be commonly available nursery stock. These plants are in addition to the symbols shown on the plans.

- 10 - 15 Gallon Shrubs
- 50 - 5 Gallon Shrubs
- 75 - 1 Gallon Shrubs

Water Efficient Landscape Ordinance (WELO)

Planting and Irrigation have been designed to be compliant with the Water Efficient Landscape Ordinance. The contractor shall not make substitutions of irrigation product or placement of product or plant species and cultivars without written consent of the Landscape Architect. The contractor shall be responsible for making all modifications to ensure the requirements of the Water Efficient Landscape Ordinance are met if any changes are made. Water use calculations as described on these plans must be met. The signature on this plan concurs that "I have complied with the criteria of the Water Efficient Landscape Ordinance and applied them accordingly for the efficient use of water in the irrigation and planting design plan."

NORTH
Scale: 1" = 10'-0"
0' 5' 10' 20'

811 Know what's below. Call before you dig.
Dial 811 or 800-227-2600

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PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

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Sonora Ca. 95370
(209)532-2856
LANDSCAPE ARCHITECTURE PLANNING
www.kla-ca.com

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LICENSED LANDSCAPE ARCHITECT
Signature
03.31.2023
Renewal Date
12.06.2021
Date
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Scale
1" = 10'-0"

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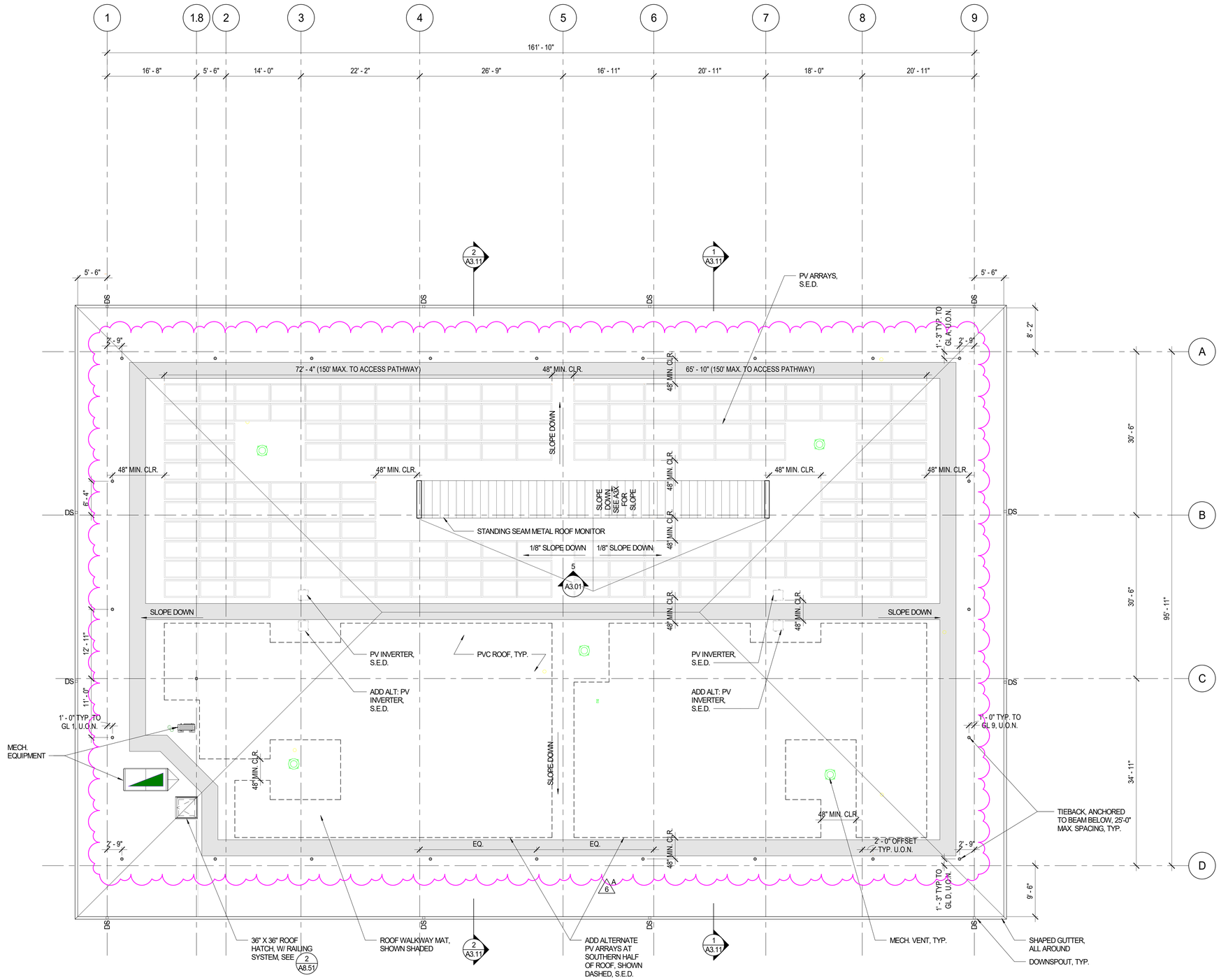
MBH

EHDD Job Number
KLA 20-2266

Sheet Title
Planting Plan

Sheet Number
L4.1



1 A2.02 ROOF PLAN
SCALE: 1/8" = 1'-0"

10.0° TO TRUE NORTH

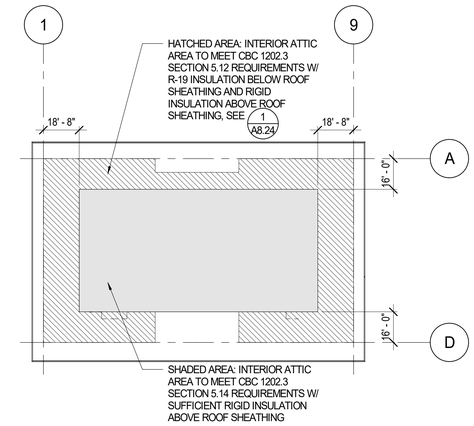
8' 0' 8' 16'

ROOF PLAN SHEET NOTES

1. ROOF SLOPE TO BE 1/4" / FT, U.O.N.
2. SEE A8.51 FOR TYPICAL ROOF DETAILS
3. SEE ELECTRICAL DRAWINGS FOR PV SIZING, SCOPE AND ADDITIONAL INFO

ROOF PLAN LEGEND

○ DS	DOWNSPOUT
⊙	ROOF TIEBACK, SEE 10/A8.51 FOR WATERPROOFING, SEE S6.15 FOR ATTACHMENT DETAIL



NOTES:
1) ATTIC TO MEET CBC 1202.3 REQUIREMENTS.
2) MONTHLY AVERAGE WINTER EXTERIOR TEMPERATURE IS ABOVE CODE MINIMUM OF 45F.

2 A2.02 ROOF PLAN - INSULATION DIAGRAM
NOT TO SCALE

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-

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ehdd.

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THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

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JENNIFER K. DEVLIN
Ren. 5-31-23
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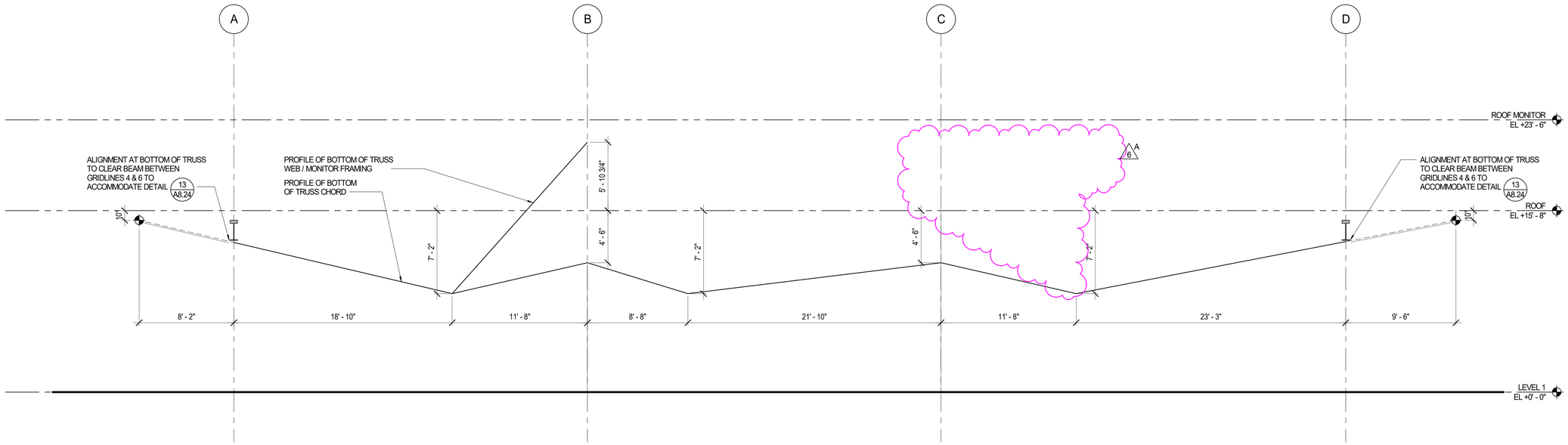
Sheet Title
ROOF PLAN

Sheet Number
A2.02



1 / A3.12 TRUSS PROFILE DIAGRAM

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

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THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

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LICENSED ARCHITECT
JENNIFER K DEVLIN
No. C-27434
Ren. 5-31-23
STATE OF CALIFORNIA

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1	A	Addendum 1	04.01.2022
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Scale
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Sheet Title
TRUSS PROFILE

Sheet Number
A3.12

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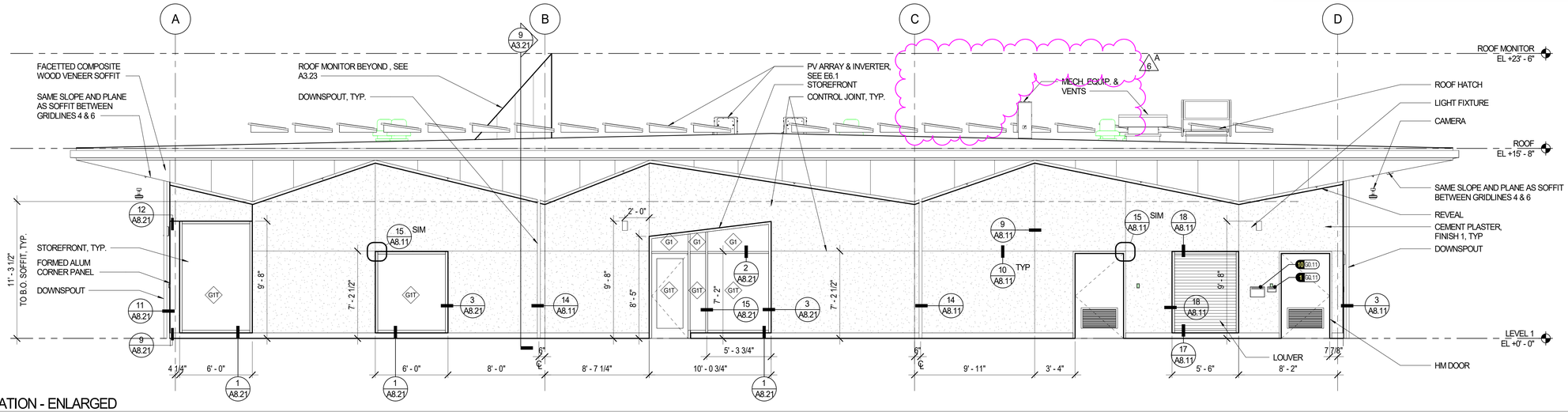
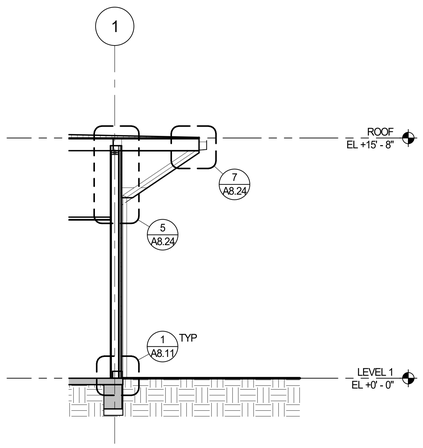
ELEVATION NOTES & LEGEND

1. SEE A0.31 DOOR SCHEDULE FOR SIZES AND DETAIL REFERENCES.
2. SEE A2.21 FOR SIGNAGE REFERENCES.
3. SEE A8.11 FOR TYPICAL CEMENT PLASTER ASSEMBLY DETAILS

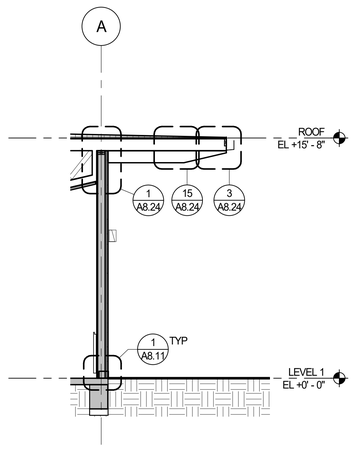
G# G#T GLASS TYPE, 'T' DENOTES TEMPERED GLASS, SEE SPEC SECTION 08 80 00



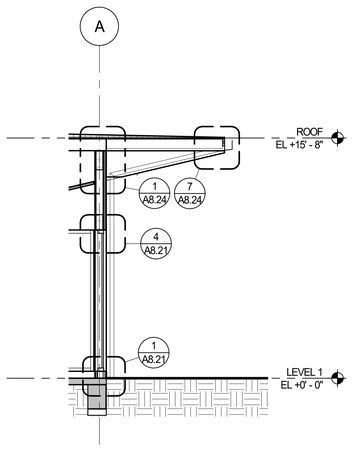
11 A3.21 **WEST ELEVATION - ENLARGED**
SCALE: 1/4" = 1'-0"



