

December 21, 2022

## **NOTICE TO ALL BIDDERS**

From: Javier Luna, PE – Director of Facilities, Planning, and Construction  
Imperial Community College District  
380 E. Aten Rd., Building 2000,  
Imperial, CA 92251

Re: SPORTS FIELD RESTROOM AND CONCESSION, WESTSIDE LIGHTING AND BORDER LINK  
ANTENNA PROJECT  
RFP No 22-23-02  
ADDENDUM #03

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

### Document Additions, Revision, and Clarifications:

1. Corrections and clarifications to the contract documents are hereby modified based on the following attachment by Sanders, Inc. (AOR), dated December 19, 2022.
2. Specification section 00 21 13, Instruction to and Information for Bidders, Section 1.3, Item A., shall be disregarded and eliminated from the contract documents.
3. Specification section 00 21 13, Instruction to and Information for Bidders, Section 1.16, Item A., shall be disregarded and eliminated from the contract documents.
4. Specification sections 00 41 43, Bid Forms, Section 1.1, Item. C, last portion of sentence, “and that it shall self-perform at least twenty percent (20%) of the Work”, shall be disregarded, and eliminated from the contract documents.
5. Specification section 00 72 13, General Conditions, Section 6.9, Item A., shall be disregarded and eliminated from the contract documents.
6. The roofing system to be utilized will be the following. The contractor shall provide and install an SBS Modified Bituminous Roofing System. Disregard the PVC single-ply roofing system.

7. The Border Link Antenna equipment and installation referenced in the drawings will not be part of the scope of work under this contract. The District will procure this scope of work through ICOE, there will be coordination between the District, ICOE and the Contractor when said scope of work commences. The Contractor will need to allow ICOE to conduct their scope of work during the overall Project.
8. The IID contractor notes for this project is an attachment to this addendum and shall be considered part of the contract documents. The Contractor shall be responsible to review and understand all work and underground inspection processes as listed within the IID contractor notes. The Contractor is responsible for work shown within the contractors notes, including work listed under the underground inspection process, and associated details within the contractor notes. IID is responsible for cable installation from existing sectionalizing switch to new sector/transformer, any new sector/transformer, and secondary cable from new transformer to new meter panel. The Contractor shall be responsible for all coordination with IID inspectors, to review work and provided required testing, as outline within the IID contractor notes, and Project contract documents.
9. Protection of Existing Utilities:
  - A. Utilities: Unless otherwise illustrated on the Plans or stated in the Contract documents, all underground utilities shall be maintained in continuous service throughout the entire contract period. The Contractor shall be responsible and liable for any damages to or interruption of service caused by the construction.

If the Contractor desires to simplify his operation by temporarily or permanently relocating or shutting down any utility or appurtenance, he shall make the necessary arrangements, agreements and approvals with the utility purveyor, the District and District representatives, and shall be completely responsible for all costs concerned with the relocation or shutdown and reconstruction. All property shall be reconstructed in its original or new location as soon as possible and to a condition at least as good as its previous condition. This cycle of relocation or shutdown and reconstruction shall be subject to inspection and approval by the utility purveyor, or the District and District representatives.

The Contractor shall be entirely responsible for safeguarding and maintaining all conflicting utilities that are illustrated on the Plans. If, in the course of work, a conflicting utility line that was not illustrated on the Plans is discovered, it shall be brought to the immediate attention of the Engineer and appropriate utility purveyor for a determination regarding alternatives to the conflict.

B. Building, Foundations and Structures: Where trenches are located adjacent to buildings, foundations and structures, the Contractor shall take all necessary precaution against damage to them.

10. Open trenches shall not be allowed. If open trenches are necessary to continue the progress of work, the Contractor shall practice and provide all provisions to cover and barricade the trenches securely and safely.

11. Clean up of Existing Streets

Dirt, dust, mud, native earth material, sand, gravel, pipe material, asphalt debris, cement debris and all other construction-related material shall be swept from the street and sidewalk areas in the vicinity of the electrical pipeline installation work on a daily basis. The material shall be removed and disposed of by the Contractor. The street and sidewalk sections to be cleaned are within the street and sidewalk areas opened to traffic. It shall not be necessary to clean the street sections cordoned off from traffic within the pipe installation trench and adjoining work area. At the conclusion of the completion of electrical pipeline installation the entire street width along the electrical pipeline shall be swept clean to the satisfaction of the District.

12. Deposition of A.C. Pavement, Native Material & Construction Debris

A.C. pavement, native material spoils, and overall construction debris resultant from trenching and other construction activities shall be removed and disposed by the Contractor. The District will not accepted any deposition materials and/or debris to be dumped at the District's yard, and/or trash bins.

Questions & Answers:

1. Plans call for PVC Single Ply Roofing. Project Manual contains specifications for both PVC single ply roofing and SBS Modified Bituminous Membrane Roofing. Please confirm that the SBS Modified Bituminous Roofing specification is being offered as an alternate option in response to typical supply chain issues currently being experienced with PVC single ply roofing or please clarify intent for additional specification.

A. Refer to document additions, revisions, and clarifications. The roofing system will be an SBS Modified Bituminous Roofing System.

2. Please provide Engineer's estimate for this Project.

A. The Engineers Estimate, Base Bid, and Alternate Add 1 and 2: \$3,100,00.00.

3. Section 00 11 16- Notice Inviting Bids calls for bids to be submitted on November 17, 2022. The Mandatory Pre-Bid Meeting Agenda distributed at the job walk calls for bids to be submitted November 15, 2022. Please confirm the correct bid date for this Project.
  - A. Please refer to Addendum No. 02
4. The finish schedule shows N/A for exposed ceilings, and the RCP plan shows painting of exposed duct accent color per notes. Please clarify the painting scope of the exposed ceilings.
  - A. The exposed ductwork shall be painted with an accent color. Refer to Addendum no. 03 revised sheet AD-3\_A2 reflected keynotes no. 3 and 4 and revised sheet AD-3\_AX1.1 revised room finish schedule for the exposed ceiling finish.
5. Advertisement states BID DATE is 11/15/22; according to the spec book, the BID DATE is 11/17/22. Please advise which one is correct.
  - A. Please refer to Addendum No. 02
6. The legal advertisement published has a bid date of 11/15/22. The mandatory walk agenda has a bid date of 11/15/22. However, the notice inviting bids (00 11 16) lists a bid date of 11/17/22. Please clarify the bid date for the Project.
  - A. Please refer to Addendum No. 02
7. Specification sections 00 21 13 and 00 41 43 indicate a self-perform requirement of 20 percent. While, specification 00 72 13 indicates a 30 percent requirement. Please clarify the requirement for self-performed percentage and confirm that general conditions are included in this calculation.
  - A. Please see the above document Additions, Revisions, and Clarifications section.
8. If alternate #1 is accepted without alternate #2, there will be a gap in the building. Please provide clarification as to how the building will be modified to allow for the construction.
  - A. If alternate #2 is not accepted. The building length will decrease, including the engineered pad, concrete foundation, walls, roofing framing, and all finishes.
9. The specifications issued for the Project include a specification for a wet-pipe sprinkler system. However, the title sheet of the plans under building data state the building contains no fire sprinklers. Does this specification apply to the Project?



- A. Section 21 13 13 Wet pipe Sprinkler System specifications was included in error. This section shall be removed from the project manual. A Fire sprinkler system is not required.
10. I see drawings for the communication/low voltage on CM1 and FA-101 but nothing in the specifications. Please provide specifications for the communications and low voltage.
- A. Specification Section 27 10 00 Structured cabling, 27 11 00 Communications Equipment, and 28 13 00 Access Control was omitted from the project manual in error. The specification has been incorporated in Addendum 03.
11. I see there is a Border Link Antenna on top of one of the Musco Light Poles. Is this considered part of our scope, or will this be provided by the owner as well?
- A. The Border Link Antenna equipment and installation will not be part of the scope of work under this contract.
12. Doors #6 and #7 in the plans are S-1 with hardware headings 1 and 2. The specs state that hardware heading 1 is AD300 with integrated card reader. Heading 2 is L9080 electric lock with card reader mounted on the wall. Both openings are restrooms. Do you want these restroom openings to have different hardware, as stated in the plans?
- A. No, doors #6 and #7 shall have the same hardware heading. 2. Refer to the revised hardware schedule in sheet AD-3\_AX1.1.
13. Public Contract Code states that contractors must be prequalified to bid public projects over 1 million dollars, but we could not find any prequalification requirements in the project bid documents. Please advise what, if any, are the prequalification requirements for this Project.
- A. Please be advised that there is no pre-qualification requirements for this Project.
14. There are two sections in the Specifications for the sealed concrete flooring, 03 35 00 Concrete Floor Finishing and 09 97 23 Solvent Concrete Sealers. Each section calls for a different product. Can you clarify which spec is correct for sealed concrete floor inside of the building?
- A. Refer to the additions, clarifications, and additions made by the AORS. For example, section 09 97 23 has been removed from the Project Manual. Section 03 35 43 Polished Concrete Finishing was added to the Project Manual. Refer to revised sheet AD-3\_AX1.1, room finish schedule.

15. On the title sheet, Alternate Add 1 states to provide a covered outdoor shade adjacent to concession. This is not shown in the plans anywhere else. Does this refer to the overhang canopy which is a part of the roof plan on sheet A3?

A. Refer to Addendum no. 3 Alternate Add 1. A new line item describing the scope of work has been added to clarify your question.

16. I have a subcontractor that is not a distributor or installer of the specified concrete sealant and is recommending substituting the specified acrylic sealant for a more durable and longer-lasting polyurethane sealant. The specs do not clarify whether we can use an equal product. I will attach the proposed product information. Will we be able to substitute the specified floor sealant for another product of equal quality?

A. The substitution is not approved.

17. Typical notes from S0.1 (under Steel, Note 4) states all steel and connectors exposed to weather shall be hot-dipped galvanized. Specification 05 12 00, Part 2, calls for all structural steel to receive shop paint. What is the desired shop finish of the exterior steel used for the overhanging canopy?

A. All exposed structural steel shall receive paint as shown in revised drawings AD-3\_AX1 – Schedules Door and Window Types and AD-3\_A2 – Architectural Sections and Reflected ceilings.

18. It has been brought to my attention that the specified Grab Bars (Model: Bobrick B-490 Series) are no longer available. We suggest replacing the specified grab bars with the B-5806 Series by Bobrick. Please confirm whether we can use the suggested Bobrick B-5806 Series Grab Bars.

A. No exception taken to substitution request.

19. Specifications call for (1) Bradley 584 Toilet Seat Cover dispenser at each toilet. This specified toilet seat cover dispenser is recessed. On page AX3.1 section B, the mounting location in accessible ambulatory toilet stalls for the toilet seat cover dispenser is on the partition wall. Please confirm whether each toilet requires a recessed toilet seat cover dispenser to be mounted to the wall above the toilet. If there is a surface-mounted alternate to be mounted on the partition wall, please provide specifications.

A. The recessed Toilet Seat Cover dispenser is only required in the accessible stall. The remaining toilet seat cover dispensers can be surface mounted.

20. Specifications state that there is a Soils Report available, No. LE22111, dated June 2022. Please provide the Soils Report referenced in the specifications.
- A. Please refer to Addendum No. 02
21. Specifications call for (1) Feminine Napkin Disposal (Bradley 4731-15, Recessed) at each female toilet. Please confirm whether each female toilet requires a recessed Feminine Napkin Disposal, and if so, where to mount the Feminine Napkin Disposal on the stalls with partition walls. If there is a surface-mounted alternate, please provide specifications.
- A. The recessed feminine napkin disposal is required in the accessible stall. The remaining feminine napkin disposal products will be surfaced mounted. Use the Bradley surface-mounted option.
22. Specification 23 00 00 HVAC, section 2.14 A-1 states "Roof top package units: Carrier as scheduled (No known equivalent)". The HVAC schedule on M0.1 in the plans call for York equipment. Please clarify which equipment should be used for the package rooftop heat pumps.
- A. Refer to attached Corrections and clarifications Letter by AOR.
23. The title sheet under Sheet Index lists AS3 – Site Survey and Demolition, which is missing from the plans. Please provide the missing page, AS3 – Site Survey and Demolition.
- A. The sheet was not attached to the drawing set in error. Refer to Addendum no. 03. The sheet has been added to the project drawings.
24. On page AS5, there is a walking path southeast of the proposed restroom/concession building and northwest of the existing baseball field. It has a patterned fill, doesn't appear to be existing, or include a call-out that references a detail or typical section. The job walk photos show this area to be dirt. Is this area intended to be future work or part of the new work proposed? If it is considered new work, please provide more information.
- A. Refer to the revised Hardscape Plan, sheet AD-3\_AS5 – HARDSCAPE PLAN attached to this Addendum. The area shown with a hatch will receive an all-weather surface with Class II base.
25. The drinking fountain models aren't matching. The Plumbing Fixture Schedule on P0.1 shows (2) HAWS #1109 and a water bottle filler HAWS #1920. Detail 10 on sheet ASX3 calls for (4) HAWS #1025G and doesn't show a water bottle filler. On sheet P1, there is

also no information about sewage or cold-water hookups. Please clarify which model number is correct, including counts, and provide clarification about sewage and cold-water hookups.

A. Refer to the revised site utility plan for the water and sewer hookups for the drinker fountains issued in Addendum no. 03. The plumbing fixture schedule for the drinking fountains is in error. Refer to Addendum no. 03 for revised fixture model numbers.

26. Specs 08 33 13 Coiling Counter Doors calls for Alpine Overhead Doors, Inc. as the only acceptable manufacturer. I have a subcontractor who is a supplier/installer for Cornell Cookson asking if substitutions are allowed for the coiling doors. For the coiling counter doors, they are proposing to offer Cornell ERC11(SmokeShield) as a substitution with the same features, curtain gauge, fire rating, smoke rating, and finish. For the grade level overhead coiling door, they are proposing to offer Cornell ESD10 as a substitution with the same features, curtain gauge, and finish. Attached you will find the data sheets for these models. Are we able to substitute the specified Alpine Coiling Shutters/Doors for these Cornell Cookson models?

A. No exception take to substitution request.

27. Landscape plans call for concrete benches. There is nothing in the Architectural Site plans showing details for these.

A. Refer to attached Revised Plans Sheets – Equipment Schedule Clarification

28. AS1 – Accessibility Site Plan calls for Student Bike Racks and Staff Bike Lockers but there is nothing listed in the specifications.

A. Refer to attached Revised Plans Sheets – Equipment Schedule Clarification

29. There are two roof specifications listed, 07 52 16 Modified Bituminous Membrane Roofing and 07 54 19 Fully Adhered PVC Membrane Roofing. Please clarify which roof specification is preferred for the Restroom and Concession Building.

A. Refer to attached Corrections and clarifications Letter by AOR.

30. Specification 08 33 13 Coiling Counter Doors calls for manual operated, automatic closing Counter-Shutter Fire doors. The door schedule on plan sheet AX1.1 calls for motorized coiling doors. Please clarify whether the coiling doors are manually operated or motorized.