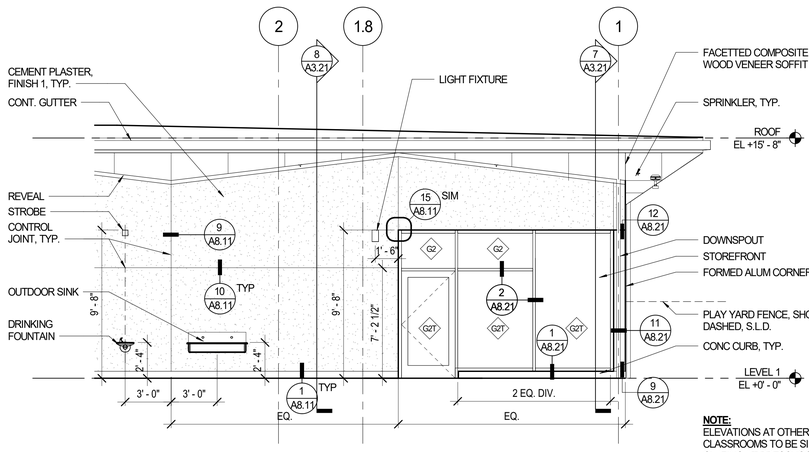
9 A3.21 **WALL SECTION @ INFANT CLASSROOM - WEST ELEVATION**
SCALE: 1/4" = 1'-0"



8 A3.21 **WALL SECTION @ INFANT CLASSROOM**
SCALE: 1/4" = 1'-0"

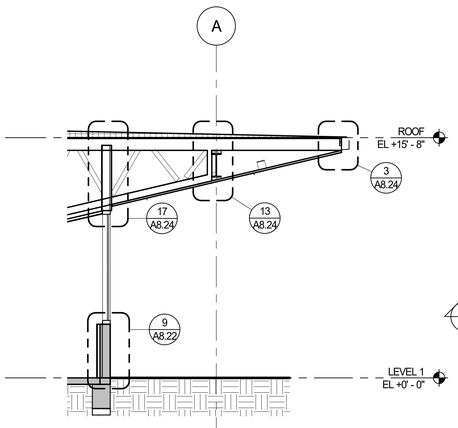


7 A3.21 **WALL SECTION @ INFANT CLASSROOM1**
SCALE: 1/4" = 1'-0"

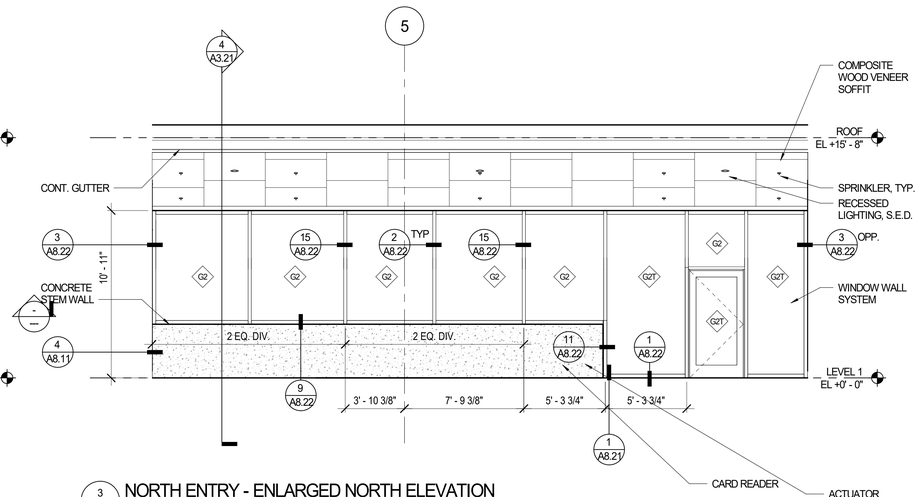


NOTE:
ELEVATIONS AT OTHER CLASSROOMS TO BE SIM./OPP., GLAZING AT PRESCHOOL CLASSROOMS TO BE REPLACED W/ TYPES G1 AND G1T.

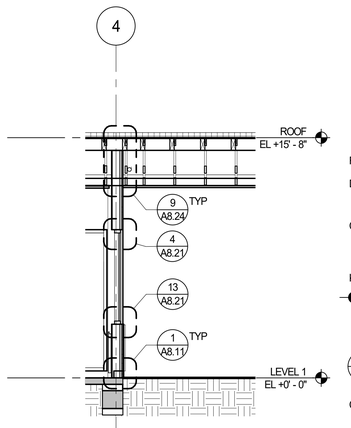
6 A3.21 **INFANT CLASSROOM - ENLARGED NORTH ELEVATION**
SCALE: 1/4" = 1'-0"



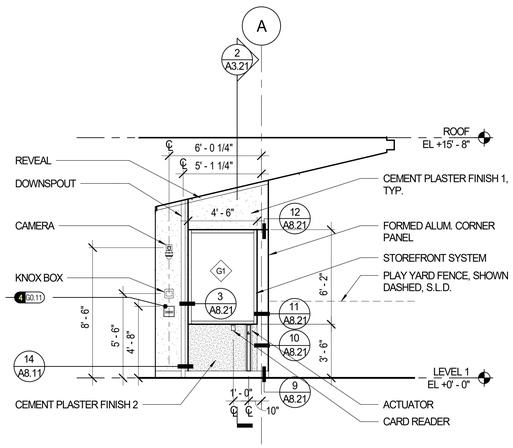
4 A3.21 **WALL SECTION @ NORTH ENTRY**
SCALE: 1/4" = 1'-0"



3 A3.21 **NORTH ENTRY - ENLARGED NORTH ELEVATION**
SCALE: 1/4" = 1'-0"



2 A3.21 **WALL SECTION @ NORTH ENTRY - EAST ELEVATION**
SCALE: 1/4" = 1'-0"



1 A3.21 **NORTH ENTRY - ENLARGED EAST ELEVATION**
SCALE: 1/4" = 1'-0"

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PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

Stamp

LICENSED ARCHITECT
JENNIFER K DEVLIN
No. C-37934
Ren. 5-31-23
STATE OF CALIFORNIA

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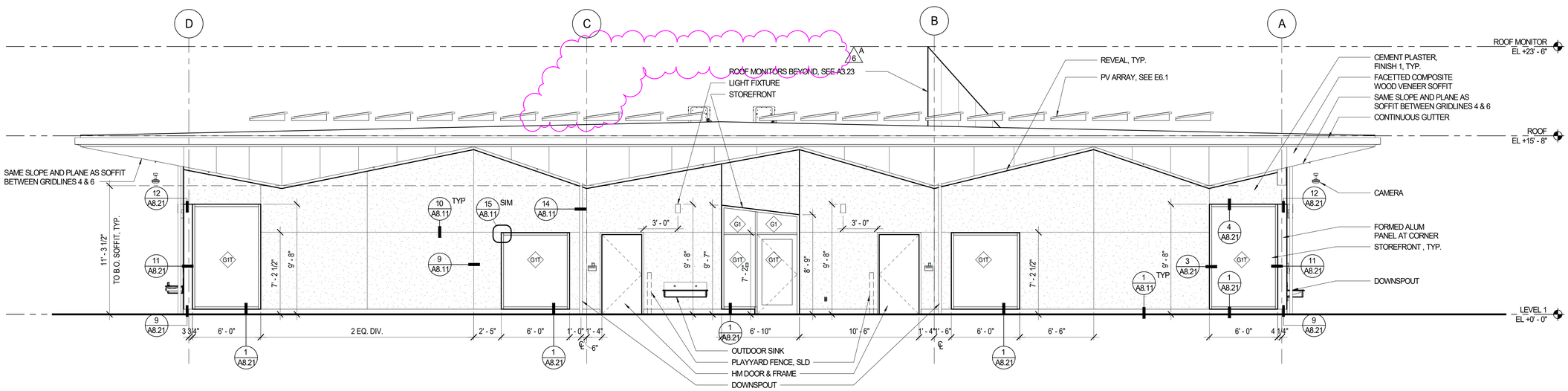
Sheet Title
ENLARGED ELEVATIONS & SECTIONS

Sheet Number
A3.21

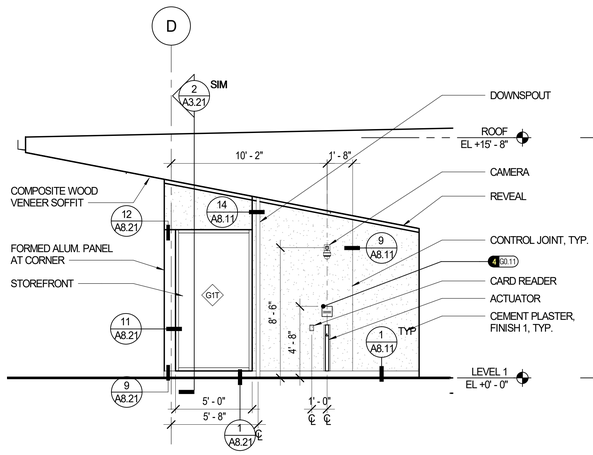
ELEVATION NOTES & LEGEND

1. SEE A0.31 DOOR SCHEDULE FOR SIZES AND DETAIL REFERENCES.
2. SEE A2.21 FOR SIGNAGE REFERENCES.
3. SEE A8.11 FOR TYPICAL CEMENT PLASTER ASSEMBLY DETAILS

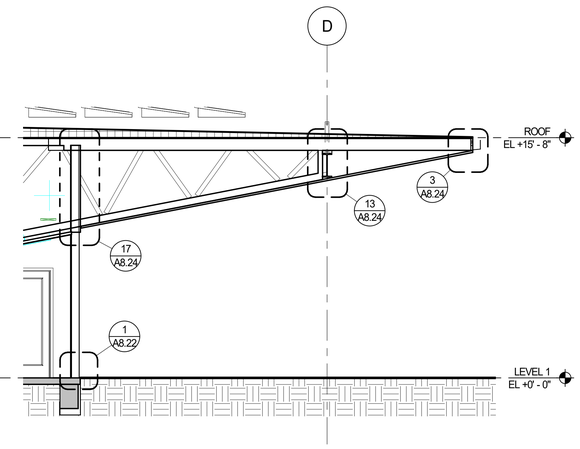
G# G#T GLASS TYPE, 'T' DENOTES TEMPERED GLASS, SEE SPEC SECTION 08 80 00



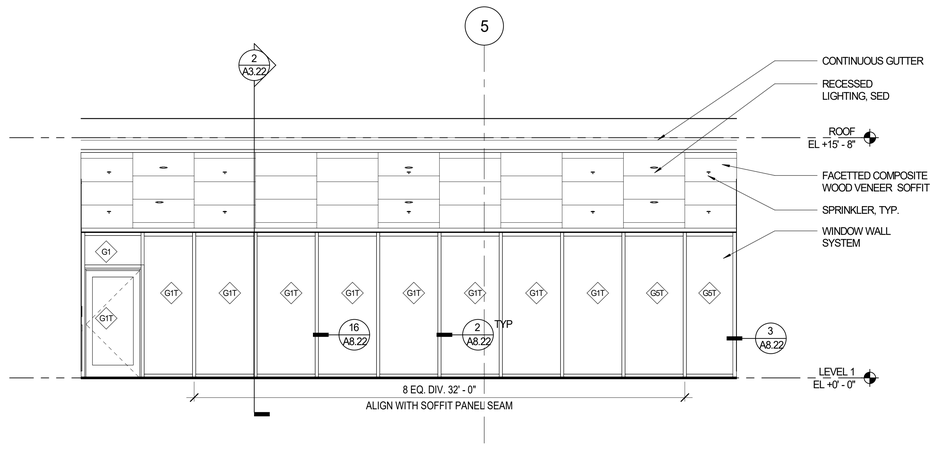
5 A3.22 PRESCHOOL CLASSROOM - ENLARGED EAST ELEVATION
SCALE: 1/4" = 1'-0"



3 A3.22 SOUTH ENTRY - ENLARGED EAST ELEVATION
SCALE: 1/4" = 1'-0"



2 A3.22 WALL SECTION @ SOUTH ENTRY
SCALE: 1/4" = 1'-0"



1 A3.22 SOUTH ENTRY - ENLARGED SOUTH ELEVATION
SCALE: 1/4" = 1'-0"

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ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

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PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

Stamp

LICENSED ARCHITECT
JENNIFER K. DEVITT
No. C-27347
Ren. 5-31-23
STATE OF CALIFORNIA

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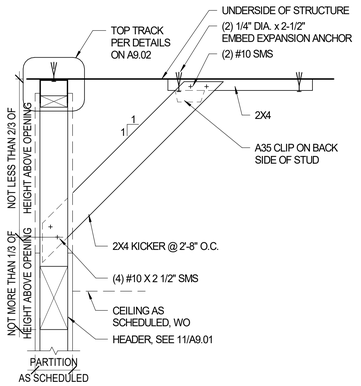
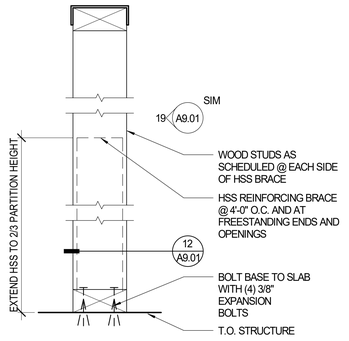


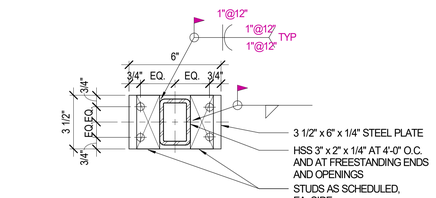
20 A9.01 WALL BRACE AT OPNG'S MORE THAN 10' WIDE

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



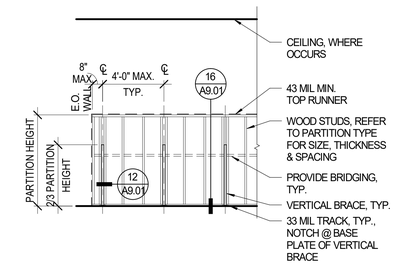
16 A9.01 SECTION - BRACE @ PARTIAL HT. WALL

SCALE: 3" = 1'-0"



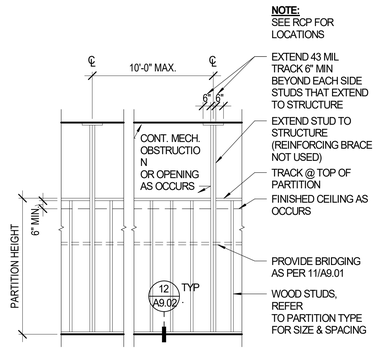
12 A9.01 PLAN - BRACE @ PARTIAL HEIGHT WALL

SCALE: 3" = 1'-0"