- A. Refer to attached Corrections and clarifications Letter by AOR. The Contractor shall provide manual coiling counter doors. The door schedule on plan sheet AX1.1 was in error.
  
- 31. On plan sheet A1, Equipment Schedule and Architectural Floor Plan call for two Stainless Steel Carts. Sheet A4.1, keynote #34 and #35 calls for Stainless Steel Shelves and Counters. On plan sheet AX1.1, under Equipment Schedule, these items are listed as Contractor Furnished, Contractor Installed. There is nothing in the specifications detailing this food service equipment. Please confirm whether these items are CFCI and if so, please provide specifications for the Stainless Steel Carts, Stainless Steel Shelves, and Stainless Steel Counters.
  
- A. Refer to attached Revised Plans Sheets – Equipment Schedule Clarification

**END OF ADDENDUM NO. 03**



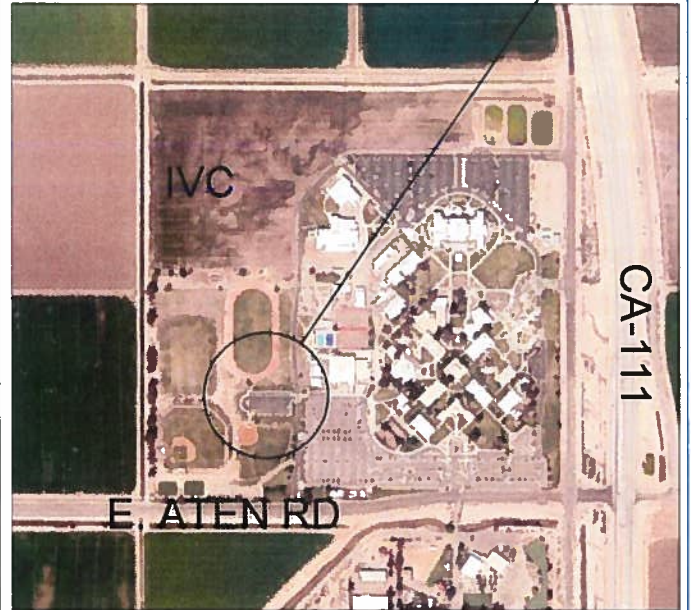
**IID**

A century of service.  
**ENGINEERING**

DEC 19 2022  
COMPLETE

- CUSTOMER
- DISTRIBUTION SUPERVISOR
- DISTRIBUTION
- PROJECT MANAGER
- INSPECTOR
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**PROJECT SITE**



**IMPERIAL  
LOCATION MAP**

NOT TO SCALE



## CONTRACTOR NOTES

**THIS WORK REQUIRES IID UNDERGROUND INSPECTION. FOR THE UNDERGROUND INSPECTION PROCESS, SEE DETAIL PAGES 7 THRU 11 FROM THE DEVELOPER ENERGY PLANNING GUIDE. ALL EQUIPMENT OR MATERIAL INSTALLED, COVERED, OR ENCLOSED BY THE CONTRACTOR PRIOR TO IID INSPECTION SHALL BE REMOVED OR UNCOVERED FOR INSPECTION, AND REINSTALLED, AT NO EXPENSE TO IID. IID WILL NOT ACCEPT OR ENERGIZE FACILITIES THAT FAIL TO MEET THE REQUIREMENTS OUTLINED IN THE PROCESS.**

### DETAIL PAGES

DETAIL PAGES REFER TO THE DEVELOPER ENERGY PLANNING GUIDE (D.E.P.G.) REV. 5.0 2020, IT CAN BE OBTAINED ON THE IID WEBSITE [WWW.IID.COM/ENERGY/NEW-CONSTRUCTION](http://WWW.IID.COM/ENERGY/NEW-CONSTRUCTION)



**CAUTION: ENERGIZED STRUCTURES & CABLE**  
DO NOT PERFORM ANY TYPE OF WORK ON OR AROUND ENERGIZED STRUCTURES. A QUALIFIED IID ELECTRICAL WORKER MUST BE PRESENT AT JOB SITE BEFORE ANY CONDUIT OR ANY TYPE OF WORK IS PERFORMED. PLEASE CONTACT IID INSPECTION DESK AT LA QUINTA @:(760) 398-5828 ; IMPERIAL @:(760) 482-3300. INSPECTION SCHEDULES ARE SUBJECT TO A MINIMUM 48 HOUR ADVANCE NOTICE AND ARE BY APPOINTMENT ONLY.

380 E ATEN RD  
IMPERIAL VALLEY SPORTS FIELD  
IMPERIAL, CA

CUSTOMER CONTACT: JESUS ANTONIO AGUILERA  
PHONE NUMBER: 760-427-8085

PROJECT MANAGER: IGNACIO ROMO  
DISTRIBUTION ESTIMATOR: LUIS FLORES

SERVICE NOTIFICATION: 4033096  
SERVICE ORDER: 60136811

SHEET 1 OF 2

### UNDERGROUND SERVICE ALERT

1-800-422-4133  
CALL USA/SC

FOR UNDERGROUND LOCATING  
2 WORKING DAYS BEFORE YOU DIG



IMPERIAL IRRIGATION DISTRICT  
IMPERIAL, CA  
IMPERIAL VALLEY ENERGY PROJECT

U.G. DISTRIBUTION  
IMPERIAL VALLEY COMMUNITY COLLEGE DISTRICT  
CONDUIT LAYOUT

APPROVED: *AO* DATE: *12/19/22*

CHECKED BY: *I. Romo* *12/19/22*

DESIGN'D: L. FLORES DATE: 12/19/2022

FILE NAME: 60136811

REV.#	PG#	DATE	BY	DESCRIPTION



NOTES:

1. CUSTOMER TO PROVIDE PERMANENT ACCESS TO IID EQUIPMENT AS REQUIRED FOR OPERATION AND MAINTENANCE.
2. RIGHTS-OF-WAYS AND EASEMENTS SHALL BE IN A FORM ACCEPTABLE TO AND AT NO COST TO IID FOR INSTALLATION, OPERATION, AND MAINTENANCE OF ALL ELECTRICAL FACILITIES. APPLICANT SHALL PROVIDE A SURVEYED LEGAL DESCRIPTION AND AN ASSOCIATED EXHIBIT CERTIFIED BY A LICENSED SURVEYOR FOR ALL RIGHTS OF WAY DEEMED BY IID AS NECESSARY TO ACCOMMODATE THE PROJECT ELECTRICAL INFRASTRUCTURE.
3. CONTACT JORGE PACHECO, RIGHT OF WAY AGENT, @ (760) 791-5831 & EMAIL TO IIDREALESTATE@IID.COM FOR ANY QUESTIONS REGARDING RIGHT OF WAYS AND EASEMENTS.

**CAUTION:**  
 EXISTING SECTOR SLEEVE IS ENERGIZED. CONTACT IID INSPECTOR PRIOR TO INSTALLATION OF 5" CONDUIT.  
 NOTE: EXISTING OCCUPIED CONDUITS ENERGIZED AT 7.2/12.5KV HIGH VOLTAGE

PROPOSED 3Ø TRANSFORMER PAD #1244683 WITH OPENING WINDOW FACING SOUTHEAST & RE-ENFORCE CONCRETE CURB & BARRIER POSTS (SEE SHEETS 155, 156, 162, 165, 169, 170 FOR DETAILS)

INSTALL: 1-5" PVC SCHEDULE 40 PRIMARY CONDUIT ENCASED IN CONCRETE (SEE SHEETS 109, 113, 114 & 115)

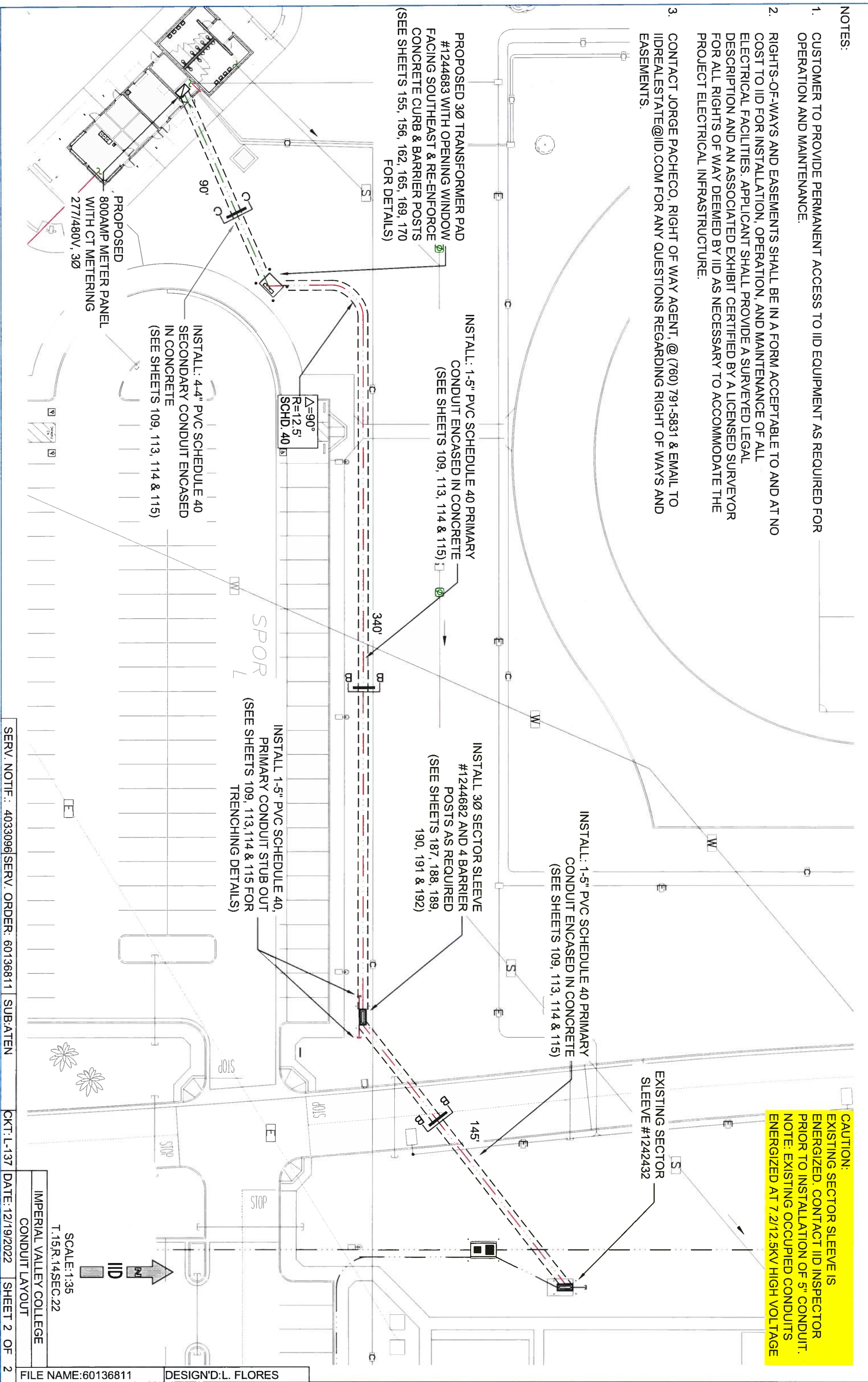
INSTALL 3Ø SECTOR SLEEVE #1244682 AND 4 BARRIER POSTS AS REQUIRED (SEE SHEETS 187, 188, 189, 190, 191 & 192)

INSTALL: 1-5" PVC SCHEDULE 40 PRIMARY CONDUIT ENCASED IN CONCRETE (SEE SHEETS 109, 113, 114 & 115)

INSTALL 1-5" PVC SCHEDULE 40, PRIMARY CONDUIT STUB OUT (SEE SHEETS 109, 113, 114 & 115 FOR TRENCHING DETAILS)

INSTALL: 4-4" PVC SCHEDULE 40 SECONDARY CONDUIT ENCASED IN CONCRETE (SEE SHEETS 109, 113, 114 & 115)

PROPOSED 800AMP METER PANEL WITH CT METERING 277/480V, 3Ø





# IMPERIAL IRRIGATION DISTRICT

Customer Project Development • 333 S. Waterman Ave • El Centro, CA 92243

**NOTE: CONTACT IID AT (760) 482-3300 TO SCHEDULE A PRE-CONSTRUCTION MEETING BEFORE PROJECT TRENCHING GETS UNDERWAY AND TO REVIEW U.G. INSPECTION SCHEDULE.**

## UNDERGROUND INSPECTION PROCESS

1. Pre -construction meeting with Electrical Contractor.
  - A. IID Inspector and Contractor to meet **BEFORE** any construction or excavating. IID Inspector will explain and/or highlight general installation notes according to the job. IID Inspector will also answer any questions the contractor has to avoid any delays in the future.
2. Trench depth and inspection of primary or secondary conduit installation.
  - A. Verify minimum primary and secondary trench depth is met.
  - B. Verify correct conduit(s) is being used, schedule 40 for below ground and schedule 80 for above ground use.
  - C. Verify approved diameter of conduit is being installed; see Contractor's Notes (drawing).
  - D. Verify spacing between conduits (3") is met and spacers are installed at every six feet.
3. Concrete encasement of conduit(s) where required or 12 inches of "native soil or sand."
  - A. Concrete encasement is required for street crossings, parking lots, driveways, and sidewalks. Encasement to be three sack mix at 2,000 p.s.i sand slurry. When these applications are not the case, then two sack slurry mix to be used.
  - B. Verify there is a three-inch envelope of encasement all around conduit (spacers must be installed prior to encasing)
4. Caution tape over encasement or 12 inch of backfill.
5. Cadweld connection of ground wire to ground rod located at the bottom of the trench for all transformer precast pads, single phase sector precast pads, and three phase sector sleeves.
  - A. Verify ground rods are 5/8" x 10'
  - B. Verify copper strand is 2/0 wire.
6. Backfill of trench and compaction.
  - A. Backfill of trench shall or excavated areas must be a minimum of 90% compaction.





# IMPERIAL IRRIGATION DISTRICT

Customer Project Development • 333 S. Waterman Ave • El Centro, CA 92243

Continued:

7. Stub out markers are installed where applicable.
8. Backfill of all transformer precast pads, single phase sector precast pads, and sector sleeve locations.
9. Verification of compaction test results for all transformer precast pads and all single phase sector precast pads.
  - A. Location of all transformer precast pad and single phase sector precast pads to be a compaction of 90% minimum by contractor/developer.
  - B. Compaction will be performed at a minimum of 2' beyond proposed transformer and single phase sector precast pads on all four sides.
  - C. Contractor to contact IID Inspector after compaction has been completed. IID Inspector must pass visual compaction prior to compaction test.
  - D. After IID Inspector passes compaction by contractor, the contractor will obtain a compaction test.
    - a) **NOTE:** A maximum of ½" of sand fill will be approved for leveling of compaction area. If the sand fill exceeds the maximum requirement, the IID Inspector will fail the compaction.
  - E. All transformer and single phase sector precast pads will not be installed until compaction test report has been received and reviewed by IID Inspector.
  - F. After compaction test report is reviewed by IID Inspector, the inspector must be present when contractor installs all transformer precast pads.
    - a) **NOTE:** After compaction test has been reviewed by IID Inspector, transformer precast pad must be installed within 24 hours. If transformer precast pad is not installed within allotted time, IID will require a re-test of compaction from contractor/developer.
10. Installation of any concrete vault, transformer precast pad, sector sleeve or secondary pullbox.
  - A. Verify there are no visible cracks on all transformer precast pads, single phase sector precast pads, concrete vaults, and sector sleeves.
  - B. Verify vaults, all transformer precast pads, sector sleeves, and secondary pullboxes are installed above their appropriate final grade (See Developers Energy Planning Guide).

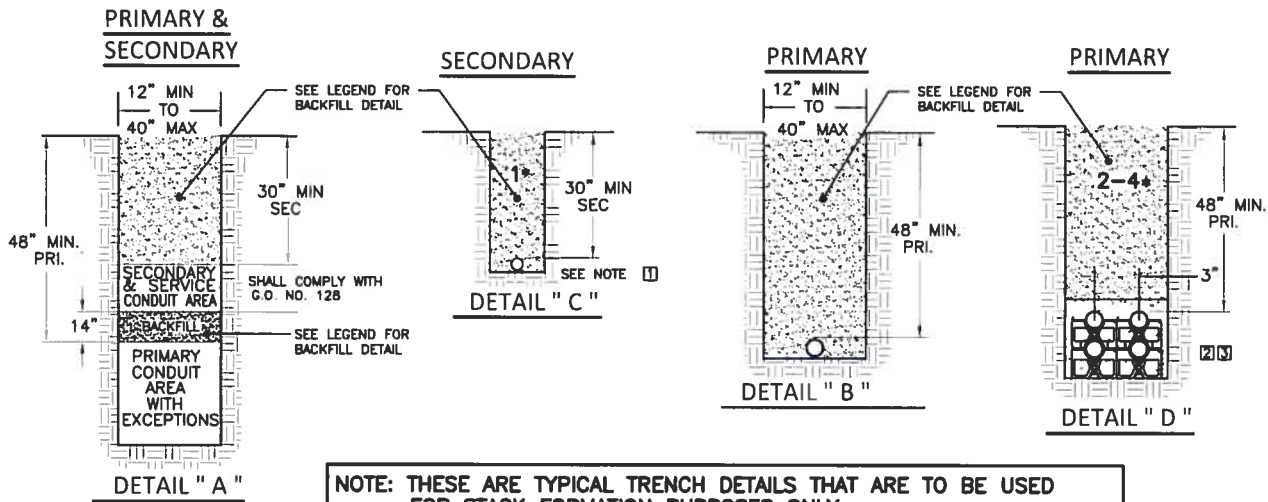


# IMPERIAL IRRIGATION DISTRICT

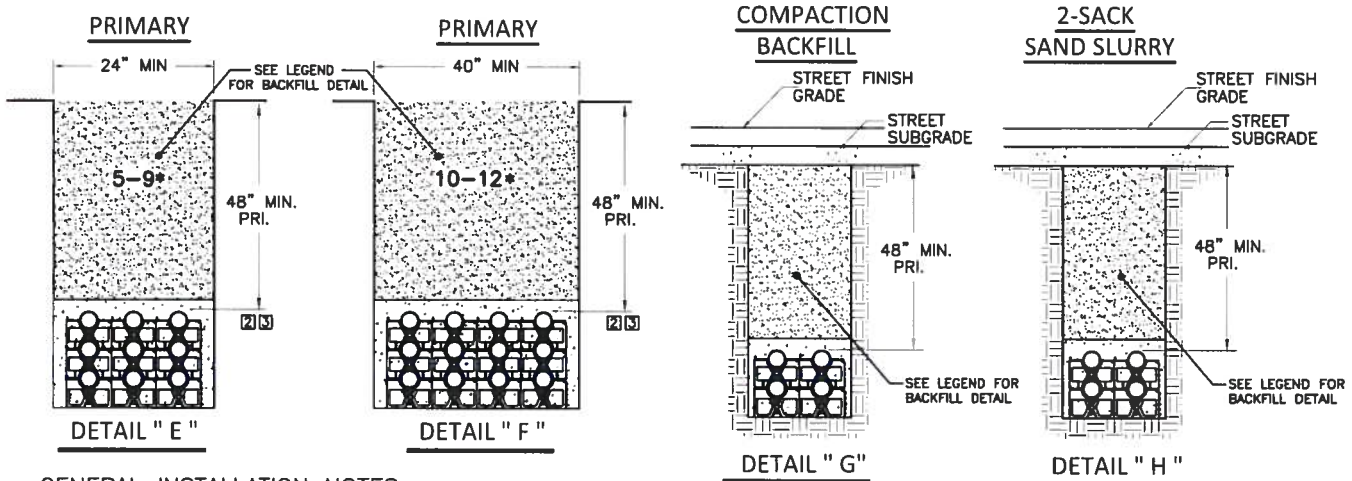
Customer Project Development • 333 S. Waterman Ave • El Centro, CA 92243

Continued:

11. Framing and pouring concrete pad for customer meter panel.
12. Installation of customer meter panel.
13. Barrier post installation (when applicable).
  - A. Verify footing is 36" in depth and 18" in diameter.
  - B. Barrier post is set 30" below finish grade.
  - C. Barrier post is 4" steel pipe.
  - D. Barrier post is painted High Visibility Yellow.
14. Final: Cold and/or hot mandrel inspection.



**NOTE: THESE ARE TYPICAL TRENCH DETAILS THAT ARE TO BE USED FOR STACK FORMATION PURPOSES ONLY. MIN. DEPTH WILL BE (PRI. 48", SEC. 30") AT ANY DEPTH.**




**GENERAL INSTALLATION NOTES**

1. USE PLASTIC SPACERS THAT PROVIDE 3" SEPARATION.
2. PLASTIC SPACERS SHALL BE USED ON CONDUIT RUNS TO BE CONCRETE ENCASED BOTH AS SINGLE OR BANKED INSTALLATIONS AND ON DUCT BANKS NOT ENCASED. (REFER TO NOTE 3.48).
3. CONDUIT RUNS SHALL NOT CROSS EACH OTHER WHEN ON THE SAME LEVEL AND/OR PLANE. (REFER NOTE 3.23)
4. THE MAXIMUM OBTAINABLE SEPARATION BETWEEN POWER FACILITIES AND ALL OTHER SUBSTRUCTURES SHALL BE MAINTAINED AT ALL TIMES, 12" MIN. WHEN PARALLELING AND 12" MIN. WHEN CROSSING ENCASED IN CONCRETE.
5. WHEN CONCRETE ENCASEMENT IS SPECIFIED ON THE JOB, ENCASEMENT SHALL BE A 3 SACK MIX (2000 PI) WITH SAND SLURRY WILL BE USED BELOW STREETS, PARKING LOTS, DRIVEWAYS, AND SIDEWALKS. WHEN STREETS, PARKING LOTS, DRIVEWAYS, AND SIDEWALKS DO NOT EXIST OVER THE DUCT SYSTEM, A 2 SACK SAND SLURRY MAY BE USED. (REFER TO NOTES 3.18, 3.19).
6. ENCASE IN CONCRETE 3" ENVELOPE WHERE REQUIRED. SEE CONDUIT LAYOUT SHEETS (JOB COPY) FOR LOCATION OF CONCRETE TRENCHES.
7. LINE GUARD TAPE REQUIRED IN ALL TRENCHES. (REFER TO NOTE 3.46 STANDARD100.5).

\*IDENTIFY # OF CONDUITS

**LEGEND**

- CONDUIT
- 3 SACK MIX SAND SLURRY
- 2 SACK SAND SLURRY
- 90% COMPACTION BACKFILL (BACKFILL TO BE NATIVE SOIL OR CALTRANS CLASS 2 AGGREGATE BASE OR CRUSHER FINE WITH 3/8 INCH ROCK).

IMPERIAL IRRIGATION DISTRICT		 <b>TRENCH DETAILS</b> <b>100.3</b>
DRAWN BY	<i>gr</i>	
REVIEWED	<i>PL</i>	
APPROVED	<i>MS</i>	
REVISION	REV 6	
DATE	9-27-2016	

3.38.1 Table 5 Riser Sweep Radius – Vertical

RISER SWEEP RADIUS INDEX (VERTICAL) TABLE 5						
SECONDARY	Radius	Pole Riser	Equip. Riser	Trans. Pad	Secondary	Meter Panels
Conduit Dia.		PVC SCH	PVC SCH	PVC SCH	PVC SCH	PVC SCH
2"	24" Radius	N/A	40	40	40	40
3"	36" Radius	80	40	40	40	40
4"	*36"-48" Radius	80	40	40	40	40
PRIMARY	Radius	Pole Riser	Equip. Riser	Trans. Pad	Secondary	Meter Panels
Conduit Dia.		PVC SCH	PVC SCH	PVC SCH	PVC SCH	PVC SCH
4"	48" Radius	80	40	40	N/A	N/A
5"	*48"-60" Radius	80	40	40	N/A	N/A
6"	60" Radius	80	N/A	N/A	N/A	N/A

\*Contact your IID Customer Service Project Manager for instructions.

N/A = Not Applicable

3.39 The installation of the conduit system will be conducted by a single contractor or other entity to give the project continuity, reducing the possibility of deviations from the G.O. 128 regulations, Authority having jurisdiction, and IID standards. Developer/Contractor will accept the most strict or highest requirements from the entities mentioned above.

3.40 Marking Tape over Conduits:

3.40.1 Contractor shall install 2 inch line guard III tape, red in color with black lettering "**CAUTION BURIED ELECTRIC LINE BELOW**" (See 3.46, Standard 100.5)

3.40.2 Contractor will install tape 12 inches (1') above the power conduits. When conduit(s) is/are encased in concrete, Developer/Contractor shall back fill with compacted (90%) native soil to meet the 12 inch (1') requirement. (See 3.46, Standard 100.5)

3.41 Mandrel

3.41.1 The installation contractor shall mandrel all primary ducts and secondary service ducts. IID shall provide the mandrel and the IID inspector for the mandrel process. Refer to 3.41.1 Pulling Rope, Table 8 Conduit rope/Measured Rope Requirements for Primary Pulls. Inspection field check schedules are subject to a minimum 48 hour advance notice and are by appointment only; Imperial (760) 482-3300; La Quinta (760) 398-5828

3.41.2 IID Inspector will conduct a field check prior to mandrel test to ensure IID structures are:

3.41.2.1 Not damaged

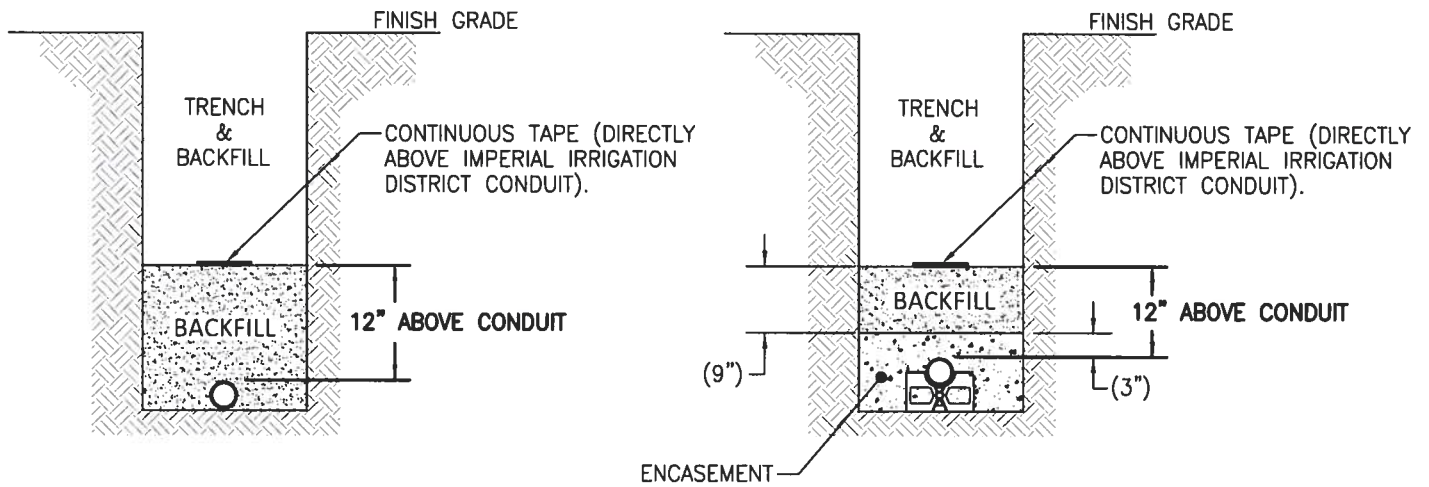
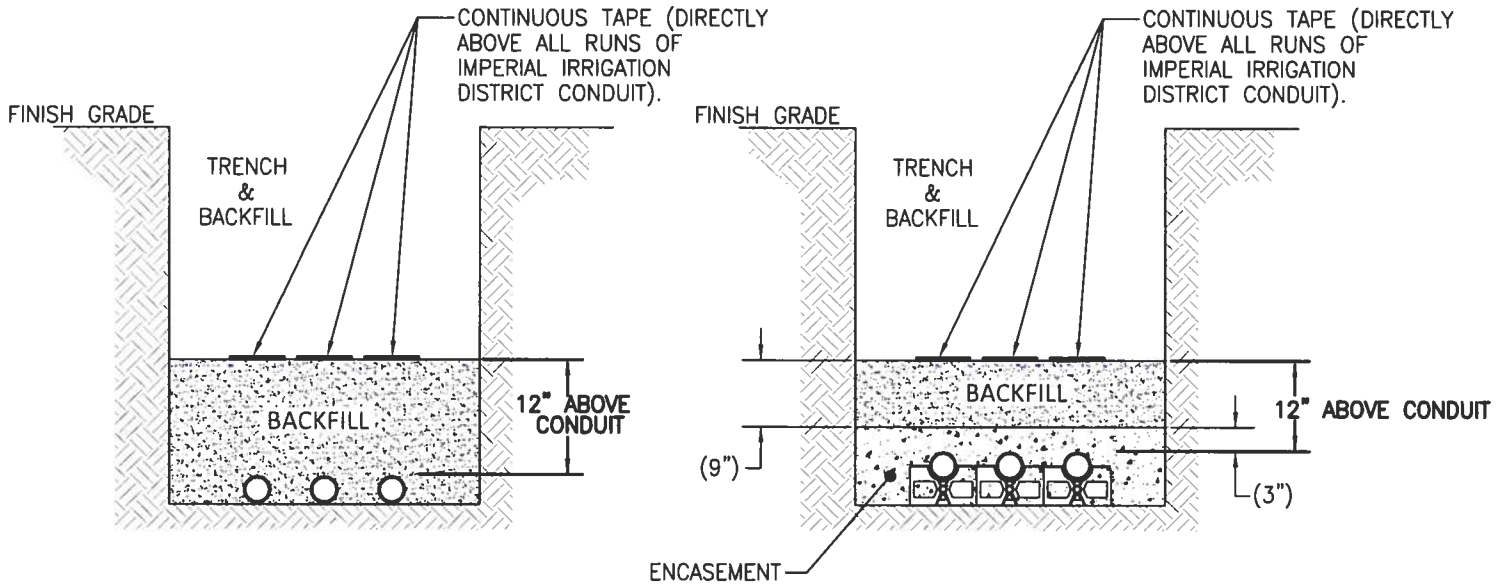
3.41.2.2 Clear of debris