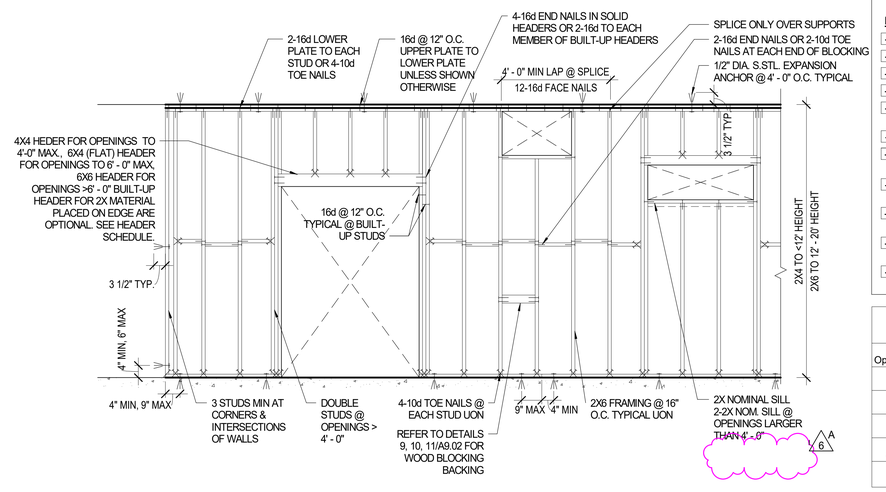
19 A9.01 FRAMING FOR PARTIAL HT. WALL NOT EXTENDING TO CLG ABOVE

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



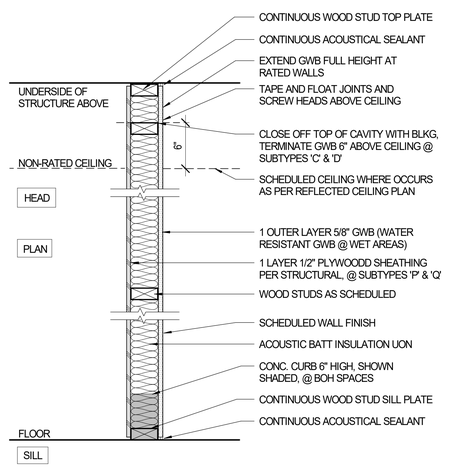
15 A9.01 FRAMING FOR PARTIAL HEIGHT WALL NOT EXTENDING TO SLAB ABOVE

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



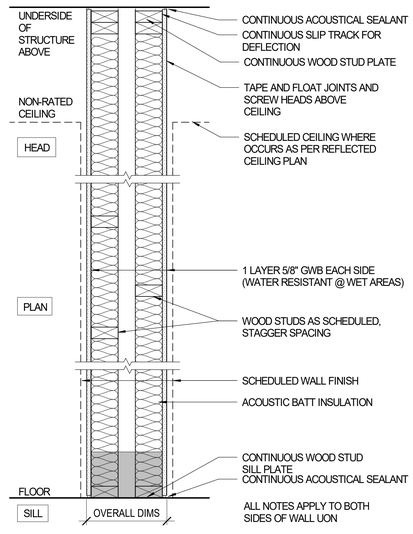
11 A9.01 TYPICAL WOOD FRAMING FOR INTERIOR PARTITIONS

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



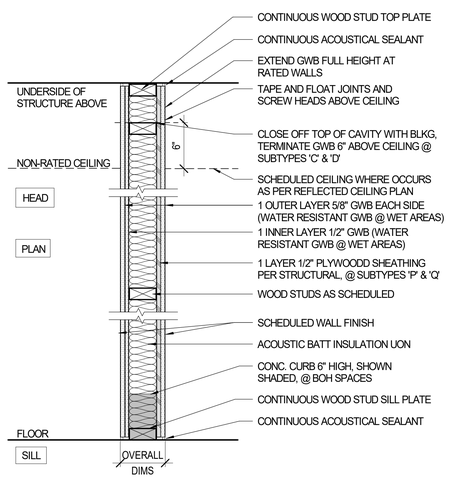
F TYPICAL WOOD FURRING PARTITION

WALL TYPE	STUD SIZE	OVERALL DIMENSION	FIRE RATING	COMMENTS
F4B	2x4	4 1/8"		
F6P	2x6	6 1/8"		



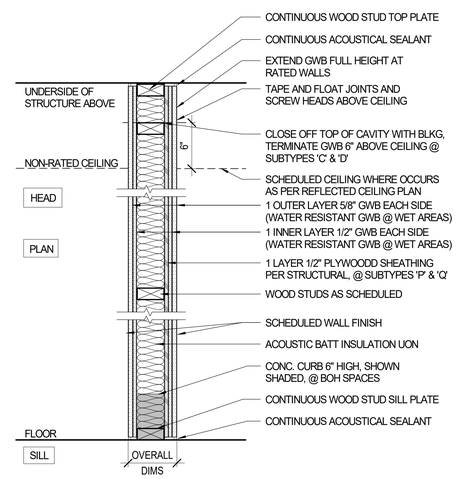
E DOUBLE STUD PARTITION (UL #U493 @ FIRE RATED CONDITION)

WALL TYPE	STUD SIZE	OVERALL DIMENSION	FIRE RATING	COMMENTS
E4A1	2X4	SEE PLAN		1 LAYER OF GYP BD EA. SIDE



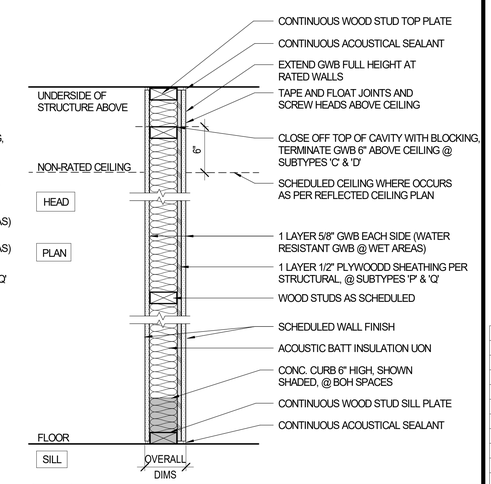
C TYPICAL WOOD PARTITION, (1 LAYER OF GYP EA/ SIDE) (UL #U309 @ FIRE-RATED CONDITION)

WALL TYPE	STUD SIZE	OVERALL DIMENSION	FIRE RATING	COMMENTS
C4A	2x4	5 1/4"		
C6A	2x6	7 1/4"		
C6P	2x6	7 3/4"		PLYWD SHEATHING LOCATED AT SIDE W/ ONE LAYER OF GWB.
C6R	2x6	8 1/4"		PLYWD SHEATHING LOCATED ON BOTH SIDES, AS INDICATED ON STRUCTURAL PLANS



B TYPICAL WOOD PARTITION, (1 LAYER OF GYP EA/ SIDE) (UL #U309 @ FIRE-RATED CONDITION)

WALL TYPE	STUD SIZE	OVERALL DIMENSION	FIRE RATING	COMMENTS
B6A	2x6	7 3/4"		
B6P	2x6	8 1/4"		PLYWD SHEATHING LOCATED AT SIDE INDICATED ON PLANS



A TYPICAL WOOD PARTITION, (1 LAYER OF GYP EA/ SIDE) (UL #U309 @ FIRE-RATED CONDITION)

WALL TYPE	STUD SIZE	OVERALL DIMENSION	FIRE RATING	COMMENTS
A3B	2x3	3 3/4"		
A4A	2x4	4 3/4"		
A4B	2x4	4 3/4"		
A4G	2x4	5"		3/4" FIN PLYWD BOTH SIDES, SEE DETAIL 8/A9.33
A6A	2x6	6 3/4"		
A6B	2x6	6 3/4"		
A6P	2x6	7 1/4"		PLYWD SHEATHING LOCATED AT SIDE INDICATED ON PLANS
A6Q	2x6	7 1/4"		PLYWD SHEATHING LOCATED AT SIDE INDICATED ON PLANS
A6S	2x6	7 3/4"		PLYWD SHEATHING LOCATED ON BOTH SIDES, AS INDICATED ON STRUCTURAL PLANS

GENERAL SHEET NOTES

- ALL PARTITIONS TO BE FULL-HEIGHT TO UNDERSIDE OF STRUCTURAL TRUSSES, UON
- GWB TO BE TYPE 'X' UON AND WATER RESISTANT AT WET CONDITIONS
- PROVIDE CEMENTITIOUS BACKER BOARD WHERE TILE FINISH OCCURS, SEE SHEET A9.41 FOR TILE DETAILS.
- CONT. WOOD SILL PLATE TO MATCH STUD SIZE, UON
- REFERENCE STRUCTURAL DRAWING FOR STUD SPACING
- PROVIDE OPENING AND THROUGH-PENETRATION PROTECTION AT WALLS DESIGNATED AS FIRE SEPARATIONS ON G1.1 & A2 SERIES
- SEE SHEET A0.40 FOR SCHEDULED WALL FINISHES
- SEE A5 SERIES FOR SCHEDULED CEILINGS.
- ALLOW FOR ADDITIONAL ASSEMBLY COMPONENTS, AS REQUIRED TO MEET PROJECT ACOUSTICAL REQUIREMENTS. STRATEGY MAY INCLUDE RESILIENT CHANNELS

PARTITION TYPE DESIGNATION

D3E2
- PARTITION TYPE
- STUD SIZE
- PARTITION SUBTYPE (ACOUSTIC RATING, FIRE RATING, SPECIAL CONDITIONS, ETC)
- GYP BD LAYERS (DENOTED ONLY FOR WALL TYPES C THROUGH J)

PARTITION SUBTYPE DESIGNATION

-A-	WITH BATT INSULATION
-B-	WITHOUT BATT INSULATION
-C-	EXTEND GYP 6" ABOVE CEILING, W/ BATT INSULATION
-D-	EXTEND GYP 6" ABOVE CEILING, W/O BATT INSULATION
-E-	PARTIAL HEIGHT WALL NOT EXTENDING TO CEILNG, W/O BATT INSULATION, SEE ELEVATIONS FOR HEIGHT
-F-	FULL HEIGHT GYP TO UNDRSIDE OF ROOF SHEATHING, W/ BATT INSULATION
-G-	PARTIAL HEIGHT WALL NOT EXTENDING TO CEILNG, W/O BATT INSULATION, FINISHED PLYWOOD BOTH SIDES, SEE ELEVATIONS FOR HEIGHT
-P-	FULL HEIGHT GYP TO UNDRSIDE OF ROOF SHEATHING WITH ONE LAYER PLYWOOD SHEATHING PER STRUCTURAL, W/ BATT INSULATION
-Q-	FULL HEIGHT GYP TO UNDRSIDE OF ROOF SHEATHINGWITH ONE LAYER PLYWOOD SHEATHING PER STRUCTURAL, W/O BATT INSULATION
-R-	FULL HEIGHT GYP TO UNDRSIDE OF ROOF SHEATHING WITH 2 LAYERS PLYWOOD SHEATHING PER STRUCTURAL, W/ BATT INSULATION
-S-	FULL HEIGHT GYP WITH 2 LAYERS PLYWOOD SHEATHING PER STRUCTURAL, W/O BATT INSULATION

WOOD FRAMED PARTITION HEADER SCHEDULE

Opening Width (ft)	Header Size (in)
<4'-0"	4x4
4'-0" - 6'-0"	4x6
6'-0" - 8'-0"	4x8
8'-0" - 10'-0"	4x10
>10'-0"	ENGINEERING REQUIRED

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ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

ehdd.

PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

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PERMIT SET - SFM	12.21.2021

Revisions and Description			Date
6	A	Addendum 6	04.25.2022

Scale
As indicated

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Author

EHDD Job Number
20020

Sheet Title
WOOD PARTITION TYPES AND FRAMING DETAILS

Sheet Number
A9.01

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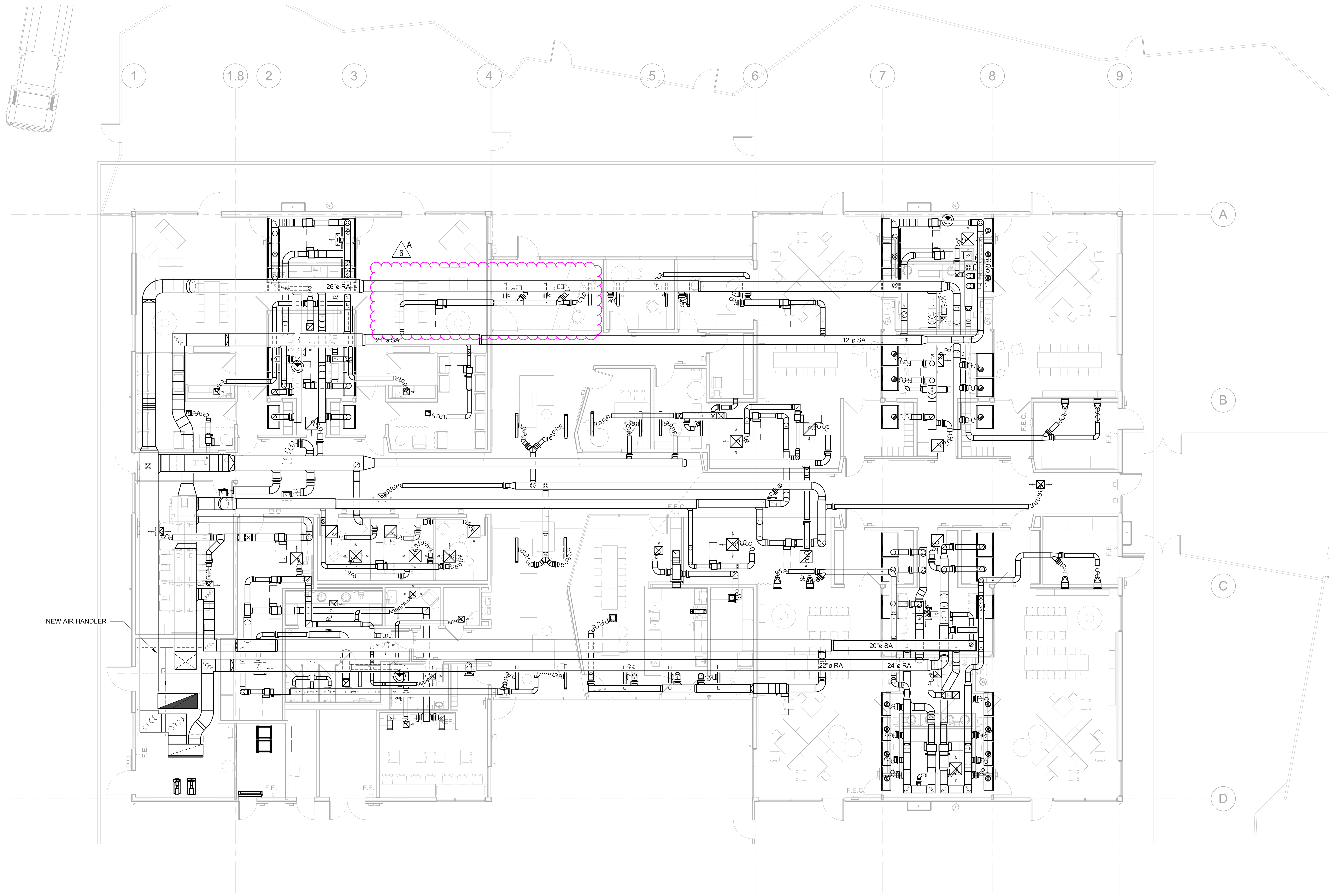