3.41.2.3 No obstructions to IID structures (accessibility)

3.41.3 If mandrel is requested from IID structure to meter panel, IID Inspector will field check the following:

- 3.41.3.1 Scratch coat or brown coat must be installed on residence/building
- 3.41.3.2 Wallboard must be installed on the wall the meter panel is located.
- 3.42 After field checks are approved by IID Inspector:
  - 3.42.1 Cold Mandrel: Can continue per IID Inspectors instructions
  - 3.42.2 Hot Mandrel: Will be scheduled at a later date to an IID Troubleshooter
- 3.43 IID Inspector is required to be in attendance on all mandrel tests
- 3.44 Pulling rope: In all duct runs, the installation contractor is to furnish and install the following:
  - 3.44.1 Polypropylene rope usually yellow in color is acceptable
  - 3.44.2 All conduits may be filled with polypropylene rope, *knots & splices are not allowed at any time.*
    - 3.44.2.1 *Note:* If pulling wire at a later date (any time after construction), Developer/Contractor is responsible and required to pull in new rope that have no splices.
    - 3.44.2.2 *Note:* When multiple conduits are installed, Mule tape, ½" wide with foot markers, is required in *one* conduit. Mule tape will meet or exceed 1,250 lbs. tensile strength.
    - 3.44.2.3 *Note:* Detectable mule tape, rope, or wire is prohibited
- 3.45 Table 8 Conduit Rope/Measured Rope Requirements

CONDUIT ROPE/MEASURED ROPE REQUIREMENTS			
Rope Type	Conduit Length	Conduit which will contain Wire	Rope Tensile Strength (Average Breaking Strength)
1) Polypropylene 3/8"	0' – 1000'	No Knots	1,250 lbs. Min.
2) Polypropylene 1/2"	1000' – Greater	No Knots	2,500 lbs. Min.




**TYPICAL TRENCH DETAIL  
W/LINEGUARD III TAPE OR EQUIVALENT**

**NOTES:**

1. INSTALL LINE GUARD III TAPE (RED, MINIMUM 2" WIDE). TAPE TO BE FURNISHED & INSTALLED BY CONTRACTOR AND SHALL READ: **"CAUTION: BURIED ELECTRIC LINE BELOW"**.
2. TAPE WILL BE INSTALLED 12" ABOVE HIGHEST PRIMARY OR SECONDARY IMPERIAL IRRIGATION DISTRICT CONDUIT TRENCH.

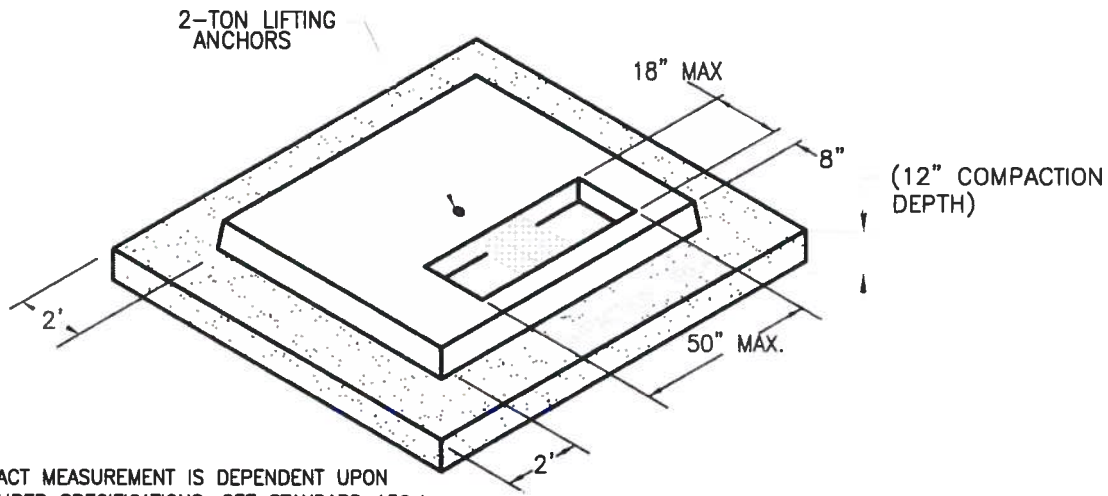
IMPERIAL IRRIGATION DISTRICT	
DRAWN BY	<i>JR</i>
REVIEWED	<i>[Signature]</i>
APPROVED	<i>MS</i>
REVISION	REV 5
DATE	12-31-2013



**LINE GUARD III TAPE**

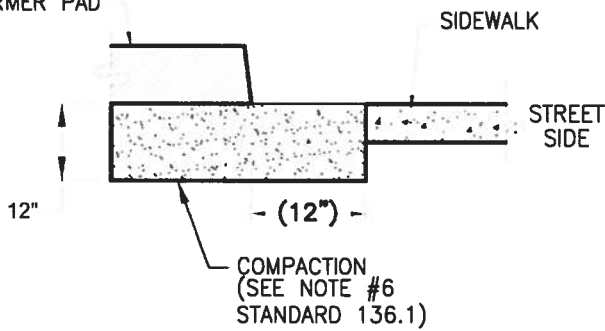
**100.5**



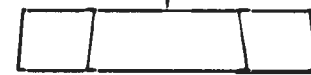


\*NOTE: EXACT MEASUREMENT IS DEPENDENT UPON MANUFACTURER SPECIFICATIONS. SEE STANDARD 136.1, CONSTRUCTION NOTE 2. APPROVED MANUFACTURERS AND STRUCTURERS.

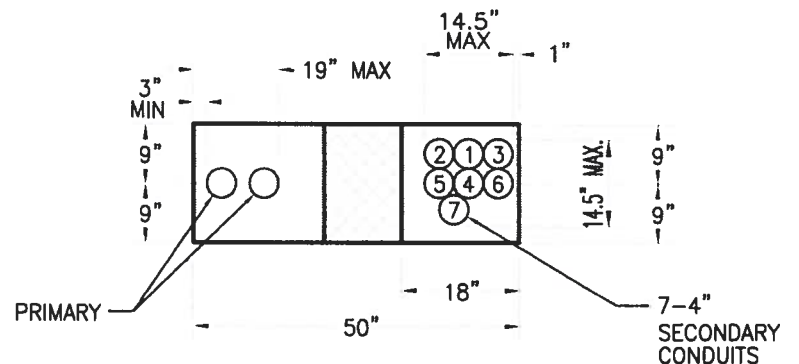
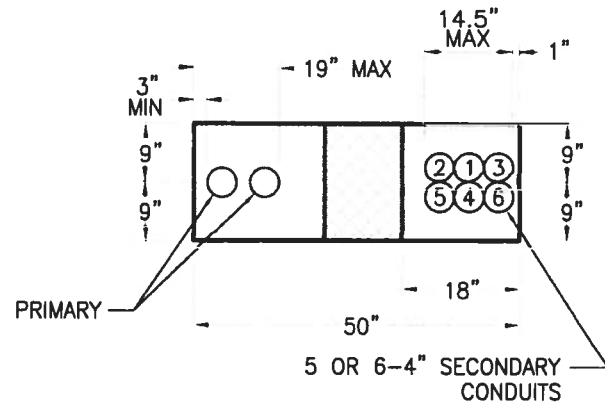
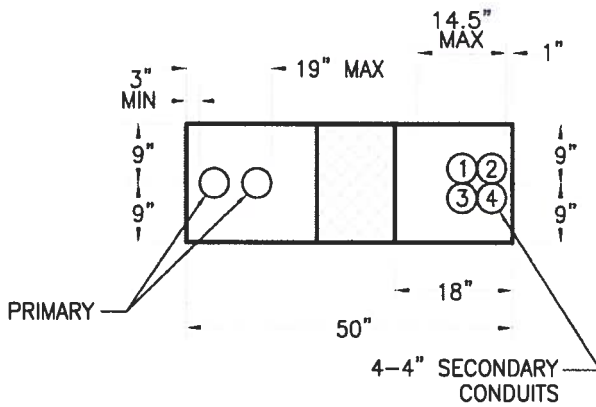
TRANSFORMER PAD



OPENING  $\nabla$



FRONT VIEW  
N.T.S



SHADED AREA TO BE CLEAR OF ALL CONDUIT

NOTE:

$\nabla$  WINDOW OPENING ON TOP OF PAD IS SLIGHTLY SMALLER THAN BOTTOM OPENING A RESULT OF FORM CONSTRUCTION

IMPERIAL IRRIGATION DISTRICT		
DRAWN BY	<i>JK</i>	 <p>PRECAST CONCRETE PAD DETAIL FOR THREE-PHASE TRANSFORMERS 45KVA TO 500KVA</p>
REVIEWED	<i>MB</i>	
APPROVED	<i>MB</i>	
REVISION	REV 7	
DATE	9-27-2016	
		136

**CONSTRUCTION NOTES:**

1. A PRECAST CONCRETE PAD SHALL BE USED.
2. APPROVED MANUFACTURERS AND STRUCTURES.

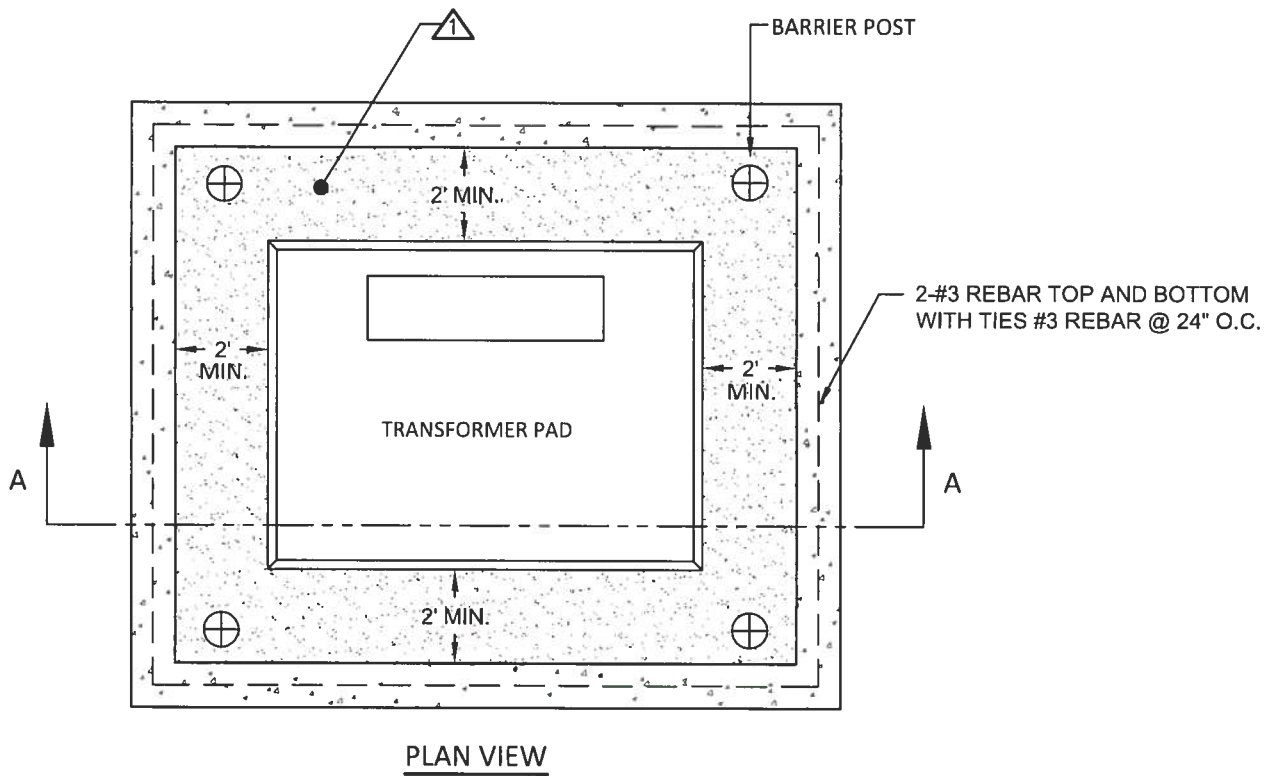
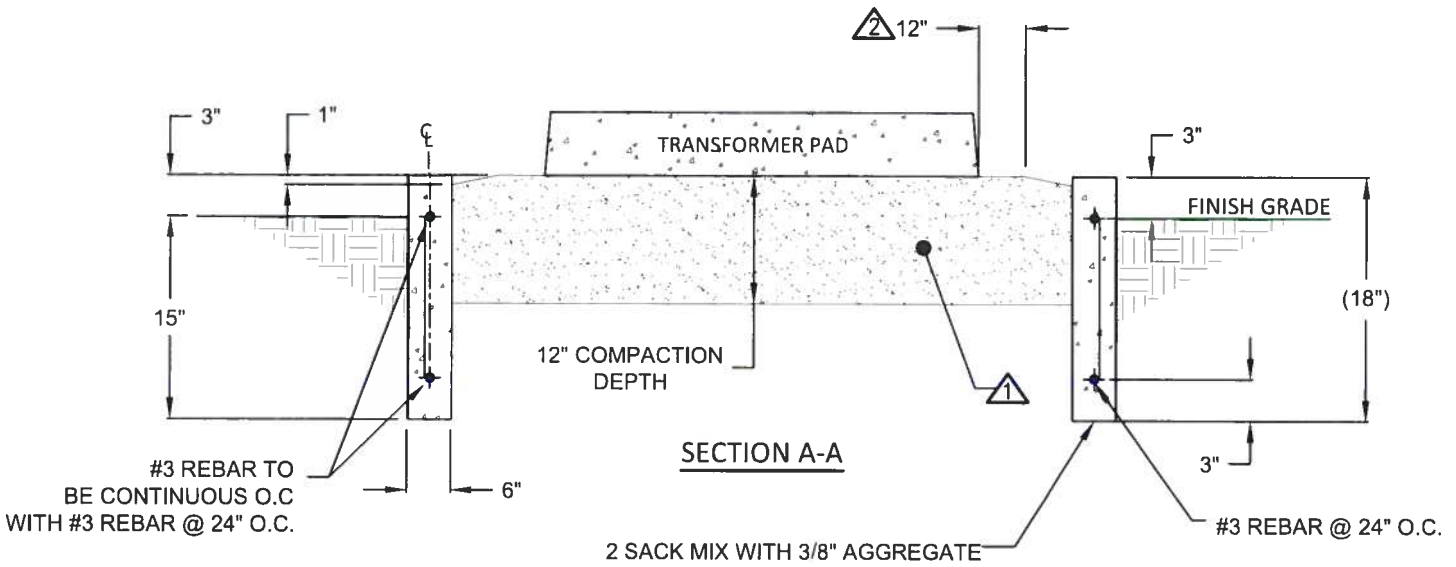
50KV - 500KV TRANSFORMER PAD			
MANUFACTURER	PHONE No.	STRUCTURE No.	FRONT/SIDE/THICKNESS DIMENSIONS
SUPERIOR READY MIX	(760) 352-4341	3426 HLR	94"(F) X 73"(S) X 8"(T)
JENSEN PRECAST	1-775-352-2700	PD7296-T8-25	96"(F) X 72"(S) X 8"(T)
OLD CASTLE	1-800-626-3860	IID-7296-8-TP	96"(F) X 72"(S) X 8"(T)

(F) = FRONT                      (S) = SIDE                      (T) = THICKNESS

3. CONTRACTOR TO PROVIDE TWO 5/8"x10' COPPERWELD GROUND RODS PER PAD (INSTALLATION BY CONTRACTOR).
4. SIZE AND NUMBER OF CONDUITS IN EACH PAD TO BE AS SHOWN ON CONDUIT LAYOUT.
5. ANCHORAGE TO BE SET BY I.I.D. WHEN TRANSFORMER IS INSTALLED.
6. CONTRACTOR SHALL PROVIDE & INSTALL 12" OF CLASS 2 AGGREGATE ROAD BASE MATERIAL OR CRUSHER FINES WITH 3/8" ROCKS UNDERNEATH TRANSFORMER PAD, AND COMPACT ALL ROAD BASE UNDERNEATH TRANSFORMER PAD TO A MINIMUM COMPACTION OF 90%. SEE STANDARD 136. SECTION 3, 3.4.
7. CONDUITS TO TERMINATE 1" ABOVE TOP OF TRANSFORMER PAD.


IMPERIAL IRRIGATION DISTRICT		
DRAWN BY	<i>gr</i>	 <p>PRECAST CONCRETE PAD DETAIL FOR THREE-PHASE TRANSFORMER 45KVA TO 500KVA</p>
REVIEWED	<i>MB</i>	
APPROVED	<i>MB</i>	
REVISION	REV 7	
DATE	9-27-2016	
		136.1

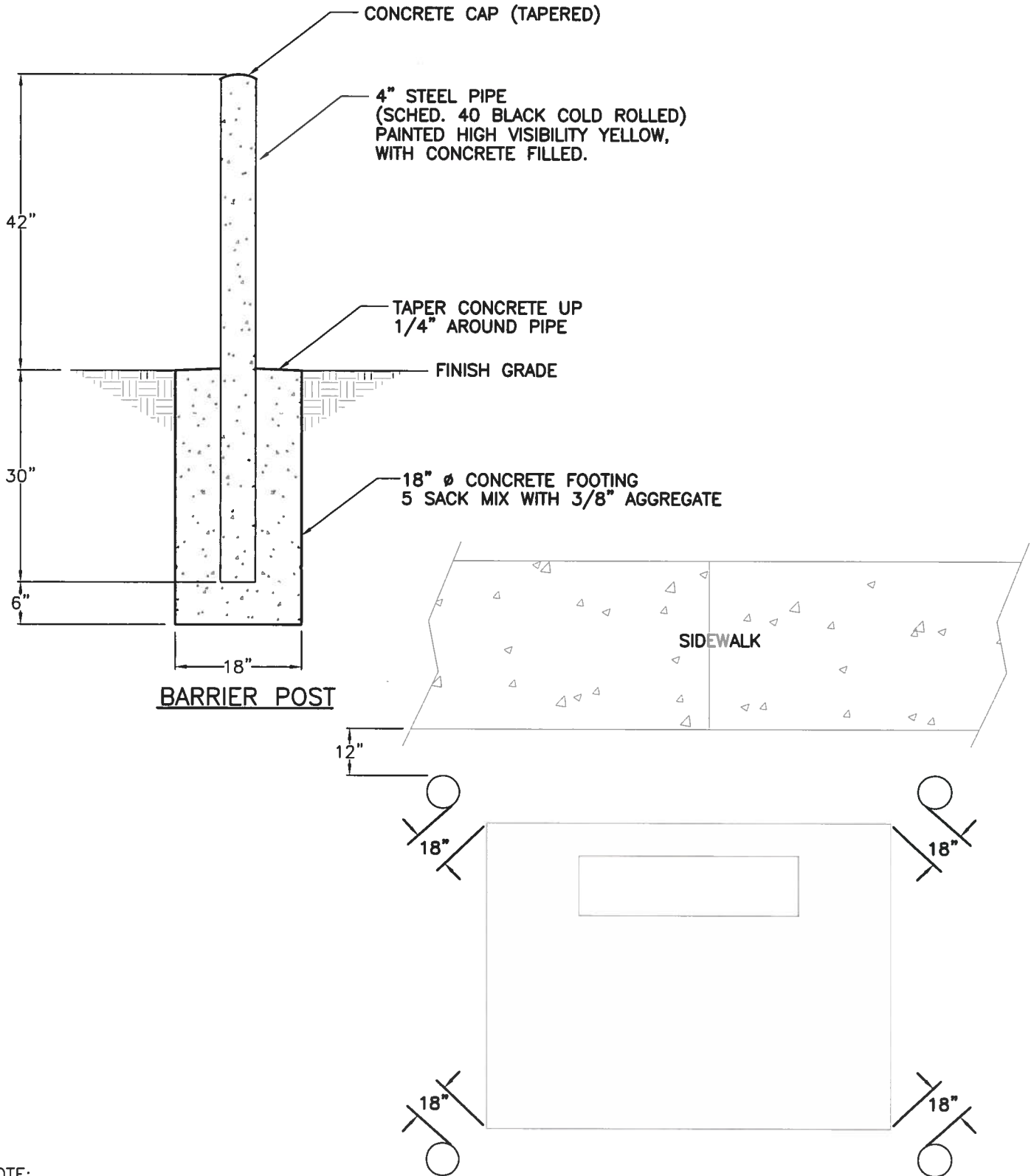




**NOTES:**


- 1 COMPACTED AREA SHALL BE CALTRANS CLASS 2 AGGREGATE BASE OR CRUSHER FINES WITH 3/8" ROCKS. SECTION 5.5 COMPACTION PROCESS.
- 2 A MAXIMUM OF 1/2" OF SAND FILL WILL BE APPROVED FOR LEVELING OF COMPACTION AREA. SECTION 5.5 COMPACTION PROCESS.

IMPERIAL IRRIGATION DISTRICT	
DRAWN BY	<i>JR</i>
REVIEWED	<i>[Signature]</i>
APPROVED	<i>[Signature]</i>
REVISION	REV 3
DATE	9-27-2016
	
<b>TRANSFORMER PAD CONCRETE RE-ENFORCEMENT CURB DETAIL</b>	
<b>100.9</b>	



**NOTE:**

1. REMOVABLE BARRIER POSTS ARE NOT ALLOWED.
2. IMPERIAL VALLEY TRANSFORMER PAD SHOWN.

IMPERIAL IRRIGATION DISTRICT			TYPICAL BARRIER POST DETAIL
DRAWN BY	<i>JK</i>		
REVIEWED	<i>MS</i>		
APPROVED	<i>MS</i>		
REVISION	REV 5		
DATE	9-27-2016		

**CONSTRUCTION NOTES:**


- (A) GROUND RODS TO HAVE A 6'-0" MINIMUM SEPARATION.
- (B) WRAP 6' OF WIRE (NOT EXPOSED) 1" UNDERGROUND NEXT TO GROUND ROD.
- (C) **LOCATE GROUND RODS SO THEY DO NOT TOUCH CONDUITS.** GENERAL ORDER 128 REQUIRES GROUND RODS TO BE DRIVEN.

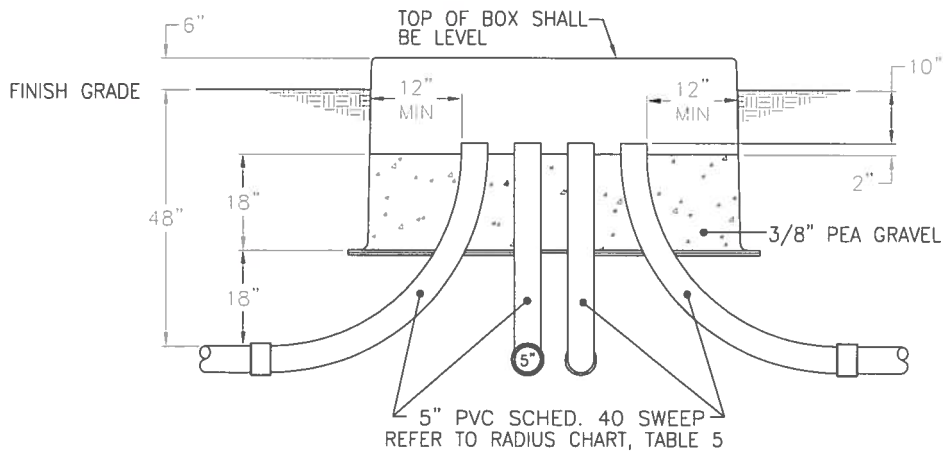
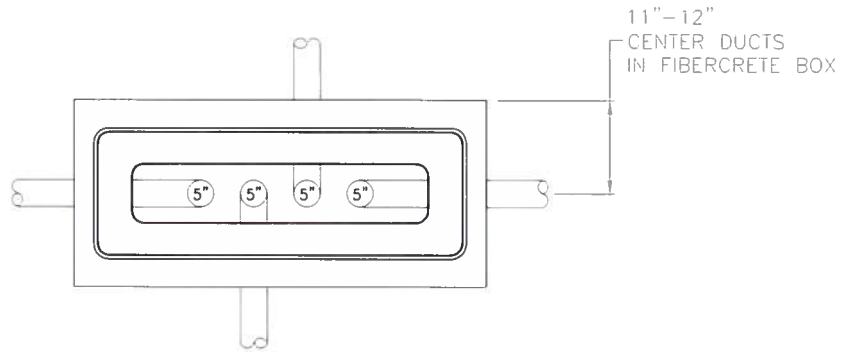
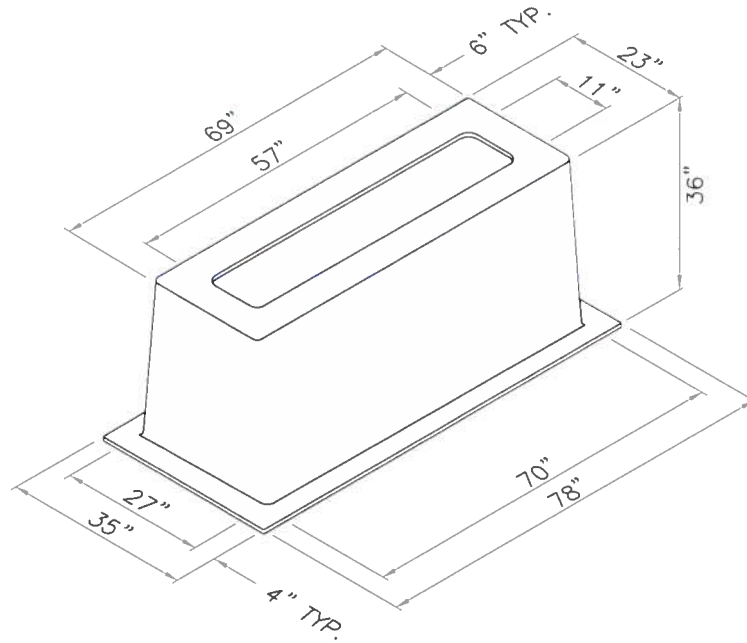
BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	STOCK No.	PAGE No.
1	1	CONCRETE PAD, SEE STANDARD 136 THRU 137		
2	1	CADWELD, ONE-SHOT/Amp CONNECTOR #83750-1	40003365	
3	20'	WIRE - COPPER 00 2/0 STRAND, SOFT DRAWN BARE	40004222	
4	2	GROUND ROD, 5/8" x 10', COPPERWELD	40003814	

**NOTES:**

THE SERVICE TRENCH IS ON PRIVATE PROPERTY AND BELONGS TO THE CUSTOMER, THEREFORE, THE TRENCH GROUND WIRE SHOULD ALWAYS BE INSTALLED IN THE PRIMARY TRENCH.