1 M2.01 MECHANICAL - OVERALL FLOOR PLAN

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

8' 0' 8' 16'

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SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

neXus engineering
Consulting Mechanical Engineers
1400 Lone Palm Ave, Suite A
Modesto, CA 95351
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6	A	Addendum 6	04.25.2022

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Sheet Title

MECHANICAL - OVERALL HVAC FLOOR PLAN

Sheet Number

M2.01

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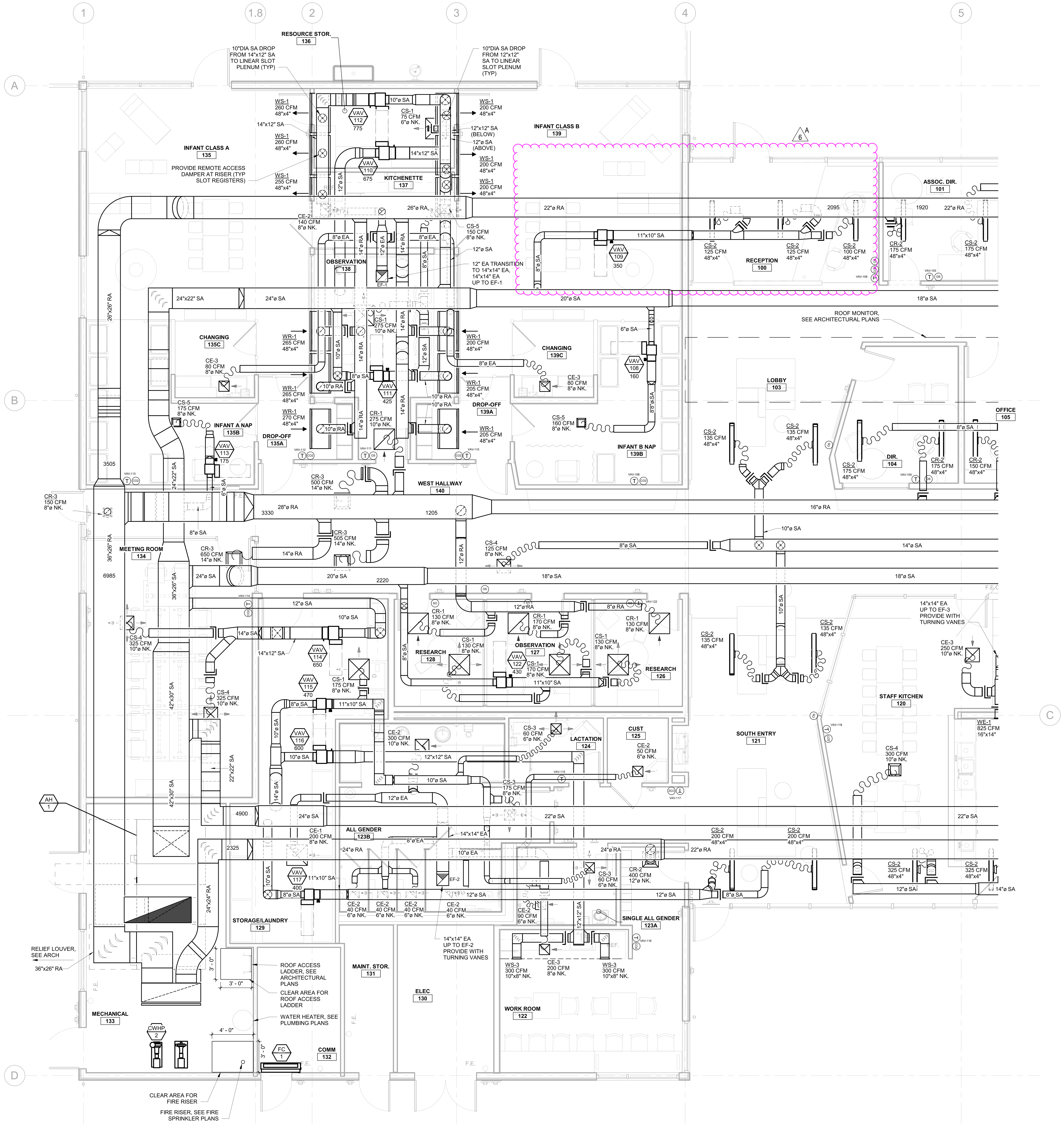
SHEET NOTES

1. SEE A6.01 FOR REFLECTED CEILING PLAN.



1 M2.02 MECHANICAL - HVAC FLOOR PLAN - A

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

4' 0' 4' 8'

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THE EMBARCADERO
SAN FRANCISCO, CA 94111

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PERMIT SET - SFM	12.21.2021

		Revisions and Description	Date
6	A	Addendum 6	04.25.2022

Scale
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EHDD Job Number
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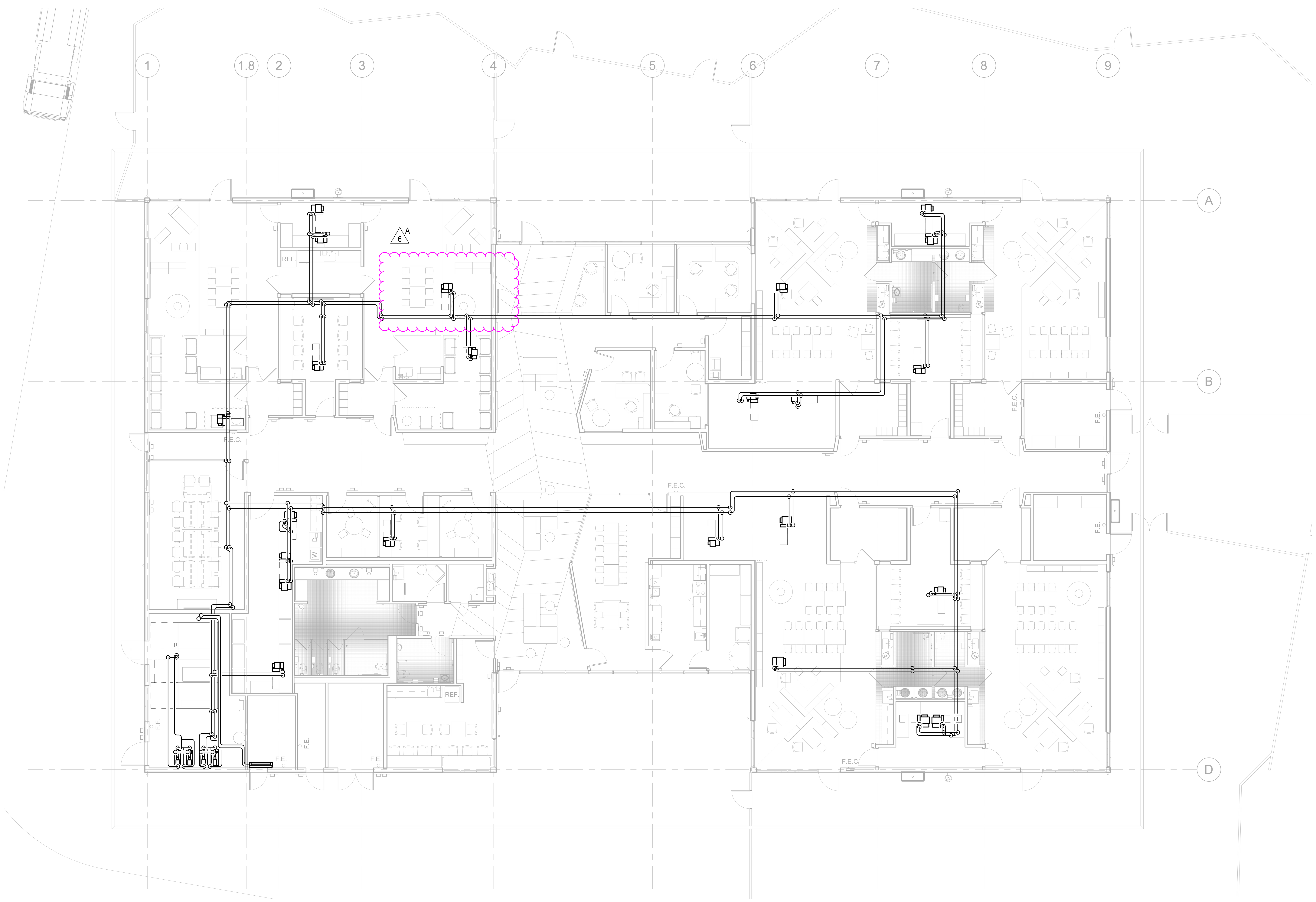
Sheet Title

MECHANICAL - ENLARGED HVAC FLOOR PLAN

Sheet Number

M2.02



1 M3.01 MECHANICAL - OVERALL HVAC PIPING FLOOR PLAN

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

8' 0' 8' 16'

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INFO@EHDD.COM
+1 415-285-9193

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Consulting Mechanical Engineers
1400 Lone Palm Ave, Suite A
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Revisions and Description Date

6	A	Addendum 6	04.25.2022

Scale
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Sheet Title
MECHANICAL - OVERALL HVAC PIPING FLOOR PLAN

Sheet Number
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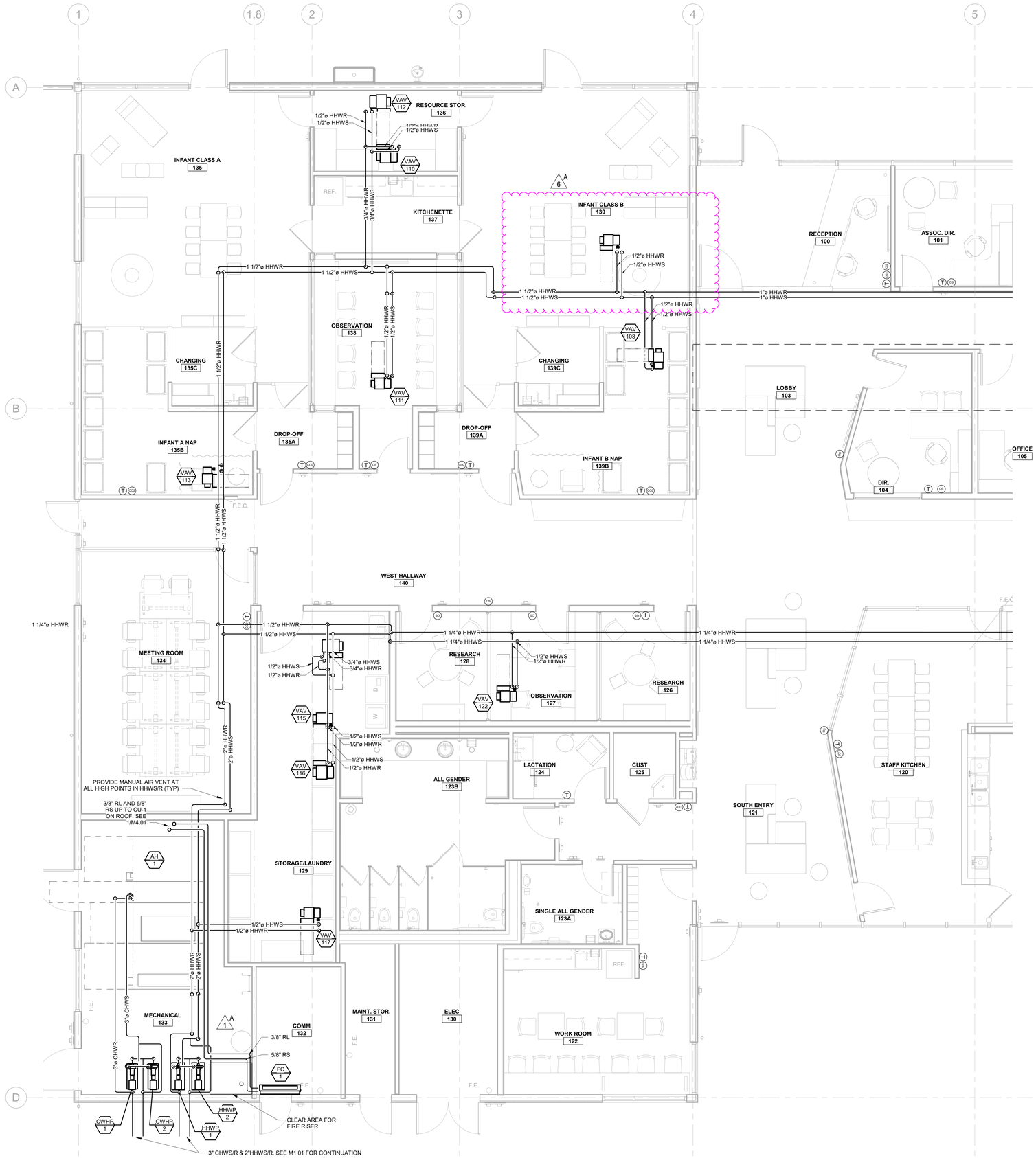

1 M3.02 MECHANICAL - HVAC PIPING FLOOR PLAN - A

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

4' 0' 4' 8'

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THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

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Consulting Mechanical Engineers
1400 Lone Palm Ave, Suite A
Modesto, CA 95351
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1	A	Addendum 1	04.01.2022
6	A	Addendum 6	04.25.2022