DRAWN BY		IMPERIAL IRRIGATION DISTRICT	
REVIEWED	<i>gr</i>	 <p>TRENCH GROUND WIRE FOR <u>THREE PHASE TRANSFORMERS PAD</u> TO BE INSTALLED BY CUSTOMER</p>	190.31
APPROVED	<i>MB</i>		
REVISION	REV 7		
DATE	11-21-2016		



IMPERIAL IRRIGATION DISTRICT			<b>THREE PHASE SECTOR SLEEVE INSTALLATION DETAILS</b>
DRAWN BY	<i>JB</i>		
REVIEWED	<i>MB</i>		
APPROVED	<i>MB</i>		
REVISION	REV 7		
DATE	12-19-2016	171.2	

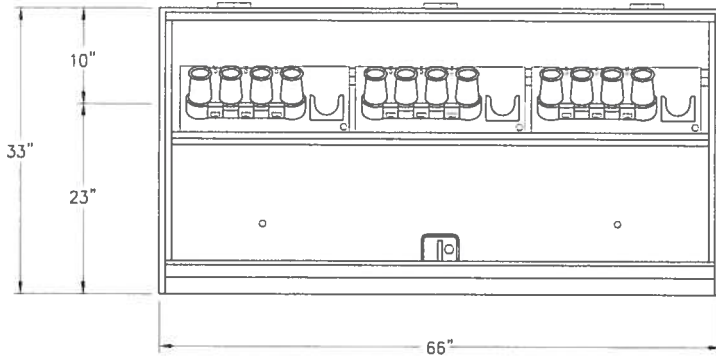
CONSTRUCTION NOTES:

1. COMPACT ALL BACKFILL FOR EXCAVATION UNDER SECTOR SLEEVE TO 90% BEFORE FIBERCRETE BOX PAD INSTALLATION.
2. CONTRACTOR SHALL PROVIDE & INSTALL 3/8" PEA GRAVEL MATERIAL UNDERNEATH SECTOR SLEEVE, AND 18" INSIDE OF BOX FOR SUPPORT AND DRAINAGE.
3. CONTRACTOR TO PROVIDE TWO 5/8" x 10' COPPERWELD GROUND RODS PER SECTOR SLEEVE (INSALLATION BY CONTRACTOR.
4. SIZE AND NUMBER OF CONDUITS IN EACH SECTOR SLEEVE TO BE AS SHOWN ON CONDUIT LAYOUT.
5. CONDUITS NEED TO BE CENTERED IN FIBERCRETE BOX.
6. ALL PRIMARY SWEEPS TO BE PVC SCHEDULE 40, REFER TO TABLE 5 RISER SWEEP RADIUS.
7. GUARD POSTS MAY BE REQUIRED AT DISCRETION OF I.I.D. INSPECTOR.
8. ANCHORAGE TO BE SET BY I.I.D. WHEN TRANCLOSURE IS INSTALLED.
9. APPROVED MANUFACTURERS AND STRUCTURES:

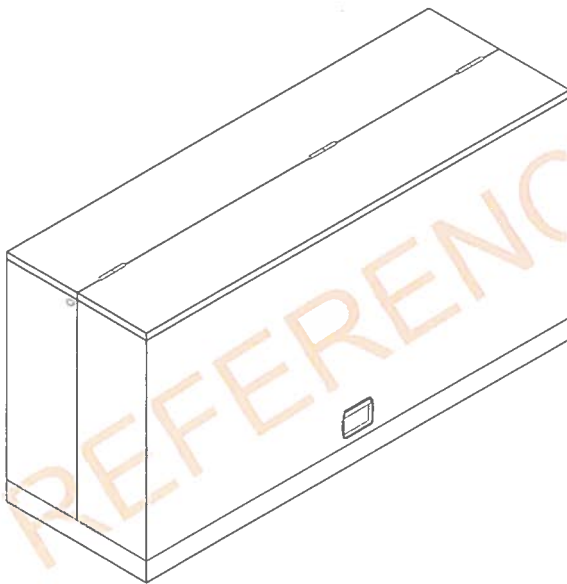
MANUFACTURER	PHONE No.	STRUCTURE No.
CONCAST, INC	REXEL (760) 352-4941	FC-23-69-36-1157

IMPERIAL IRRIGATION DISTRICT		
DRAWN BY	<i>JK</i>	 <p align="center">THREE PHASE SECTOR SLEEVE INSTALLATION DETAILS</p>
REVIEWED	<i>JK</i>	
APPROVED	<i>MS</i>	
REVISION	REV 6	
DATE	12-09-2013	

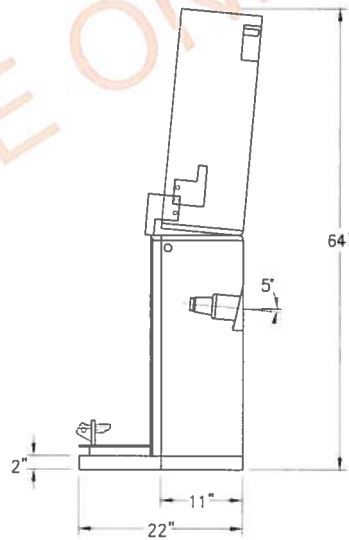
SCOPE: THIS STANDARD SHOWS THE PAD-MOUNTED, THREE-PHASE, LOW PROFILE CABLE TERMINATING CABINET, PREFERRED INSTALLATION WHEN TERMINATING 4/0 AND SMALLER CABLE.



FRONT VIEW

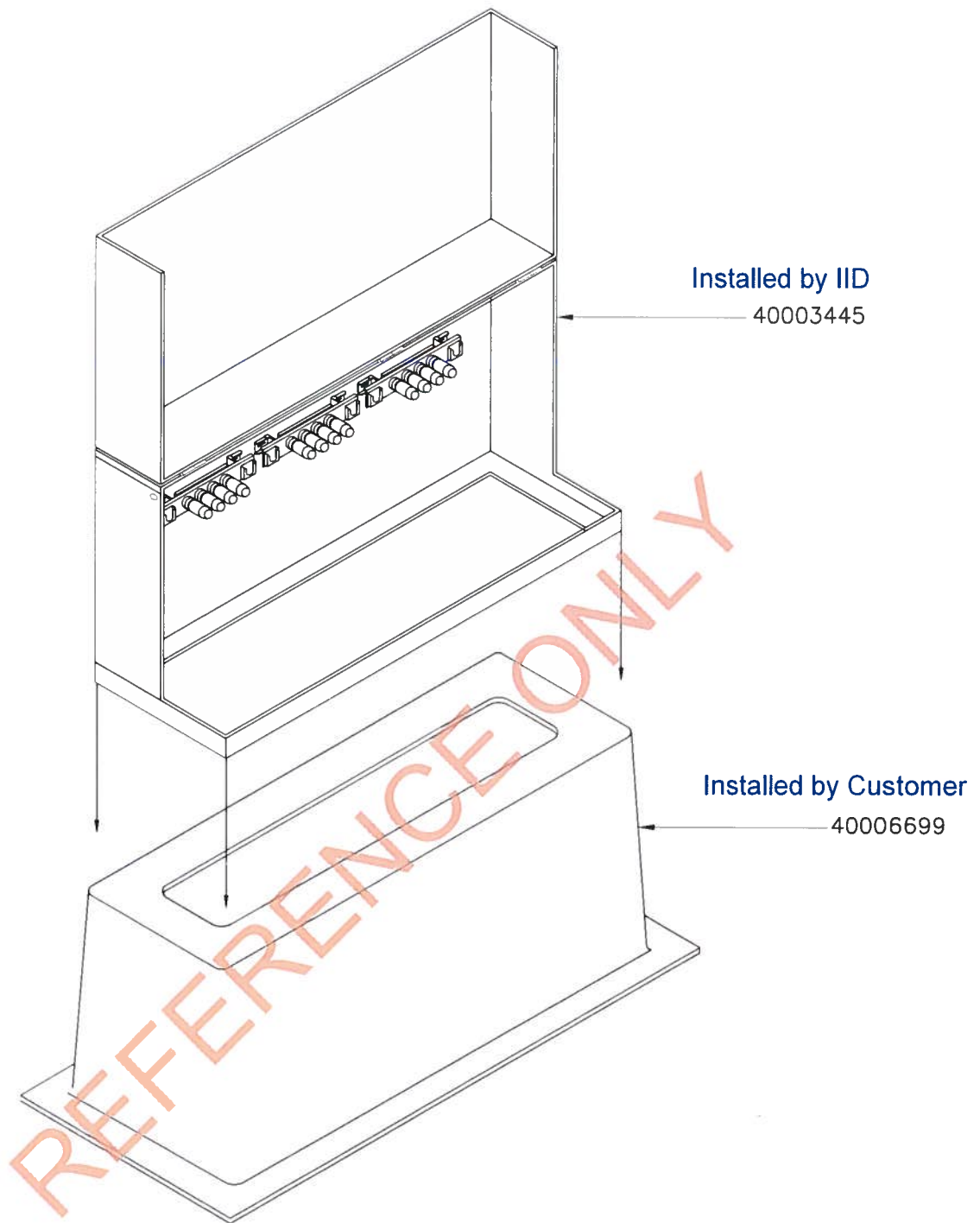



ISOMETRIC VIEW

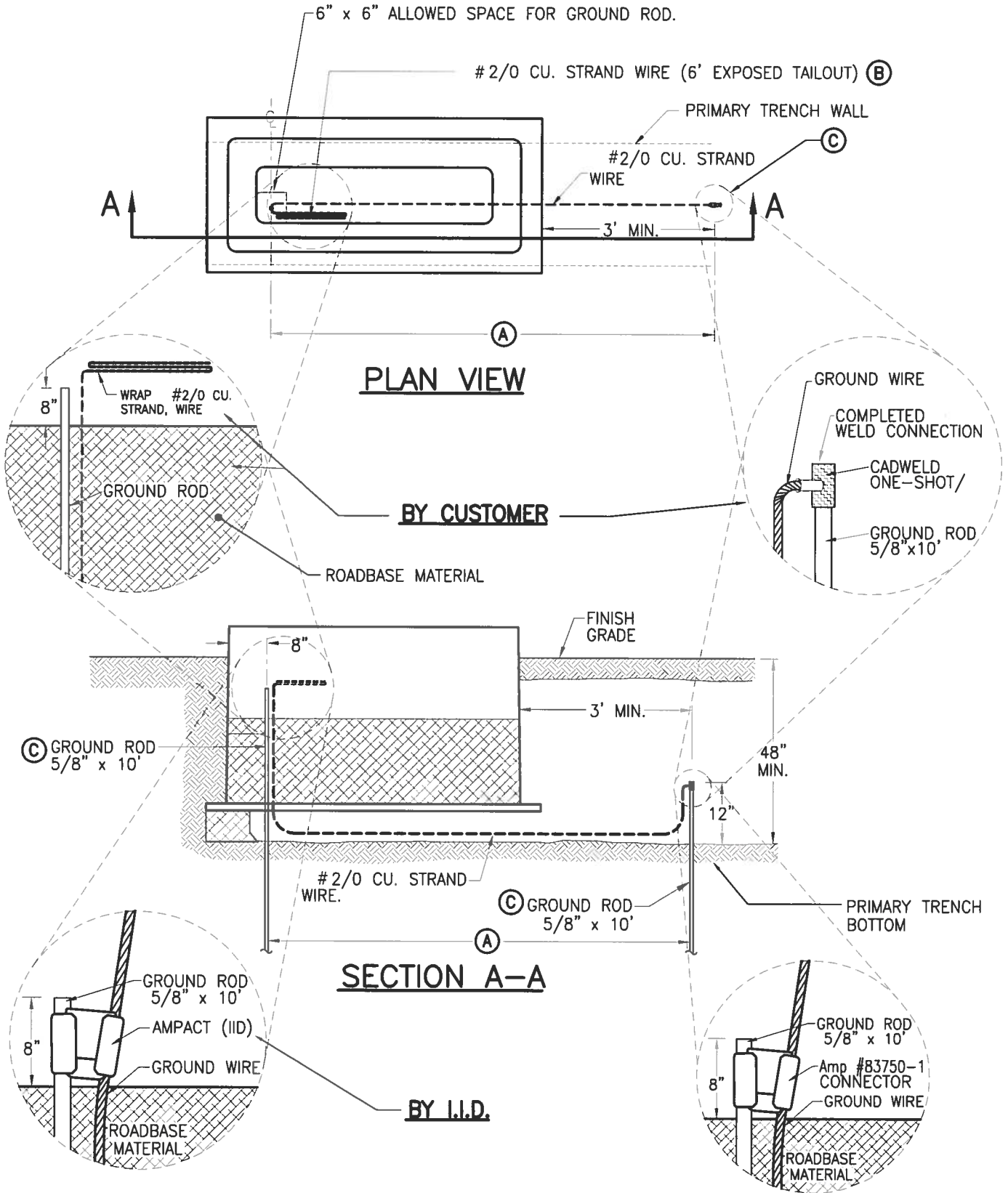



SIDE VIEW

IMPERIAL IRRIGATION DISTRICT		
DRAWN BY	<i>gk</i>	<div style="display: flex; align-items: center; justify-content: space-between;"> <span>40003445</span>  <span>THREE PHASE SECTOR</span> </div>
REVIEWED	<i>ms</i>	
APPROVED	<i>ms</i>	
REVISION	REV 3	
DATE	1.3.2017	
		170.3



DRAWN BY		IMPERIAL IRRIGATION DISTRICT	
REVIEWED	<i>[Signature]</i>	 THREE PHASE SECTOR ON BOX PAD	174.2
APPROVED	<i>[Signature]</i>		
REVISION	REV 4		
DATE	1.3.2017		



DRAWN BY		IMPERIAL IRRIGATION DISTRICT	
REVIEWED	<i>[Signature]</i>	 <p>THREE PHASE SECTOR SLEEVE GROUNDING DETAIL TO BE INSTALLED BY CONTRACTOR</p>	
APPROVED	<i>[Signature]</i>		
REVISION	REV 7		
DATE	11-21-2016		



**CONSTRUCTION NOTES:**

- Ⓐ GROUND RODS TO HAVE A 6'-0" MINIMUM SEPARATION.
- Ⓑ WRAP 6' OF WIRE (EXPOSED TAILOUT)
- Ⓒ **LOCATE GROUND RODS SO THEY DO NOT TOUCH CONDUITS.** GENERAL ORDER 128 REQUIRES GROUND RODS TO BE DRIVEN.

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	STOCK No.	PAGE No.
1	1	SECTOR SLEEVE SEE STANDARD 171.2		
2	1	CADWELD, ONE-SHOT/ Amp #83750-1 CONNECTOR	40003365	
3	20'	WIRE - COPPER 00 2/0 STRAND, SOFT DRAWN BARE	40004222	
4	2	GROUND ROD, 5/8" x 10', COPPERWELD	40003814	

**NOTES:**

THE SERVICE TRENCH IS ON PRIVATE PROPERTY AND BELONGS TO THE CUSTOMER, THEREFORE, THE TRENCH GROUND WIRE SHOULD NOT BE INSTALLED IN THE CUSTOMER TRENCH.

IMPERIAL IRRIGATION DISTRICT	
DRAWN BY	<i>jr</i>
REVIEWED	<i>[Signature]</i>
APPROVED	<i>MS</i>
REVISION	REV 7
DATE	11-21-2016



**THREE PHASE SECTOR SLEEVE  
GROUNDING DETAIL  
TO BE INSTALLED BY CONTRACTOR**

**190.51**

December 19, 2022

IMPERIAL VALLEY COLLEGE  
SPORTS FIELD RESTROOM AND CONCESSION WESTSIDE LIGHTING AND BORDERLINK  
ANTENNA PROJECT RFP NO. 22-23-02

## ADDENDUM #3

THE FOLLOWING ITEMS ARE LISTED AS CORRECTIONS OR CLARIFICATIONS TO THE  
CONSTRUCTION DOCUMENTS.

### ALTERNATE ADD 1

1. Add to ALTERNATE ADD 1 the following scope of work under the new line item no.03.  
Item 03: Provide the entire structure, including the engineered pad, concrete foundation, wall, roofing, and all finishes.

### ALTERNATE ADD 2

1. Add to ALTERNATE ADD 2 the following scope of work under the new line item no. 02.  
Item 02: Provide the entire structure, including the engineered pad, concrete foundation, wall roofing, and all finishes.

### SECTION 23 00 00 HVAC

1. Section 2.14 Equipment, letter A number 1 Rooftop package units list Carrier in error. The specified HVAC Units are York, as described in the mechanical plans.
2. It is acceptable to substitute the HVAC Equipment with LG products

### SECTION 03 35 43 POLISHED CONCRETE FINISHING

1. Section 03 35 46 Polished Concrete Finishing was omitted in the Project Manual in error. Section 03 35 43 is included with the Addendum.