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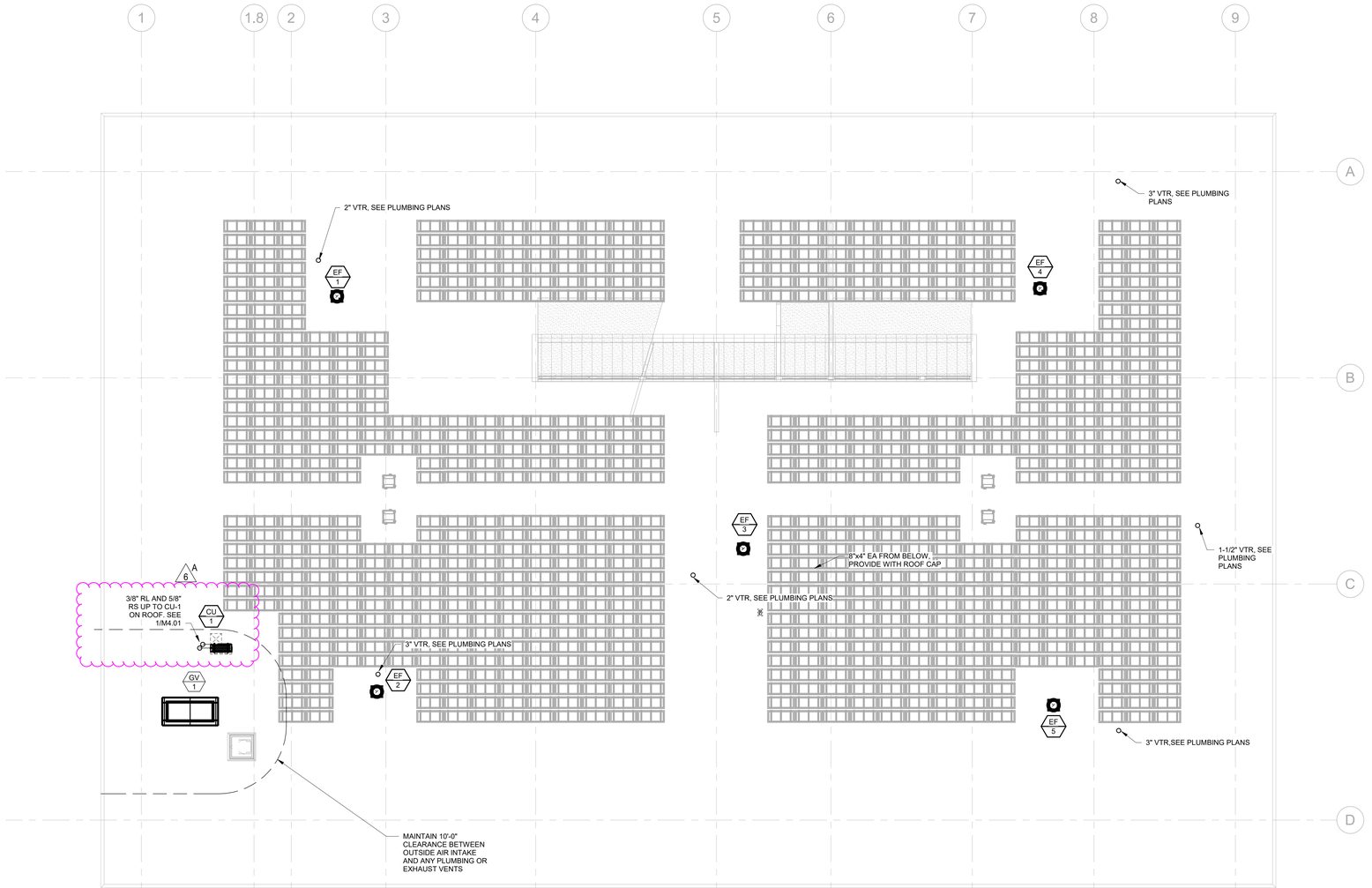
Sheet Title
MECHANICAL - ENLARGED HVAC PIPING FLOOR PLAN

Sheet Number
M3.02



1 / M4.01 MECHANICAL - ROOF PLAN
SCALE: 1/8" = 1'-0"

8' 0' 8' 16'

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THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
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Modesto, CA 95351
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6	A	Addendum 6	04.25.2022

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Sheet Title
MECHANICAL - ROOF PLAN

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M4.01

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PLUMBING GREEN BUILDING CODE NOTES

REQUIRED

SECTION 5.301 GENERAL

5.301.1 SCOPE. THE PROVISIONS OF THIS CHAPTER SHALL ESTABLISH THE MEANS OF CONSERVING WATER USE INDOORS, OUTDOORS AND IN WASTEWATER CONVEYANCE.

SECTION 5.302 DEFINITIONS

5.302.1 DEFINITIONS. THE FOLLOWING TERMS ARE DEFINED IN CHAPTER 2 (AND ARE INCLUDED HERE FOR REFERENCE)

CONSTRUCTION SITE. A PARCEL OF LAND BOUNDED BY LOT LINE(S) OR A DESIGNATED PORTION OF A PUBLIC RIGHT-OF-WAY WHERE CONSTRUCTION IS TAKING PLACE. A CONSTRUCTION SITE MAY INCLUDE, BUT NOT BE LIMITED TO, BUILDINGS AND ACCESSORY STRUCTURES, WALKS, SIDEWALKS, CURBS, CURB RAMPS, PARKING FACILITIES, PLANTING AREAS, POOLS, PROMENADES, EXTERIOR GATHERING OR ASSEMBLY AREAS, RAISED OR DEPRESSED PAVED AREAS, OPEN SPACES, GOLF COURSES, AND/OR LANDSCAPE AREAS.

DISINFECTED TERTIARY RECYCLED WATER. FILTERED AND SUBSEQUENTLY DISINFECTED WASTEWATER THAT MEETS THE APPROVED METHOD OF TREATMENT AND MINIMUM LEVEL OF WATER QUALITY SPECIFIED IN CALIFORNIA CODE OF REGULATIONS, TITLE 22, DIVISION 4, CHAPTER 3 FOR THE PURPOSE OF DIRECT BENEFICIAL USE.

EVAPOTRANSPIRATION ADJUSTMENT FACTOR (ETAF) [DSA-SS]. AN ADJUSTMENT FACTOR WHEN APPLIED TO REFERENCE EVAPOTRANSPIRATION THAT ADJUSTS FOR PLANT FACTORS AND IRRIGATION EFFICIENCY, WHICH AE TWO MAJOR INFLUENCES ON THE AMOUNT OF WATER THAT NEEDS TO BE APPLIED TO THE LANDSCAPE.

FOOTPRINT AREA [DSA-SS]. THE TOTAL AREA OF THE FURTHEST EXTERIOR WALL OF THE STRUCTURE PROJECTED TO NATURAL GRADE, NOT INCLUDING EXTERIOR AREAS SUCH AS STAIRS, COVERED WALKWAYS, PATIOS AND DECKS.

GRAYWATER. PURSUANT TO HEALTH AND SAFETY CODE SECTION 17922.12, "GRAYWATER" MEANS UNTREATED WASTEWATER THAT HAS NOT BEEN CONTAMINATED BY ANY TOILET DISCHARGE, HAS NOT BEEN AFFECTED BY INFECTIOUS, CONTAMINATED, OR UNHEALTHY BODILY WASTES, AND DOES NOT PRESENT A THREAT FROM CONTAMINATION BY UNHEALTHFUL PROCESSING, MANUFACTURING, OR OPERATING WASTES. "GRAYWATER" INCLUDES, BUT IS NOT LIMITED TO WASTEWATER FROM BATHTUBS, SHOWERS, BATHROOM WASHBASINS, CLOTHES WASHING MACHINES AND LAUNDRY TUBS, BUT DOES NOT INCLUDE WASTE WATER FROM KITCHEN SINKS OR DISHWASHERS.

METERING FAUCET. A SELF-CLOSING FAUCET THAT DISPENSES A SPECIFIC VOLUME OF WATER FOR EACH ACTUATION CYCLE. THE VOLUME OR CYCLE DURATION CAN BE FIXED OR ADJUSTABLE.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). THE CALIFORNIA ORDINANCE REGULATING LANDSCAPE DESIGN, INSTALLATION AND MAINTENANCE PRACTICES THAT WILL ENSURE COMMERCIAL, MULTIFAMILY AND OTHER DEVELOPER INSTALLED LANDSCAPES GREATER THAN 2500 SQUARE FEET MEET AN IRRIGATION WATER BUDGET DEVELOPED BASED ON LANDSCAPED AREA AND CLIMATOLOGICAL PARAMETERS.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). [HCD] THE CALIFORNIA MODEL ORDINANCE (CALIFORNIA CODE OF REGULATIONS, TITLE 23, DIVISION 2, CHAPTER 2.7), REGULATING LANDSCAPE DESIGN, INSTALLATION AND MAINTENANCE PRACTICES. LOCAL AGENCIES ARE REQUIRED TO ADOPT THE UPDATED MWELO, OR ADOPT A LOCAL ORDINANCE AT LEAST AS EFFECTIVE AS THE MWELO.

POTABLE WATER. WATER THAT IS DRINKABLE AND MEETS THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) DRINKING WATER STANDARDS. SEE DEFINITION IN THE CALIFORNIA PLUMBING CODE, PART 5.

POTABLE WATER. [HCD] WATER THAT IS SATISFACTORY FOR DRINKING, CULINARY, AND DOMESTIC PURPOSES, AND MEETS THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) DRINKING WATER STANDARDS AND THE REQUIREMENTS OF THE HEALTH AUTHORITY HAVING JURISDICTION.

RECLAIMED (RECYCLED) WATER. NON-POTABLE WATER THAT MEETS CALIFORNIA STATE WATER RESOURCES CONTROL BOARD STATEWIDE UNIFORM CRITERIA FOR DISINFECTED TERTIARY RECYCLED WATER. RECLAIMED (RECYCLED) WATER IS ALSO KWOWN AS "RECYCLED WATER" OR "RECLAIMED WATER".

RECYCLED WATER. WATER WHICH, AS A RESULT OF TREATMENT OF WASTE, IS SUITABLE FOR A DIRECT BENEFICIAL USE OR A CONTROLLED USE THAT WOULD NOT OTHERWISE OCCUR [WATER CODE SECTION 13050 (N)]. SIMPLY PUT, RECYCLED WATER IS WATER TREATED TO REMOVE WASTE MATTER ATTAINING A QUALITY THAT IS SUITABLE TO USE THE WATER AGAIN.

RECYCLED WATER SUPPLY SYSTEM. THE BUILDING SUPPLY PIPE, THE WATER DISTRIBUTION PIPES, AND THE NECESSARY CONNECTING PIPES, FITTINGS, CONTROL VALVES, BACKFLOW PREVENTION DEVICES, AN ALL APPURTENACES CARRYING OR SUPPLYING RECLAIMED (RECYCLED) WATER IN OR ADJACENT TO THE BUILDING OR WITHIN THE PREMISES.

SPECIAL LANDSCAPE AREA (SLA). [DSA-SS] AN AREA OF THE LANDSCAPE DEDICATED SOLELY TO EDIBLE PLANTS, PLANTING AREAS USED FOR EDUCATIONS PURPOSES, RECREATIONAL AREAS, AREAS IRRIGATED WITH RECYCLED WATER, WATER FEATURES USING RECYCLED WATER, AND WHERE TURF PROVIDES A PLAYING SURFACE OR GATHERING SPACE.

SUBMETER. A METER INSTALLED SUBORDINATE TO A SITE METER. USUALLY USED TO MEASURE WATER INTENDED FOR ONE PURPOSE, SUCH AS LANDSCAPE IRRIGATION. FOR THE PURPOSES OF CALGREEN, A DEDICATED METER MAY BE CONSIDERED A SUBMETER.

REQUIRED

SECTION 5.303 INDOOR WATER USE

[ ] 5.303.1 METERS. SEPARATE SUBMETERS OR METERING DEVICES SHALL BE INSTALLED FOR THE USES DESCRIBED IN SECTIONS 5.303.1.1 AND 5.303.1.2.

5.303.1.1 BUILDINGS IN EXCESS OF 50,000 SQUARE FEET. SEPARATE SUBMETERS SHALL BE INSTALLED AS FOLLOWS:

1. FOR EACH INDIVIDUAL LEASED, RENTED OR OTHER TENANT SPACE WITHIN THE BUILDING PROJECTED TO CONSUME MORE THAN 100 GAL/DAY (380 L/DAY), INCLUDING, BUT NOT LIMITED TO, SPACES USED FOR LAUNDRY OR CLEANERS, RESTAURANT OR FOOD SERVICE, MEDICAL OR DENTAL OFFICE, LABORATORY, OR BEAUTY SALON OR BARBER SHOP.

2. WHERE SEPARATE SUBMETERS FOR INDIVIDUAL BUILDING TENANTS ARE UNFEASIBLE, FOR WATER SUPPLIED TO THE FOLLOWING SUBSYSTEMS:

A. MAKEUP WATER FOR COOLING TOWERS WHERE FLOW THROUGH IS GREATER THAN 500 GPM (30 L/S).
B. MAKEUP WATER FOR EVAPORATIVE COOLERS GREATER THAN 6 GPM (0.04 L/S).
C. STEAM AND HOT WATER BOILERS WITH ENERGY INPUT MORE THAN 500,000 BTU/H (147 KW).

[ ] 5.303.1.2 EXCESS CONSUMPTION. A SEPARATE SUBMETER OR METERING DEVICE SHALL BE PROVIDED FOR ANY TENANT WITHIN A NEW BUILDING OR WITHIN AN ADDITION THAT IS PROJECTED TO CONSUME MORE THAN 1,000 GAL/DAY.

5.303.3 WATER CONSERVING PLUMBING FIXTURES AND FITTINGS. PLUMBING FIXTURES (WATER CLOSETS AND URINALS) AND FITTINGS (FAUCETS AND SHOWERHEADS) SHALL COMPLY WITH THE FOLLOWING:

[X] 5.303.3.1 WATER CLOSETS. THE EFFECTIVE FLUSH VOLUME OF ALL WATER CLOSETS SHALL NOT EXCEED 1.28 GALLONS PER FLUSH. TANK-TYPE WATER CLOSETS SHALL BE CERTIFIED TO THE PERFORMANCE CRITERIA OF THE U.S. EPA WATERSENSE SPECIFICATION FOR TANK-TYPE TOILETS.

NOTE: THE EFFECTIVE FLUSH VOLUME OF DUAL FLUSH TOILETS IS DEFINED AS THE COMPOSITE, AVERAGE FLUSH VOLUME OF TWO REDUCED FLUSHES AND ONE FULL FLUSH.

[ ] 5.303.3.2 URINALS.
5.303.3.2.1 WALL-MOUNTED URINALS. THE EFFECTIVE VOLUME OF URINALS SHALL NOT EXCEED 0.125 GALLONS PER FLUSH.
5.303.3.2.2 FLOOR-MOUNTED URINALS. THE EFFECTIVE VOLUME OF URINALS SHALL NOT EXCEED 0.5 GALLONS PER FLUSH.