### SECTION 09 97 23 SOLVENT CONCRETE SEALERS

1. Section 09 97 23 Solvent Concrete Sealers was included in the Project Manual in error. Remove Section 09 97 23 from the Project Manual.

### SECTION 21 13 13 WET – SPRINKLER SYSTEM

1. Section 21 13 13 Wet–Pipe Sprinkler System was included in Project Manual in error. Remove Section 21 13 13 from the Project Manual.

### SECTION 23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HAVC

1. Section 23 09 13 Instrumentation and Control Devices for HVAC was omitted in the Project Manual in error. Section 23 09 13, Instrumentation and Control Devices, is attached to this Addendum.

### SECTION 27 10 00 STRUCTURED CABLING

1. Section 27 10 00 Structured Cabling was omitted from the Project Manual in error. Section 27 10 00 Structured Cabling is attached to this Addendum.

---

## **SECTION 27 11 00 COMMUNICATIONS EQUIPMENT**

1. Section 27 11 00 Communications Equipment was omitted in the Project Manual in error. Section 27 11 00, Communications Equipment, is attached to this Addendum.

## **SECTION 28 13 00 ACCESS CONTROL**

1. Section 28 13 00 Access Control was omitted in the Project Manual in error. Section 28 13 00 Access Control Equipment is attached to this Addendum.

## **STRUCTURAL DRAWINGS**

1. Sheet S0.3 – TYPICAL CONCRETE DETAILS
  - a. Detail 8, Typical Building Slab on Grade, calls out a 5” thick slab in error. The thickness of the concrete Slab on Grade shall be 6”.
  - b. Detail 11, Grade Beam Detail Shall not be used as part of the project.
2. Sheet S0.6 – TYPICAL STEEL DETAILS
  - a. Detail 1, Typical Steel Beam Connection and Schedule, has three details. First, detail Beam to Beam (one side) Full Height has a note that states: Stifferplate match shear plate thickness that is missing a detail reference. Add the following detail reference 2/S0.6.

## **ARCHITECTURAL SITE DRAWINGS**

The following referenced sheet in the plan set has been revised and is required to be replaced:

1. AS5 – HARDSCAPE PLAN
2. AS6 – SITE UTILITIES

The attached Addendum drawing will replace the referenced sheet; the revisions are clouded.

1. AD-3\_AS5 – HARDSCAPE PLAN
2. AD-3\_AS6 – SITE UTILITIES

The following drawing was omitted from the plan set in error. The following drawing shall be added to the plan set and is attached to this Addendum.

1. AS3 – SITE SURVEY AND DEMOLITION

## **ARCHITECTURAL DRAWINGS**

The following referenced sheet in the plan set has been revised and is required to be replaced:

1. A2 – ARCHITECTURAL SECTIONS AND REFLECTED CEILING PLAN
2. AX1 – SCHEDULES DOOR AND WINDOW TYPES

The attached Addendum drawing will replace the referenced sheet; the revisions are clouded.

1. AD-3\_A2 – ARCHITECTURAL SECTIONS AND REFLECTED CEILING PLAN
2. AD-3\_AX1 – SCHEDULES DOOR AND WINDOW TYPES

## **PLUMBING DRAWINGS**

1. P0.1 – LEGEND AND NOTES
  - a. Plumbing Fixture Schedule P-24 calls for (2) Haws#1109 water bottle fillers and two Haws#1920 drinker fountains in error. Provide one (1) Haws ADA Stainless Steel Bottle Filler and Drinking Fountain – Model:3611. In addition, provide one (1) HawsADA Stainless Steel Pedestal Foutain – Model:3602.

## **ELECTRICAL DRAWINGS**

The following referenced sheets in the plan set have been revised and shall be replaced:

1. E201 – CONCESSION POWER AND LIGHTING PLAN
2. E202 – CONCESSION ROOF PLAN
3. E301 – SINGLE-LINE DIAGRAM AND PANEL SCHEDULES

---

The attached Addendum drawings will replace the referenced sheets; All revisions are clouded.

1. AD-3\_E201 – CONCESSION POWER AND LIGHTING PLAN
2. AD-3\_E202 – CONCESSIONS ROOF PLAN
3. AD-3\_E301 – SINGLE-LINE DIAGRAM AND PANEL SCHEDULES

#### **COMMUNICATION DRAWINGS**

1. CM0.1 – COMMUNICATIONS SITE PLAN
  - a. Keynote 1 mentions to provide and install a (2)2” PVC conduit in error. Keynote 1 shall read as follows: Provide and Install a (2) 2” PVC conduit and one single mode 12-pair fiber line from the existing IDF in the gymnasium to the new IDF in the concession stand.
  - b. Keynote 2 mentions an existing IDF in error. Keynote 2 shall read as follows: Provide and install a communications junction box outside the gymnasium to run a new fiber line to the existing IDF.
2. CM1 – COMMUNICATIONS PLAN
  - a. Provide the following doors with access control: 2,3,5,6, 7, 8,5,10.
  - b. Provide wall-mounted wireless access points outside the concessions stand room 1, Maintenance room 6, and Women’s and Men’s Toilet rooms.

#### **SKETCH DRAWINGS**

1. The following sketch drawing is hereby issued as part of the construction drawings: AD-3\_SK1.0 – CONCRETE BENCH SECTION

#### **COILING DOORS**

1. The Contractor shall provide manual coiling counter doors.

#### **EQUIPMENT SCHEDULE**

1. The Owner shall provide Stainless Steel carts.
2. The Contractor shall provide Stainless Steel Shelves and counters. Shelve, and counters shall be built from stainless steel 304 grade.
3. The following items were omitted from the equipment schedule that the Owner will provide.
  - a. Bike Racks for Students
  - b. Staff Bike Lockers.

END OF ADDENDUM #3



Jesus Antonio Aguilera

SECTION 03 35 43  
POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Polished concrete.
- B. Dyed and polished concrete.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Structural Concrete.
- B. Section 03 31 16 – Lightweight Structural Concrete
- C. Section 07 92 00 – Joint Sealants.

1.3 REFERENCES

- A. American Concrete Institute (ACI): ACI 302.1R - Guide for Concrete Floor and Slab Construction.
- B. American National Standards Institute (ANSI): Standards B-101.1/2009.
- C. ASTM International (ASTM):
  - 1. ASTM C 779 - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
- D. National Floor Safety Institute (NFSI): NFSI Test Method 101-A - Standard for Evaluating High-Traction Flooring Materials.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide polished flooring that has been designed, manufactured and installed to achieve the following:
  - 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch wear in 30 minutes.
  - 2. Reflectivity: Increase of 35% as determined by standard gloss meter.
  - 3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.
  - 4. High Traction Rating: NFSI 101-A, ANSI B-101.1 2009 non-slip properties.
- B. Design Requirements:
  - 1. Hardened Concrete Properties:
    - a. As per Structural Drawings.
  - 2. Placement Properties:
    - a. As per Structural Drawings.
    - b. Flatness Requirements:
      - 1) Overall FF 50.
      - 2) Local FF 40.
  - 3. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.
  - 4. Curing Options:

- a. Membrane forming curing compounds not permitted.
- b. Sheet membrane not permitted.
- c. Damp Curing: Seven day cure.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Shop Drawings: Indicate information on shop drawings as follows:
  1. Typical layout including dimensions and floor grinding schedule.
  2. Plan view of floor and joint pattern layout.
  3. Areas to receive colored surface treatment.
  4. Hardener, sealer, densifier identified in notes.
- C. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.
  1. Material Safety Data Sheets (MSDS).
  2. Preparation and concrete grinding procedures.
  3. Colored Concrete Surface, Dye Selection Guides.
- D. Quality Assurance Submittals:
  1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in Performance Requirements.
  2. Certificates:
    - a. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
    - b. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A. ANSI B-101.1 2009 non-slip properties.
    - c. Current contractor's certificate signed by manufacturer declaring Contractor as an approved installer of polishing system.
  3. Manufacturer's Instructions: Manufacturer's installation instructions.
- E. Warranty: Submit warranty documents specified.
- F. Operation and Maintenance Data: Submit operation and maintenance data for installed products.
  1. Manufacturer's instructions on maintenance renewal of applied treatments.
  2. Protocols and product specifications for joint filing, crack repair and/or surface repair.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
  1. Installer with a minimum of 5 years' experience in performing work of this section who has specialized in installation of work similar to that required for this project.
  2. Installer trained and holding a current certificate as a FGS PermaShine installer.
  3. Current Certification from the CPAA stating that the technicians are trained craftsmen.
- B. Concrete finishing components and materials shall be from single manufacturer.
- C. Manufacturer Qualifications:
  1. Manufacturer capable of providing field service representation during construction and approving application method.
  2. Manufacturer shall have a minimum 5 years of experience in manufacturing components similar to or exceeding requirements of project.
- D. Regulatory Requirements: Comply with NFSI Test Method 101-A Phase Two Level High

Traction Material.

- E. Mock-Ups:
1. Mock-Up Size: 100 sf area or small room located per Architect.
  2. Mock-up will be used to judge workmanship, material application, color selection and shine.
  3. Allow 24 hours for inspection of mock-up before proceeding with work.
  4. When accepted, mock-up will demonstrate minimum standard of quality required for this work.
    - a. Approved mock-up may remain as part of finished work.
  5. Mock-Up will demonstrate required level of cut and sheen:
    - a. Level 1 - Cream Finish: Polishing only the Portland Cement paste at the surface without exposing small, medium or large aggregate. Note: If dye will be used, this is not an acceptable level of grinding. Go to Level 2.
    - b. Level 2 - Salt/Pepper Finish: Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.
    - c. Level 3 - Medium Aggregate: Exposing more of the overall girth of the coarse aggregate within the concrete. Generally, this level of cut can be achieved within 1/8" of the surface.
    - d. Level 4 - Large Aggregate: Exposing the overall girth of the coarse aggregate within the concrete. This level of cut generally can be achieved within 1/4" of the surface.
    - e. Sheen Level A: Sheen (glossy) as determined by a gloss reading of 45 - 60.
    - f. Sheen Level B: Sheen (high gloss) as determined by a gloss reading of 60 - 70.
    - g. Sheen Level C: Sheen (very high gloss) as determined by a gloss reading of 70 or higher.
  6. Where more than one (1) level of polish is required per Drawings, mock-up area shall be polished to highest level required with Architect inspecting as each lower level is achieved.
    - a. Work may begin on areas to receive lower sheen levels after that level is approved.
    - b. Work shall not begin on areas of higher sheen levels until such level has been inspected and approved.
- F. Pre-installation Meetings: Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Review the following:
1. Environmental requirements.
  2. Scheduling and phasing of work.
  3. Coordinating with other work and personnel. Remind all trades that they are working on a surface that is to become a finished surface (protection and signage required).
  4. Protection of adjacent surfaces.
  5. Surface preparation.
  6. Repair of defects and defective work prior to installation.
  7. Cleaning.
  8. Installation of polished floor finishes.
  9. Application of liquid hardener, densifier.
  10. Protection of finished surfaces after installation.
  11. Placing of materials on the concrete surface that may cause staining, etching or scratching

1.7 DELIVERY, STORAGE AND HANDLING

- A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to

avoid construction delays.

- B. Delivery: Deliver materials in manufacturer's original packaging with identification labels and seals intact.
- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

## 1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- B. Protect Concrete Slab:
  - 1. Protect from petroleum stains during construction.
  - 2. Diaper hydraulic power equipment.
  - 3. Restrict vehicular parking.
  - 4. Restrict use of pipe cutting machinery.
  - 5. Restrict placement of reinforcing steel on slab.
  - 6. Restrict use of acids or acidic detergents on slab.
  - 7. Provide slab protection signage.
- C. Waste Management and Disposal:
  - 1. Separate waste materials for Reuse and Recycling in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
  - 2. Remove from site and dispose of packaging materials at appropriate recycling facilities.

## 1.9 PROJECT AMBIENT CONDITIONS

- A. Installation Location: Comply with manufacturer's written recommendations.

## 1.10 SEQUENCING

- A. Sequence with Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.

## 1.11 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: L&M Construction Chemicals, which is located at: 1 LATICRETE Park N.; Bethany, CT 06524-3423; Toll Free Tel: 800-362-3331; Tel: 402-453-6600; Email:[request info \(info@lmcc.com\)](mailto:info@lmcc.com); Web:[www.laticrete.com/lmcc](http://www.laticrete.com/lmcc)
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

### 2.2 POLISHED CONCRETE



- A. Products and Systems:
1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
    - a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Hardener Plus. Basis of design.
    - b. Acceptable Material: L&M Construction Chemicals, Inc., Lion Hard may be substituted when conditions exist where disposing of rinse water is in conflict with local building codes.
  2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.
    - a. Acceptable Material: L & M Construction Chemicals, Inc., Joint Tite 750.
  3. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.
    - a. Acceptable Material: L & M Construction Chemicals, Inc., Petrotex.
  4. Concrete Acid Stains: Formulated for application to polished cementitious surfaces.
    - a. Acceptable Material: Reactive solution of one or more metal salts stabilized by acid that produces coloration in concrete substrate by neutralization of acid followed by precipitation of metal hydroxides or oxides.
    - b. Color: to be selected by Architect from Manufacturer's standard colors.
  5. Cleaning Solution: Proprietary, mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).
    - a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Concrete Conditioner.
  6. Stain Guard Sealer: Ready to use, is a low odor, VOC compliant, topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protect concrete and other natural stone floor surfaces from the damaging effects of staining, defacing and deterioration due to contaminant penetration.
    - a. Acceptable Material: L& M Construction Chemicals, Inc. Permaguard SPS.

## 2.3 FINAL POLISHED CONCRETE FLOOR FINISH

- A. Aggregate Exposure
1. Exposure Class A – Cement Fines:
    - a. Surface exposure of 85 to 95% cement fines and 5 to 15% fine aggregate.
  2. Exposure Class B – Fine Aggregate:
    - a. Surface exposure of 85 to 95% fine aggregate and 5 to 15% cement fines and coarse aggregate.
  3. Exposure Class C – Coarse Aggregate:
    - a. Surface exposure of 80 to 90% coarse aggregate and 10 to 20% cement fines and fine aggregate.
  4. Based on visual observation of the overall area of the polished floor.
- B. Polished Concrete Appearance
1. Finish Appearance Level 1 – Flat (Ground):
    - a. Image Clarity Value, %: Shall have average value of 9 or less.
  2. Finish Appearance Level 2 – Satin (Honed):
    - a. Image Clarity Value, %: Shall have average value of 10 to 39.