[ ] 5.303.3.3 SHOWERHEADS.
5.303.3.3.1 SINGLE SHOWERHEAD. SHOWERHEADS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 1.8 GALLONS PER MINUTE AT 80 PSI. SHOWERHEADS SHALL BE CERTIFIED TO THE PERFORMANCE CRITERIA OF THE U.S. EPA WATERSENSE SPECIFICATION FOR SHOWERHEADS.

[ ] 5.303.3.3.2 MULTIPLE SHOWERHEADS SERVING ONE SHOWER. WHEN A SHOWER IS SERVED BY MORE THAN ONE SHOWERHEAD, THE COMBINED FLOW RATE OF ALL THE SHOWERHEADS AND/OR OTHER SHOWER OUTLETS CONTROLLED BY A SINGLE VALVE SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI, OR THE SHOWER SHALL BE DESIGNED TO ALLOW ONLY ONE SHOWER OUTLET TO BE IN OPERATION AT A TIME.

NOTE: A HAND-HELD SHOWER SHALL BE CONSIDERED A SHOWERHEAD.

[X] 5.303.3.4 FAUCETS AND FOUNTAINS.

5.303.3.4.1 NONRESIDENTIAL LAVATORY FAUCETS. LAVATORY FAUCETS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 0.5 GALLONS PER MINUTE AT 60 PSI.

5.303.3.4.2 KITCHEN FAUCETS. KITCHEN FAUCETS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 1.8 GALLONS PER MINUTE AT 60 PSI. KITCHEN FAUCETS MAY TEMPORARILY INCREASE THE FLOW ABOVE THE MAXIMUM RATE, BUT NOT TO EXCEED 2.2 GALLONS PER MINUTE AT 60 PSI, AND MUST DEFAULT TO A MAXIMUM FLOW RATE OF 1.8 GALLONS PER MINUTE AT 60 PSI.

5.303.3.4.3 WASH FOUNTAINS. WASH FOUNTAINS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 1.8 GALLONS PER MINUTE/20 [RIM SPACE (INCHES) AT 60 PSI].

5.303.3.4.4 METERING FAUCETS. METERING FAUCETS SHALL NOT DELIVER MORE THAN 0.20 GALLONS PER CYCLE.

5.303.3.4.5 METERING FAUCETS FOR WASH FOUNTAINS. METERING FAUCETS FOR WASH FOUNTAINS SHALL HAVE A MAXIMUM FLOW RATE OF NOT MORE THAN 0.20 GALLONS PER MINUTE/20 [RIM SPACE (INCHES) AT 60 PSI].

NOTE: WHERE COMPLYING FAUCETS ARE UNAVAILABLE, AERATORS OR OTHER MEANS MAY BE USED TO ACHIEVE REDUCTION.

5.303.4 COMMERCIAL KITCHEN EQUIPMENT.

[ ] 5.303.4.1 FOOD WASTE DISPOSERS. DISPOSERS SHALL EITHER MODULATE THE USE OF WATER TO NO MORE THAN 1 GPM WHEN THE DISPOSER IS NOT IN USE (NOT ACTIVELY GRINDING FOOD WASTE/NO-LOAD) OR SHALL AUTOMATICALLY SHUT OFF AFTER NO MORE THAN 10 MINUTES OF INACTIVITY. DISPOSERS SHALL USE NO MORE THAN 8 GPM OF WATER.

NOTE: THIS CODE SECTION DOES NOT AFFECT LOCAL JURISDICTION AUTHORITY TO PROHIBIT OR REQUIRE DISPOSER INSTALLATION.

[ ] 5.303.5 AREAS OF ADDITION OR ALTERATION. FOR THOSE OCCUPANCIES WITHIN THE AUTHORITY OF THE CALIFORNIA BUILDING STANDARDS COMMISSION AS SPECIFIED IN SECTION 103, THE PROVISIONS OF SECTION 5.303.3 AND 5.303.4 SHALL APPLY TO NEW FIXTURES IN ADDITIONS OR AREAS OF ALTERATION TO THE BUILDING.

[X] 5.303.6 STANDARDS FOR PLUMBING FIXTURES AND FITTINGS. PLUMBING FIXTURES AND FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE CALIFORNIA PLUMBING CODE, AND SHALL MEET THE APPLICABLE STANDARDS REFERENCED IN TABLE 1701.1 OF THE CALIFORNIA PLUMBING CODE AND IN CHAPTER 6 OF THIS CODE.

PLUMBING EQUIPMENT SCHEDULE

MARK	
WH-1	ELECTRIC WATER HEATER: 80 GALLON STORAGE, INSULATED TANK, 61 GPH RECOVERY @ 60°F RISE, TEMP 120°F, 480V, UNBALANCED THREE PHASE CONNECTION, 5000W/5000W SIMULTANEOUS ELEMENTS, 878 LBS, AO SMITH #DEN-80.
ET-1	EXPANSION TANK: EXPANSION TANK: 4.8 GALLON TANK, 2.9 ACCEPTANCE VOL., BUTYL DIAPHRAGM, BLADDER, MAX. OPERATING TEMPERATURE 210°F, MAX. WORKING PRESSURE 150PSI, 10.6" DIAMETER X 13.7 LONG, OP. WEIGHT 34 LBS, WELDED STEEL CONSTRUCTION, WESSELS #T-12.
CP-1	CIRCULATION PUMP: BRONZE BODY, POLYPROPYLENE IMPELLER, CERAMIC SHAFT, 3/4" UNION CONNECTIONS, 8 GPM @ 6'/HD, 115V, 1Ø, 1PH, 92 WATTS @.80 FLA, OP WT = 9.5 LBS, B&G #NBF-22. PROVIDE WITH OPTIONAL AUTOMATIC TIMER KIT AND AQUASTAT.

PLUMBING FIXTURE SCHEDULE

MARK	DESCRIPTION
WC-1	WATER CLOSET: WALL MOUNT, VITREOUS CHINA, WHITE, 1.1 GPF, INTEGRAL TRAP, DIRECT-FED SIPHON JET, FULLY-GLAZED 2-1/8" TRAPWAY, ELONGATED BOWL, TOP OF SEAT @ 17" HIGH, AMERICAN STANDARD "AFWAL" #3351.101.020. VALVE: SENSOR OPERATED, BATTERY POWERED, POLISHED CHROME, 1.1 GALLONS PER FLUSH, SLOAN "ECOS" #8111-1.1-OR. SEAT: HEAVY DUTY, OPEN FRONT, SELF-SUSTAINING HINGE, LESS COVER, AMERICAN STANDARD #5901.100SS. CARRIER: ZURN #Z1202-N4. INSTALL PER ACCESSIBILITY REQUIREMENTS.
WC-2	WATER CLOSET: WALL MOUNT, VITREOUS CHINA, WHITE, 1.1 GPF, INTEGRAL TRAP, DIRECT-FED SIPHON JET, FULLY-GLAZED 2-1/8" TRAPWAY, ELONGATED BOWL, AMERICAN STANDARD "AFWAL" #3351.101.020. VALVE: SENSOR OPERATED, BATTERY POWERED, POLISHED CHROME, 1.1 GALLONS PER FLUSH, SLOAN "ECOS" #8111-1.1-OR. SEAT: HEAVY DUTY, OPEN FRONT, SELF-SUSTAINING HINGE, LESS COVER, AMERICAN STANDARD #5901.100SS. CARRIER: ZURN #Z1202-N4.
WC-3	WATER CLOSET: FLOOR MOUNT, ELONGATED FLUSHOMETER BOWL, VITREOUS CHINA, WHITE, 1.28 OR 1.6/1.1 GPF, INTEGRAL TRAP, FULLY-GLAZED TRAPWAY, SIPHON JET, CHILDREN'S HEIGHT, 10" ROUGH-IN, AMERICAN STANDARD "BABY DEVORO" #2282.001.020. VALVE: SENSOR OPERATED, BATTERY POWERED, POLISHED CHROME, 1.1 GALLONS PER FLUSH, SLOAN "ECOS" #8111-1.1-OR. SEAT: ANTI-MICROBIAL, OPEN FRONT, WHITE, TOP OF SEAT @11" HIGH, AMERICAN STANDARD #5001G.055.020. INSTALL PER ACCESSIBILITY REQUIREMENTS.
WC-4	WATER CLOSET: FLOOR MOUNT, ELONGATED FLUSHOMETER BOWL, VITREOUS CHINA, WHITE, 1.28 OR 1.6/1.1 GPF, INTEGRAL TRAP, FULLY-GLAZED TRAPWAY, SIPHON JET, CHILDREN'S HEIGHT, 10" ROUGH-IN, AMERICAN STANDARD "BABY DEVORO" #2282.001.020. VALVE: SENSOR OPERATED, BATTERY POWERED, POLISHED CHROME, 1.1 GALLONS PER FLUSH, SLOAN "ECOS" #8111-1.1-OR. SEAT: ANTI-MICROBIAL, OPEN FRONT, WHITE, TOP OF SEAT @11" HIGH, AMERICAN STANDARD #5001G.055.020.
UR-1	URINAL: WALL MOUNT, VITREOUS CHINA, WHITE, FLUSH VALVE TYPE, 0.125 GALLON PER FLUSH, INTEGRAL TRAP, TOP SPUD, SIPHON JET, AMERICAN STANDARD "TRIMBROOK" #6561017.020 VALVE: EXPOSED, 0.125 GALLONS PER FLUSH, MANUAL FLUSH VALVE, SLOAN "ROYAL" #186-0.125. INSTALLED PER ACCESSIBILITY REQUIREMENTS.
L-1	LAVATORY: WALL MOUNT, VITREOUS CHINA, WHITE, 20-1/2"X18-1/4", CENTER HOLE, OVERFLOW, AMERICAN STANDARD "LUCERNE" #0356.421. FAUCET: POLISHED CHROME, SENSOR OPERATED, LONG TERM POWER SYSTEM (LTPS), 0.35 GPM VANDAL PROOF NON-AERATING OUTLET, SINGLE SUPPLY FOR TEMPERED WATER, CHICAGO #116.598.AB.4. THERMOSTATIC MIXING VALVE: SET AT 110°, CHICAGO #131-ABNF. CARRIER: ZURN #Z1231. PROVIDE P-TRAP, GRID STRAINER, SUPPLIES, AND ANGLE STOPS. INSTALL PER ACCESSIBILITY REQUIREMENTS.
L-2	LAVATORY: WALL MOUNT, VITREOUS CHINA, WHITE, 20-1/2"X18-1/4", CENTER HOLE, OVERFLOW, AMERICAN STANDARD "LUCERNE" #0356.421. FAUCET: POLISHED CHROME, SENSOR OPERATED, LONG TERM POWER SYSTEM (LTPS), 0.35 GPM VANDAL PROOF NON-AERATING OUTLET, SINGLE SUPPLY FOR TEMPERED WATER, CHICAGO #116.598.AB.4. THERMOSTATIC MIXING VALVE: SET AT 110°, CHICAGO #131-ABNF. CARRIER: ZURN #Z1231. PROVIDE P-TRAP, GRID STRAINER, SUPPLIES, AND ANGLE STOPS. SEE ARCHITECTURAL PLANS FOR ACCESSIBILITY AND HEIGHT REQUIREMENTS.
L-3	LAVATORY: DROP-IN, VITREOUS CHINA, OVAL, WHITE, CENTER HOLE, OVERFLOW, AMERICAN STANDARD "AQUALYN" #0475.047. FAUCET: POLISHED CHROME, SENSOR OPERATED, LONG TERM POWER SYSTEM (LTPS), 0.35 GPM VANDAL PROOF NON-AERATING OUTLET, SINGLE SUPPLY FOR TEMPERED WATER, CHICAGO #116.598.AB.4. THERMOSTATIC MIXING VALVE: SET AT 110°, CHICAGO #131-ABNF. PROVIDE P-TRAP, GRID STRAINER, SUPPLIES, AND ANGLE STOPS. INSTALL PER ACCESSIBILITY REQUIREMENTS.
S-1	SINK: COUNTER MOUNTED, SINGLE BOWL, 18 GA. 304 SS, 21" x 19", 6" DEEP, (3) HOLES ON 4" CENTERS, JUST #SL-ADA-1921-A-GR. FAUCET: CHROME PLATTED, 8" FIXED CENTERS, 1.5 GPM , 8" RIGID/SWING GOOSENECK, WRISTBLADES, "LOW-LEAD" DESIGN, CHICAGO #1100-GN8AE35-317AB. THERMOSTATIC MIXING VALVE: SET AT 110°, CHICAGO #131-ABNF. PROVIDE P-TRAP, BASKET STRAINER, SUPPLIES, AND ANGLE STOPS. INSTALL PER ACCESSIBILITY REQUIREMENTS.
S-2	SINK: COUNTER MOUNTED, SINGLE BOWL, 18 GA. 304 SS, 21" x 19", 6" DEEP, (3) HOLES ON 4" CENTERS, JUST #SL-ADA-1921-A-GR. FAUCET: CHROME PLATTED, 8" FIXED CENTERS, 1.5 GPM , 8" RIGID/SWING GOOSENECK, WRISTBLADES, "LOW-LEAD" DESIGN, CHICAGO #1100-GN8AE35-317AB. THERMOSTATIC MIXING VALVE: SET AT 110°, CHICAGO #131-ABNF. PROVIDE P-TRAP, BASKET STRAINER, SUPPLIES, AND ANGLE STOPS. INSTALL PER ACCESSIBILITY REQUIREMENTS.
S-3	SINK: COUNTER MOUNTED, SINGLE BOWL, 18 GA. 304 SS, 19" x 17.5", 6" DEEP, (1) HOLE CENTERED, JUST #SL-ADA-17519-A-GR. FAUCET: CHROME PLATTED, 8" FIXED CENTERS, 1.5 GPM , 8" RIGID/SWING GOOSENECK, WRISTBLADES, "LOW-LEAD" DESIGN, CHICAGO #1100-GN8AE35-317AB. THERMOSTATIC MIXING VALVE: SET AT 110°, CHICAGO #131-ABNF. PROVIDE P-TRAP, BASKET STRAINER, SUPPLIES, AND ANGLE STOPS. INSTALL PER ACCESSIBILITY REQUIREMENTS.
MS-1	MOP SINK: FLOOR MOUNT NEO ANGLE DROP FRONSINK, TERRAZZO, 24" x 24", 3" DRAIN, FLORESTONE #96. FAUCET: ROUGH CHROME FINISH, EXPOSED YOKE FAUCET, INTEGRAL VACUUM BREAKER, WALL BRACE, PAIL HOOK, 3/4" THREADED OUTLET WITH VACUUM BREAKER, BUILT-IN STOPS, T&S BRASS #B-0665-BSTR. PROVIDE WITH MOP HANGER AND 4' LONG 3/4" FILL HOSE.
WS-1	WASH TROUGH: (2) STATION, SINGLE BOWL, WALL HUNG TROUGH SINK, TYPE 304 STAINLESS STEEL, BUFFED SATIN FINISH, 48" WIDE x 20" FRONT TO BACK x 8" DEEP BASIN, ELKAY #EWMA4820C. FAUCET: (2) GOOSENECK FAUCET WITH WRISTBLADE HANDLES, ELKAY #LK940GN05T4H, INCLUDED WITH TROUGH SINK. DRAIN: ELKAY LK18B INCLUDED WITH TROUGH SINK INSTALL PER ACCESSIBILITY REQUIREMENTS.
DF-1	BARRIER FREE DUAL-HEIGHT DRINKING FOUNTAIN: WALL MOUNTED, INTEGRATED CHILLER, WATER BOTTLE FILLER WITH TOUCHLESS ACTIVATION, STAINLESS STEEL BASIN, VANDAL-RESISTANT BUBBLER, INTERNAL FILTER, FRONT AND SIDE PUSH BUTTONS, LAMINAR FLOW, NON-PRESSURIZED STAINLESS STEEL COOLING TANK, 8GPM CHILLING CAPACITY, 120V, 5FLA, ELKAY #LZSTL8WSLK. PROVIDE WITH NECESSARY MOUNTING HARDWARE. INSTALL PER ACCESSIBILITY REQUIREMENTS.
DF-2	SINGLE DRINKING FOUNTAIN: COUNTER MOUNTED, STAINLESS STEEL, NON-FILTERED, NON-REFRIGERATED, VANDAL RESISTANT, MECHANICAL PUSH BUTTON BUBBLER ACTIVATION, LEAD-FREE, ELKAY DRKR10C. PROVIDE WITH IN WALL CARRIER AND NECESSARY HARDWARE. SEE ARCHITECTURAL PLANS FOR ACCESSIBILITY AND HEIGHT REQUIREMENTS. GLASS FILLER: GOOSENECK SPOUT, ALL NECESSARY HARDWARE, ELKAY #96852CA
DF-3	SINGLE DRINKING FOUNTAIN: WALL MOUNTED, STAINLESS STEEL, NON-FILTERED, NON-REFRIGERATED, VANDAL RESISTANT, MECHANICAL FRONT BUBBLER BUTTON ACTIVATION, LEAD-FREE, ELKAY EDFPB114C. PROVIDE WITH IN WALL CARRIER AND NECESSARY HARDWARE. SEE ARCHITECTURAL PLANS FOR ACCESSIBILITY AND HEIGHT REQUIREMENTS.
TP-1	TRAP PRIMER: DIFFERENTIAL PRESSURE AUTOMATIC TYPE, CORROSION RESISTANT BRASS, INSTALL STRICTLY PER MANUFACTURER'S RECOMMENDATIONS, PROVIDE ACCESS PANEL AS REQUIRED, PPP MODEL #PR-500 PROVIDE DISTRIBUTION UNIT AS NECESSARY, PPP MODEL #DU-U. ACCESS PANEL: 16 GA STEEL, PRIME COAT (PAINT TO MATCH ADJACENT SURFACE), SCREW DRIVER LATCH, PPP #D-1212PC
WB-1	WALL BOX: PLASTIC ICEMAKER WATER BOX WITH BALL VALVE, SPECIALTY PRODUCTS #OB-801-LL.
WB-2	WALL BOX: PLASTIC DRYER DRAIN & WASHING MACHINE OUTLET BOX WITH BALL VALVE, TWO DRAIN OUTLETS, COPPER SWEAT FITTINGS, SPECIALTY PRODUCTS #OB-713-T
HB-1	HOSE BIB: BRONZE BODY, KEY OPERATED, VACUUM BREAKER, CHROME FINISH, CHROME PLATED TAMER RESISTANT BOX, WOODFORD #B75.
HB-2	HOSE BIB: BRASS BODY, VACUUM BREAKER, CHROME FINISH, OPTIONAL METAL WHEEL HANDLE, WOODFORD #Y24.
FS-1	FLOOR SINK: CAST IRON, ACID RESISTANT, NO-HUB 3" OUTLET, ABS ANTI-SPLASH DOME STRAINER, PROVIDE WITH HALF GRATE, ZURN #FD2376-H.
FD-1	FLOOR DRAIN: CHROME PLATED TOP, HEEL PROOF, NO-HUB 2" OUTLET, ADJUSTABLE DRAIN TOP, ZURN #FD-2321ST.
FCO	FLOOR CLEAN OUT: 4" NO-HUB, TYPE 304 SS TOP, VANDAL-PROOF SCREWS, ZURN #Z1400-SZ.
WCO	WALL CLEAN OUT: NO-HUB, CAST IRON BODY, SMOOTH STAINLESS STEEL COVER, VANDAL-PROOF SCREWS, ZURN #Z1446.
WHA-1	WATER HAMMER ARRESTOR: LEAD FREE, NPT CONNECTION, 60 PSI PRE-LOAD, WATTS #LF15M2-B.
WM	WATER METER: ONICON F-1000 SERIES TURBINE FLOW METER OR EQUAL. SEE C7.1 FOR LOCATION.

A
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ONE UNIVERSITY CIRCLE
TURLOCK, CA 95382

ehdd.

PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

neXus engineering
Consulting Mechanical Engineers
1400 Lone Palm Ave, Suite A
Modesto, CA 95351
Tel: 209.572.7399 Fax: 209.236.1579
www.nexusengineering.net
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6	A	Addendum 6	04.25.2022

Scale
12" = 1'-0"

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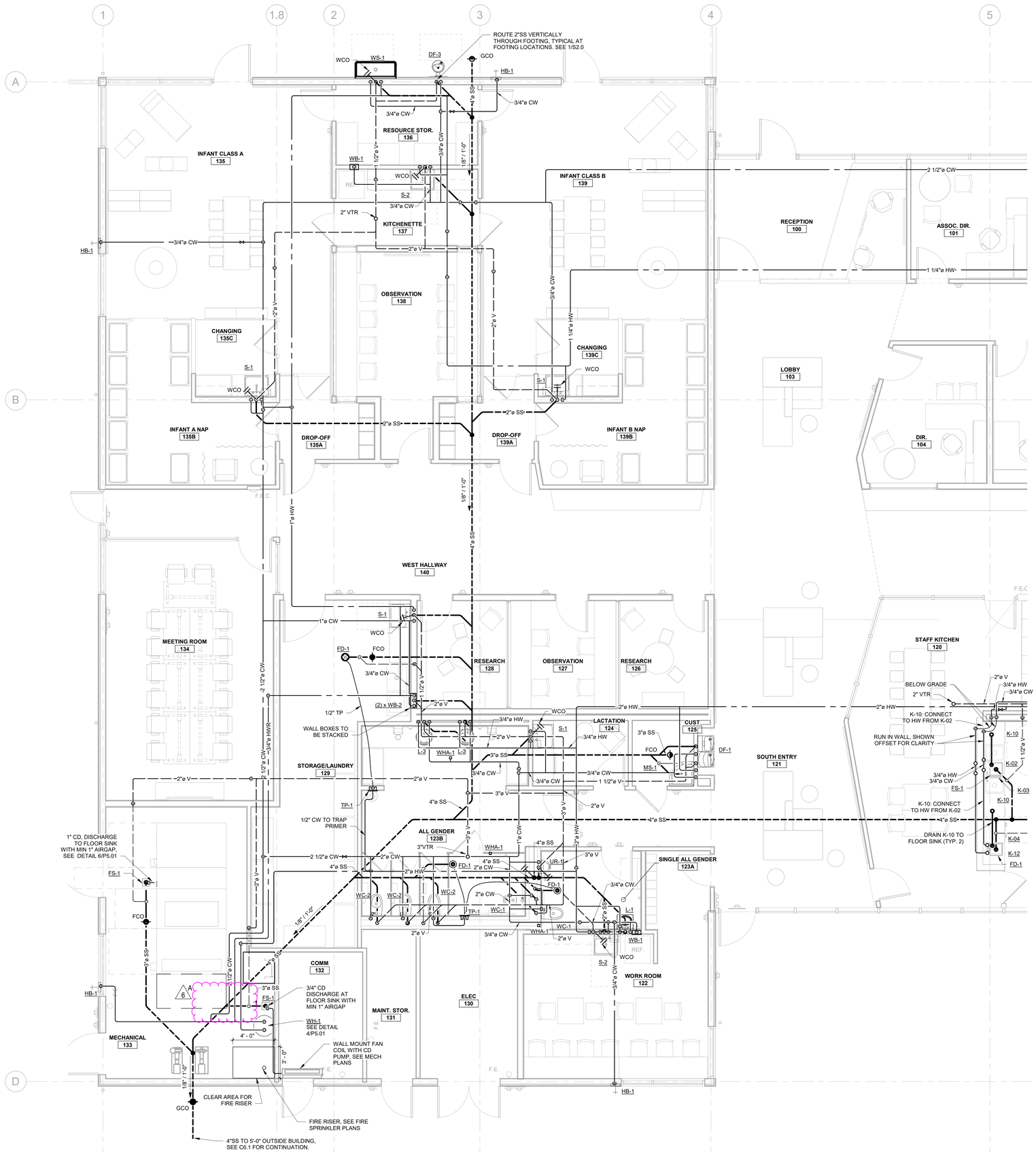
Sheet Title

PLUMBING SCHEDULES & GREEN BUILDING NOTES

Sheet Number

P0.02



1 P1.02 PLUMBING - FLOOR PLAN - A

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

4' 0' 4' 8'

SHEET NOTES

1. ALL UNDERGROUD SS SHALL BE SLOPED AT 1/4" PER FOOT UNLESS OTHERWISE NOTED.

PIPE NOTED AS SLOPED AT 1/8" PER FOOT IS DUE TO STRUCTURE FEATURES MAKING 1/4" SLOPE IMPRACTICAL.

EQUIPMENT SCHEDULE

ITEM NO.	QTY	DESCRIPTION	REMARKS
K-01	1	HAND SINK	INSTALLED BY VENDOR, PLUMBER CONNECT HW, CW, SS AND V
K-02	1	THREE COMPARTMENT SINK, DROP-IN	INSTALLED BY VENDOR, PLUMBER CONNECT HW, CW, GS AND V
K-03	1	PRE-RINSE FAUCET ASSEMBLY WITH ADD ON FAUCET	INSTALLED BY VENDOR, PLUMBER CONNECT HW, CW, GS AND V
K-04	1	MOBILE DRAWER CABINET	INSTALLED BY VENDOR, NO PLUMBING
K-05	3	TRASH CONTAINER	NIKEC / BY OWNER-OPERATOR
K-06	1	RANGE 30"	INSTALLED BY VENDOR, NO PLUMBING
K-07	1	EXHAUST VENTILATOR	INSTALLED BY VENDOR, NO PLUMBING
K-08	0	OPEN NUMBER	
K-09	1	MICROWAVE	INSTALLED BY VENDOR, NO PLUMBING
K-10	2	DISHWASHER, UNCDERCOUNTER	INSTALLED BY VENDOR, PLUMBER CONNECT HW, AND GS
K-11	1	HEATED CABINET	INSTALLED BY VENDOR, NO PLUMBING
K-12	1	PREP SINK, DROP IN	INSTALLED BY VENDOR, PLUMBER CONNECT HW, CW, GS AND V
P-01	1	REACH-IN REFRIGERATOR	INSTALLED BY VENDOR, NO PLUMBING
P-02	3	60" SHELVING UNIT	INSTALLED BY VENDOR, NO PLUMBING
P-03	1	REACH-IN FREEZER	INSTALLED BY VENDOR, NO PLUMBING

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PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

Consultant

neXus engineering
Consulting Mechanical Engineers
1400 Lone Palm Ave, Suite A
Modesto, CA 95351
Tel: 209.572.7399 Fax: 209.236.1579
www.nexusengineering.net
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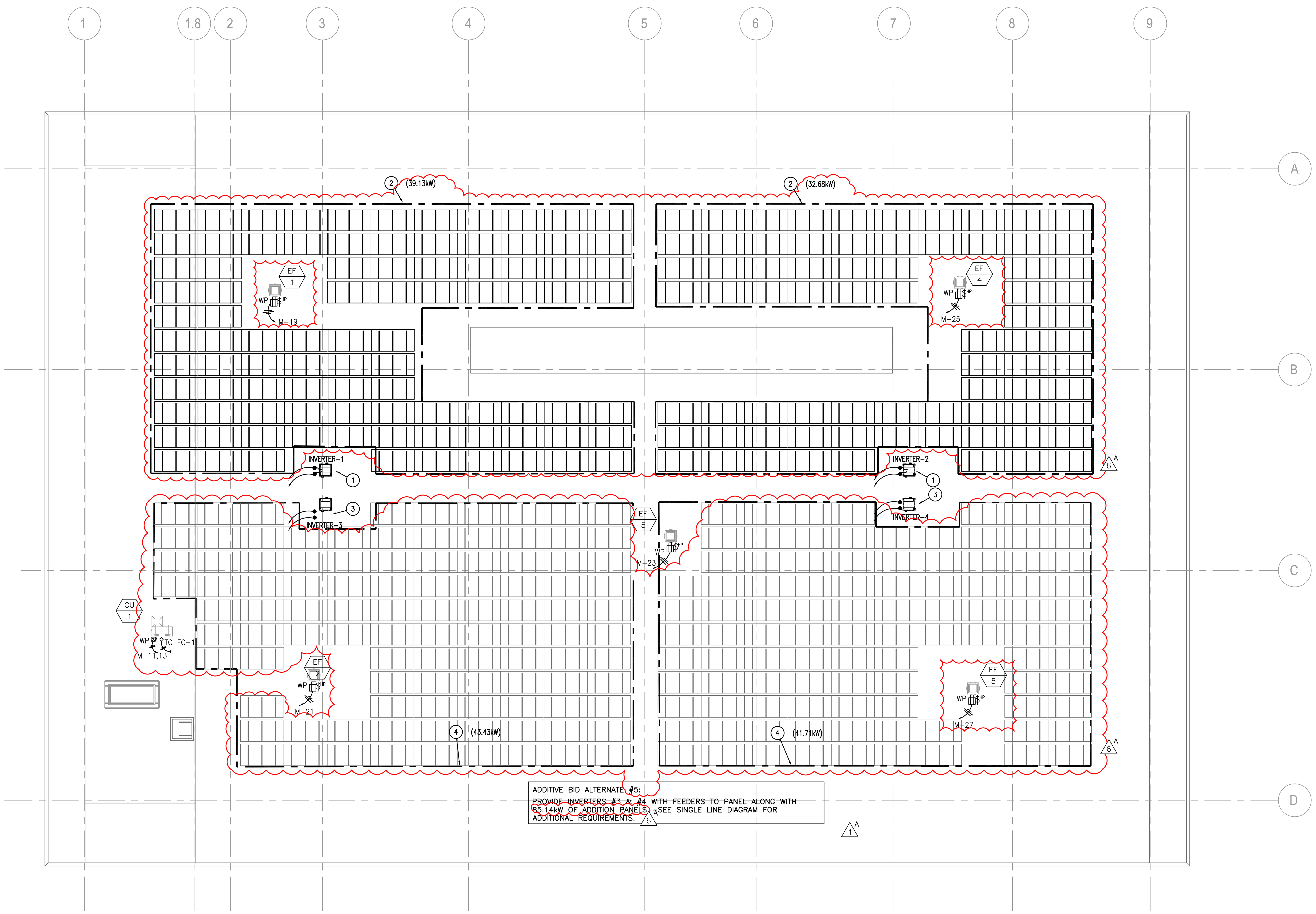
Sheet Title
PLUMBING - ENLARGED FLOOR PLAN

Sheet Number
P1.02



1 ROOF PLAN POWER
SCALE: 1/8"=1'-0"

SCALE IN INCHES 0 1/16" 1/8" 1/4"

SHEET NOTES

1. REFER TO THE GENERAL NOTES ON SHEET E0.1 FOR ADDITIONAL REQUIREMENTS.
2. ALL RECEPTACLES, WHETHER INDICATED OR NOT, INSTALLED WITH-IN SIX FEET (6') OF A SINK SHALL BE EQUIPPED WITH A GROUND FAULT CIRCUIT INTERRUPTER AS REQUIRED BY THE CALIFORNIA ELECTRICAL CODE (C.E.C.) 210.8(B)(5).
3. RECEPTACLE OUTLET BOX, (WITH UNRESTRICTED CLEAR APPROACH), MOUNTING HEIGHT SHALL BE LOCATED NO MORE THAN 48" MEASURED FROM THE TOP OF THE OUTLET BOX NOR LESS THAN 15" MEASURED FROM THE BOTTOM OF THE OUTLET BOX TO THE LEVEL OF THE FINISHED FLOOR OR WORKING PLATFORM AS REQUIRED BY C.B.C SECTION 11B-308.1.2. RECEPTACLE OUTLET BOX LOCATED ABOVE COUNTER, WHERE ACCESS IS RESTRICTED, MOUNTING HEIGHT SHALL BE NO MORE THAN 3'-10" MEASURED FROM THE TOP OF THE OUTLET BOX FOR SIDE REACH OR 3'-8" MEASURED FROM THE TOP OF THE OUTLET BOX FOR FORWARD REACH TO THE LEVEL OF THE FINISHED FLOOR OR WORKING PLATFORM.
4. SUBSCRIPT "ACT" AT DEVICE SYMBOL AT DEVICE INDICATES MOUNTING ABOVE COUNTER HEIGHT. COORDINATE DEVICE MOUNTING HEIGHT WITH THE ARCHITECTURAL INTERIOR ELEVATIONS PRIOR TO ROUGH-IN.
5. CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL JUNCTION BOXES, CONDUIT AND WIRING AS REQUIRED FOR A COMPLETE AND OPERABLE SYSTEM. MULTI-WIRE BRANCH CIRCUIT WIRING SHALL COMPLY WITH C.E.C 210.4(B).
6. ALL RECEPTACLES SHALL BE TAMPER RESISTANT.
7. THE EQUIPMENT DESIGNATED "N.I.E.S." IS EITHER OWNER FURNISHED/CONTRACTOR INSTALLED OR FURNISHED AND INSTALLED UNDER OTHER SECTIONS OF THIS PROJECT. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE TO MAKE ELECTRICAL CONNECTION TO EQUIPMENT AS REQUIRED BY THE EQUIPMENT. PROVIDE ALL NECESSARY JUNCTION BOXES, CONDUIT AND WIRING AS REQUIRED FOR COMPLETE INSTALLATION. COORDINATE CONNECTION REQUIREMENTS WITH EQUIPMENT PRIOR TO THE EXECUTION OF WORK.
8. REFER TO THE MECHANICAL SCHEDULE ON SHEETS M0 FOR MECHANICAL EQUIPMENT REQUIREMENTS.
9. MECHANICAL DRAWINGS AND SPECIFICATIONS ARE SUBJECT TO LAST MINUTE CHANGES, THEREFORE THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL COORDINATION BETWEEN ELECTRICAL AND MECHANICAL DRAWINGS. CONDUIT AND WIRING FOR THE LOW VOLTAGE CONTROLS SHALL BE PROVIDED UNDER DIVISION 23 SCOPE OF WORK.
10. ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT AS SPECIFIED ON THE MECHANICAL DRAWINGS MAY BE DIFFERENT BASED ON ACTUAL MECHANICAL EQUIPMENT SUBMITTALS. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL COORDINATION WITH THE ACTUAL MECHANICAL EQUIPMENT SUBMITTALS AND PROVIDE CONDUIT, WIRES, DISCONNECT AND CIRCUIT BREAKERS, SIZE AS REQUIRED, PER EQUIPMENT NAMEPLATE RATING.
11. DISCONNECT SWITCHES LOCATED OUTSIDE SHALL BE WEATHERPROOF.

PLAN NOTES

1. (N) PV INVERTER -ROOF TOP MOUNTED -SMA #CORE1 SEE SINGLE LINE DIAGRAM -SEE STRUCTURAL FOR MOUNTING -INSTALL (N) 1 1/2"C (POWER) & 1"C (DATA) W/LFMC CONNECTIONS
2. (N) 430W PV PANEL -TYPICAL
3. (BASE BID) PV INVERTER LOCATION -ROOF TOP MOUNTED UNIT -SEE STRUCTURAL FOR MOUNTING -INSTALL (N) 1 1/2"C (POWER) & 1"C (DATA) W/CAPS +12" ABOVE FINISHED ROOFING

   (BID ALTERNATE #5) PROVIDE & INSTALL (N) PV INVERTER #CORE1-50-US (62kW -480V -3PH) UNIT -INSTALL (N) FEEDER & DATA CONNECTION TO INVERTER W/LFMC CONNECTIONS
4. (BID ALTERNATE #5) (N) 430W PV PANEL -TYPICAL

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PIER 1, BAY 2
THE EMBARCADERO
SAN FRANCISCO, CA 94111

INFO@EHDD.COM
+1 415-285-9193

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Sheet Title
ROOF PLAN POWER

Sheet Number
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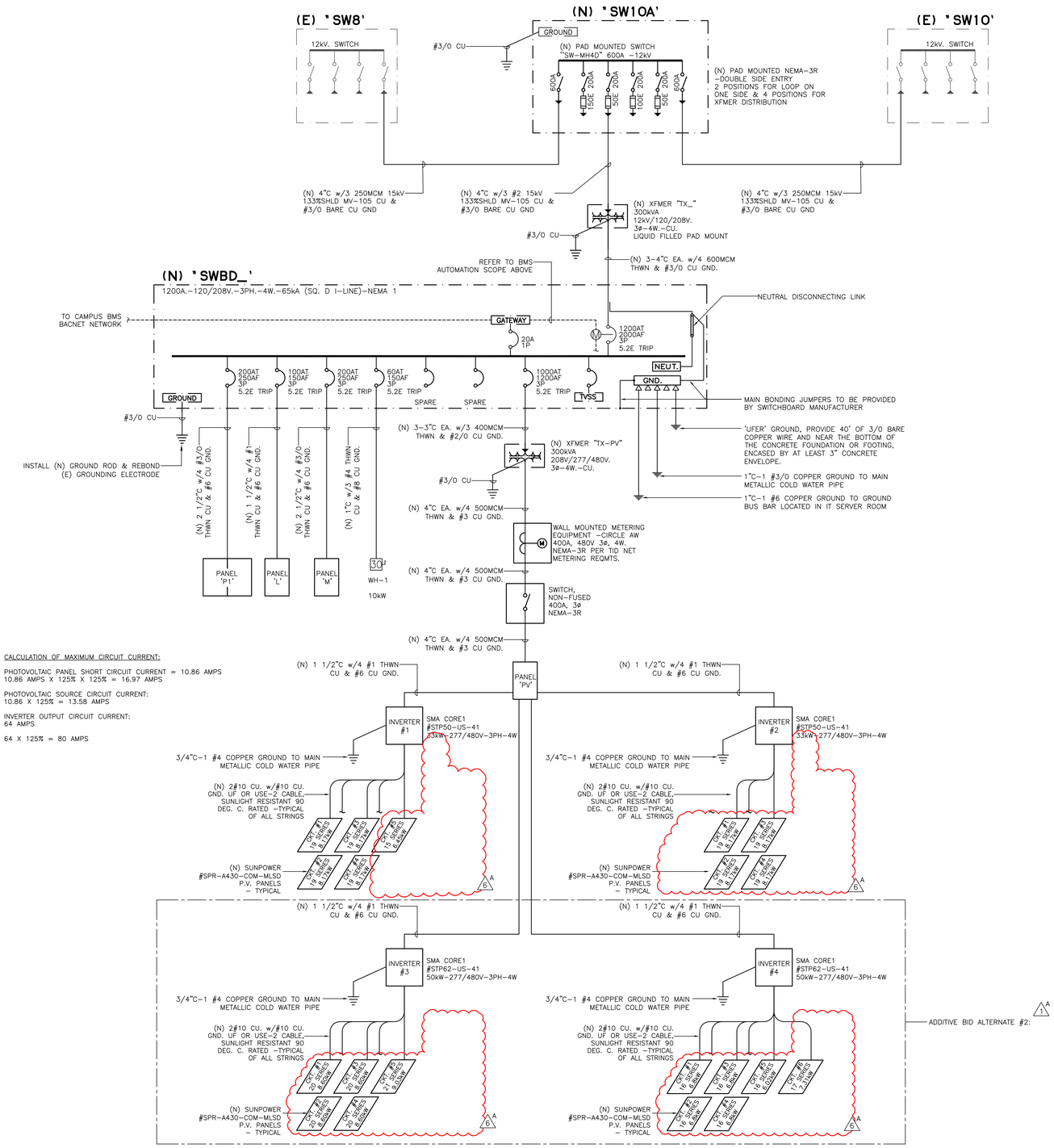


CALCULATION OF MAXIMUM CIRCUIT CURRENT:

PHOTOVOLTAIC PANEL SHORT CIRCUIT CURRENT = 10.86 AMPS
10.86 AMPS X 125% X 125% = 16.97 AMPS

PHOTOVOLTAIC SOURCE CIRCUIT CURRENT:
10.86 X 125% = 13.58 AMPS

INVERTER OUTPUT CIRCUIT CURRENT:
64 AMPS

64 X 125% = 80 AMPS

1 SINGLE LINE DIAGRAM

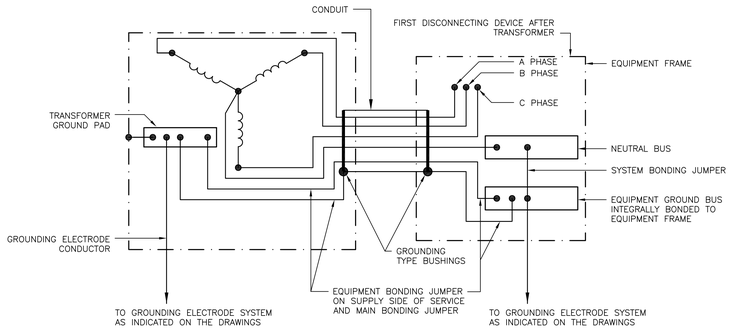
SCALE: NTS

BMS METERING AUTOMATION SCOPE

INTERNAL/EXTERIOR EQUIPMENT CABINET (20"WX36"HX6"D MIN.) W/BACKBOARD FOR CAMPUS METERING EQUIPMENT. CONTRACTOR TO COORDINATE WITH VENDOR FOR A MODBUS NETWORK BETWEEN ALL (N) METERS. WITHIN THE CABINET PROVIDE THE FOLLOW DIN RAIL MOUNTED EQUIPMENT:

- POWERLOGIC EGX300 MODBUS ETHERNET GATEWAY
- PHOENIX CONTACT #2891028- 4 PORT INDUSTRIAL ETHERNET SWITCH
- PHOENIX CONTACT #2866763- POWER SUPPLY UNIT 120VAC IN/24VDC OUT -10A OUTPUT
- PHOENIX CONTACT #5600462- DIN RAIL MOUNTED GFCI RECEPTACLE
- PROSOFT 5201-MNET-BACNET- MODBUS TCP/IP TO BACNET/IP CLIENT GATEWAY
- DIN MOUNTED BREAKERS (QNTY & RATING AS REQD.)

REFER TO DRAWING 5/E3.0 FOR 120VAC AND 24VDC INTERCONNECTION WIRING AS WELL AS COORDINATE 24VDC TO ALL MODBUS DEVICES (POWER ION METERS AND POWERLOGIC DEVICES). CONTRACTOR TO PROVIDE CAT-6 SHIELD PATCH CABLES FOR GATEWAYS, ETHERNET SWITCH, AND WAP. PROVIDE A COMPLETE AND WORKING SYSTEM FOR ALL POWERLOGIC BREAKERS SHOWN AND THE POWER-ION METER. CONTRACTOR TO COORDINATE MODBUS TAGS INTO BACNET GATEWAY FOR UNIVERSITY'S BMS VENDOR. CONTRACTOR SHALL COORDINATE ETHERNET TCP/IP CONNECTIVITY WITH UNIVERSITY'S EXISTING WIRELESS NETWORK VIA IT DEPT.



TRANSFORMER (NON-UTILITY) 3-PHASE, 4-WIRE SECONDARY POWER GROUNDING DETAIL

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PIER 1, BAY 2
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INFO@EHDD.COM
+1 415-285-9193

Consultant

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CONSULTING ELECTRICAL ENGINEERS
1550 4TH Street, Suite #101 Modesto, CA 95354
PHONE: 209. 554. 4662
HTTP://WWW.PEZENGR.COM

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