3. Finish Appearance Level 3 – Polished:
  - a. Image Clarity Value, %: Shall have average value of 40 to 69.
4. Finish Appearance Level 4 – Highly Polished:
  - a. Image Clarity Value, %: Shall have average value of 70 to 100.
5. Procedure:
  - a. Not less than 4 step process with full refinement of each diamond tool with one application of densifier.
6. Measurement:
  - a. Image Clarity Value % shall be measured in accordance with ASTM D5767 prior to the application of sealers.
  - b. Haze Index average value shall be less than 10 measured in accordance with ASTM D4039 prior to the application of sealers.
  - c. The minimum number of tests distributed across the polished surface shall be three, for areas up to 1000 ft<sup>2</sup> and one additional test for each 1000 ft<sup>2</sup> or fraction thereof. Applies to both the Image Clarity Value and Haze Index

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Site Verification of Conditions:
  1. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Verify Concrete Slab Performance Requirements:
  1. Verify concrete is cured to 28 day duration and strength per Structural Drawings.
  2. Verify concrete surfaces have received a hard steel-trowel finish (3 passes) during placement.
  3. Verify overall floor flatness is a minimum of Ff 40.

### 3.2 PREPARATION

- A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
- B. Examine surface to determine soundness of concrete for polishing.

### 3.3 INSTALLATION

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions.
- B. Floor Surface Polishing and Treatment:
  1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
  2. Apply floor finish prior to installation of fixtures and accessories.
  3. Diamond polish concrete floor surfaces with power disc machine recommended by

floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.

- a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Following the initial passes of metal bond diamonds, the installer shall drop back a minimum of one grit level when transitioning to resin bond diamonds. The separation in grit designation shall be a minimum of 50 for the transitioning step. The installer shall refine each abrasive grit to its fullest potential before moving on to the next level. Floor shall be thoroughly scrubbed between each grit pass to remove all loose material. Level of sheen shall match that of approved mock-up.
  - b. Expose aggregate in concrete surface only as determined by approved mock-up.
  - c. All concrete surfaces shall be as uniform in appearance as possible.
4. Acid Stain and Polished Concrete:
- a. Locate demarcation line between acid stained surfaces and other finishes.
  - b. Polish concrete to the 400 grit level.
  - c. Apply pre-mixed acid stain to polished concrete surface.
  - d. Allow acid stain to dry.
  - e. Remove residue with water and buffer pad; reapply as necessary for desired result.
5. Hardener and Densifier Application:
- a. First coat of FGS Hardener Plus at 250 ft<sup>2</sup>/gal, following the 400 grit level. (Lion Hard at 400-600 sq ft / gallon).
  - b. Second coat of FGS Hardener Plus at 350 ft<sup>2</sup>/gal, prior to the final polishing pass (Lion Hard at 600-800 sq ft / gallon).
  - c. Follow manufacturer's recommendations for drying time between successive coats.
6. Remove defects and re-polish defective areas.
7. Finish edges of floor finish adjoining other materials in a clean and sharp manner.
- C. Aggregate Exposure Class and Appearance Level Required:
1. Provide class and level as indicated on Drawings.

### 3.4 ADJUSTMENTS

- A. Re-polish those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface prior to the start of polishing operations.

### 3.5 FINAL CLEANING

- A. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

### 3.6 PROTECTION

- A. Protect installed product from damage during construction in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC  
BACNET FACILITY MANAGEMENT AND CONTROL SYSTEM (FMCS)

PART 1 - GENERAL

1.01 SUMMARY

- A. Furnish all labor, materials, equipment, and service necessary for a complete and operating Facility Management and Control System (FMCS), utilizing Direct Digital Controls as shown on the drawings and as described herein. The FMCS Contractor scope shall include the Phoenix Laboratory Controls as provided by Newmatic Engineering (no known equal). The Phoenix Fume Hood Control system specification is integrated with this specification section. The FMCS shall be capable of total integration of the facility infrastructure systems with user access to all system data either locally over a secure Intranet within the building or by remote access by a standard Tridium product Web Browser over the Internet. This shall include HVAC control, laboratory fume hood controls, energy management, alarm monitoring and all trending functions related to normal building operations all as indicated on the drawings or elsewhere in this specification. All controllers described herein shall be 100% BTL certified; no exceptions.
- B. All labor, material, equipment and software not specifically referred to herein or on the plans, but are required to meet the functional intent of this specification, shall be provided without additional cost to the Owner.
- C. Scope of Work: Provide all labor, materials, programming and supervision necessary to install a Direct Digital control system (DDC) integrated with the Phoenix Fume Hood Control System via BACnet.
  - 1. The scope of work shall include but not be limited to the following:
    - a. Scope shall include all costs associated with furnishing and installing a Phoenix Fume Hood Control System as provided by Newmatic Engineering, Richard Yardley 858-442-8500.
    - b. Scope shall include all costs associated with providing a turn-key, Native BACnet DDC HVAC Control System integrated with the Phoenix Control System via BACnet.
    - c. All HVAC DDC controllers shall be certified by the BACnet Testing Laboratories (BTL).
  - 2. The Control Contractor shall furnish all electrical control and interlock wiring connected to the controls and instrumentation systems. 110 VAC or greater voltage power wiring to main control panels (i.e. AHU's) as shown on the mechanical plans and/or specifications, shall be provided by Division 16 Contractor (Electrical), and coordinated with this Contractor. Control power to operate Fan Coils shall be the responsibility of division 16000 as indicated on Control details.
  - 3. All conduits in connection with the controls and instrumentation system shall be furnished and installed by this Contractor.
  - 4. Provide a comprehensive operator and technician-training program as described herein.
  - 5. Provide as-built documentation, software, and all DDC control logic and all associated support documentation on approved media, which accurately represents the final installed system.
- D. Related Work not in this Section:
  - 1. Division 16, Electrical:

- a. Providing motor starters and disconnect switches (unless otherwise noted).
- b. Power wiring and conduit (unless otherwise noted).
- c. Provision, installation and wiring of smoke detectors (unless otherwise noted).

#### 1.02 SUBMITTALS

- A. Eight copies of shop drawings of the entire control system including the Fume Hood Control System shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers catalog data sheets and installation instructions. Shop drawings shall also contain complete wiring and schematic diagrams, software descriptions, calculations, and any other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings. A complete written Sequence of Operation as well as a hard copy graphical depiction of the application control programs shall also be included with the submittal package.
- B. Upon completion of the work, provide a complete set of 'as-built' drawings and application software on magnetic floppy disk media or compact disk. Drawings shall be provided as AutoCAD™ or Visio™ compatible files. Eight copies of the 'as-built' drawings shall be provided in addition to the documents on magnetic floppy disk media or compact disk.

#### 1.03 QUALITY ASSURANCE

- A. The Manufacturer of the FMCS digital controllers shall provide documentation supporting compliance with ISO-9001 (Model for Quality Assurance in Design/Development, Production, Installation and Servicing). Product literature provided by the FMCS digital controller manufacturer shall contain the ISO-9001 Certification Mark from the applicable registrar.
- B. Coordination:
  1. The Control Contractor shall supply the control valves, immersion wells and couplings for flow and pressure switches to the Mechanical Contractor for installation.
  2. The Control Contractor shall supply and install control damper actuators. The Mechanical Contractor is responsible for providing and installing automatic control dampers and blank-off plates if needed.

#### 1.04 JOB CONDITIONS

- A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to insure that the work will be carried out in an orderly fashion.

#### 1.05 QUALIFICATION OF BIDDERS

- A. All bidders must be temperature control contractors in the business of installing direct digital temperature controls for over twenty (20) years. Contractors with less than 10 years experience shall submit qualifications and project submittals to the Engineer 30 days prior to bid date for approval to bid.
- B. All bidders must be manufacturers or licensed factory representatives and installers of the manufacturers specified for the local area. Bidders must also be a Certified Systems Integrator for the BACnet and Tridium products specified. Phoenix Fume Hood Controls shall be provided by Newmatic Engineering, Richard Yardley: 858-442-8500.
- C. All bidders shall have a local engineering and service office with at least 10 existing, installed customers within 15 miles of the job site.

- D. Acceptable DDC Control products:
  - 1. Native BACnet by Control Contractors Inc. 858-554-1814
  - 2. Siemens BACnet Controls (Proprietary Apogee excluded)

#### 1.06 WARRANTY AND WARRANTY ACCESS

- A. Equipment, materials and workmanship incorporated into the work shall be warranted for a period of one year from the time of system acceptance.
- B. The Owner shall grant to the Temperature Control sub-contractor, reasonable access to the FMCS during the warranty period. The owner shall allow the contractor to access the FMCS from a remote location for the purpose of diagnostics and troubleshooting, via the Internet, during the warranty period.

#### 1.07 SYSTEM DESCRIPTION

- A. The entire Native BACnet Facility Management and Control System (FMCS) shall be comprised of a network of interoperable, stand-alone digital controllers communicating on an open protocol communication network to a host computer within the facility and communicating via the internet to a computer with standard browser in a remote location. The FMCS shall be capable of communicating with third party systems such as chillers, boilers, air handling systems, energy metering systems, other energy management systems, access control systems, fire-life safety systems and other building management related devices with open, interoperable communication capabilities.
- B. The basic controls system also includes all Fume Hood Controls by Phoenix, sensors, controllers, instruments, valves, actuators, devices, installation and service for a complete and functional controls system. All control devices (valves, actuators, etc.) are included under the ATC contract unless specifically specified elsewhere in this document or in the HVAC Specification. Control system shall be designed to allow easy field adjustment of all set points and parameters.

#### 1.08 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. This specification defines the minimum equipment and performance requirements for an interoperable Building Automation System (BAS).
- B. The drawings are diagrammatic intending to show a workable general arrangement and location of components and are not necessarily complete or rigid in all details.

#### 1.09 AGENCY AND CODE APPROVALS

- A. All products of the FMCS shall be provided with the following agency approvals. Verification that the approvals exist for all submitted products shall be provided with the submittal package. Systems or products not currently offering the following approvals are not acceptable.
  - 1. BACnet Testing Laboratory certification for all controllers (BTL Certified).
  - 2. UL-916; Energy Management Systems
  - 3. FCC, Part 15, Subpart J, Class A Computing Devices

#### 1.10 SOFTWARE LICENSE AGREEMENT

- A. The Owner shall sign a copy of the manufacturer's standard software and firmware licensing agreement as a condition of this contract.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. The Facility Management Control System (FMCS) shall be comprised of a network of interoperable, stand-alone digital controllers, a computer system, graphical user interface software, portable operator terminals, printers, network devices and other devices as specified herein.
- B. The installed system shall provide secure password access to all features, functions and data contained in the overall FMCS.

### 2.02 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURES

- A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system with the capability to integrate both the ANSI/ASHRAE Standard 135-2004 BACnet.
- B. All components and controllers supplied under this contract shall be true “peer-to-peer” communicating devices. Components or controllers requiring “polling” by a host to pass data shall not be acceptable.
- C. The supplied system must incorporate the ability to access all data using an internet browser without requiring proprietary operator interface and configuration programs. Systems requiring proprietary database and user interface programs shall not be acceptable.
- D. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer’s internal Intranet network. Systems employing a “flat” single tiered architecture shall not be acceptable.

### 2.03 BUILDING CONTROLLER (BC)

- A. General: Building Controllers shall combine both network routing functions and control functions into a single unit. BC’s shall route communications between the BACnet/IP network, the BACnet 8802.3 network, BACnet PTP network and the BACnet MS/TP network. The BC shall be responsible for monitoring and controlling directly connected HVAC equipment such as large AHU’s, Chillers or Boilers. Controllers that support a lesser profile such as B-AAC are not acceptable. BC’s shall be tested and certified by the BACnet Testing Laboratory (BTL) as Building Controllers (B-BC).
- B. Hardware Specifications:
  - 1. Memory: The operating system and the application programs for the BC shall be stored in non-volatile FLASH memory.
  - 2. Communication Ports: Each BC shall provide communication to both the Workstation(s) and the field buses. The BC shall have on-board a 10/100bT Ethernet port, an RS-232 Port and two RS-485 ports.
  - 3. Modular Expandability: The system shall employ a modular I/O field interface (sensors, actuators, etc.) design to allow easy expansion of the field interface device Input and Output capacity. It shall be possible to add I/O modules as desired to meet the I/O requirements for individual control applications. These modules shall be capable of being installed up to 100 feet from the BC
  - 4. Inputs: The BC shall have 16 on-board universal inputs with a minimum of 12-bit analog to digital conversion. Each input shall have over-voltage protection.
  - 5. Outputs: The BC shall have 16 on-board universal outputs with a 12-bit digital to analog conversion. Each output shall have optional three position manual override switches to allow selection of the ON, OFF, or AUTO output state. These switches shall provide feedback to the

controller so that the Auto or non-Auto position of the override switch can be obtained through software.

- a. Optional output cards all with Hand-Off-Auto switches and switch feedback for the following outputs:
  - 1) 24 VAC Zero crossing Triac
  - 2) N.C. Form A relay output
  - 3) N.O. Form A relay output
  - 4) 4-20ma with override potentiometer
  - 5) 0-10VDC analog output with override potentiometer
6. Local Status Indicator Lamps: Provide as a minimum, LED indication of CPU status, Ethernet LAN status, and field bus status.
7. Real Time Clock (RTC): Each BC shall include a battery or capacitor backed, real time clock for 72 hours, accurate to 1.5 minutes per month.
8. Automatic Restart after Power Failure: Upon restoration of power after an outage, the BC shall automatically and without human intervention.
9. Battery backup: The BC shall include an on-board battery to back up the controller's RAM memory.
- C. History Logging: Each controller shall be capable of locally logging any input, output, calculated value, etc. over user defined time intervals (1 second minimum time). Up to 256 values shall be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.
- D. Alarm Management: For each system point, alarms can be created based on high/low limits or conditional expressions. All alarms will be tested each scan of the BC and can result in the display of one or more alarm messages or reports. Up to 8 alarms can be configured for each point in the controller. Alarms will be generated based on their priority. A minimum of 255 priority levels shall be provided. If communication with the Operator Workstation is temporarily interrupted, the alarm will be time-stamped and buffered in the BC. When communications return, the alarm will be transmitted to the Operator Workstation.
- E. Router Function: The BC shall be capable of routing traffic between two BACnet MS/TP ports, one BACnet PTP (Point to Point) port, four (logical) BACnet IP ports and one (logical) BACnet Ethernet port.
- F. Each BC shall have the following standard features:
  1. Each of the four BACnet IP ports can be configured for BACnet IP, BBMD, Foreign Device Registration, or PAD.
  2. The Firmware shall be upgradeable through the Ethernet connection via FTP without physical access to the BC for easy updates as future enhancements expand functionality.
  3. 16 on-board universal inputs and 16 on-board universal outputs, software selectable as either analog or binary.
  4. Accept up to seven expansion I/O cards.
  5. Expansion I/O modules shall be connected with twisted pair wire up to 100 feet from the B-BC.
  6. Shall dynamically allocate memory resources to provide flexible use of its memory.
  7. Shall contain up to 32 user defined control programs.
  8. Shall employ at minimum a 32-bit microprocessor.
  9. Shall meet or exceed the specifications in the ANSI/ASHRAE BACnet Standard 135-2004 for BACnet Building Controllers.



10. Shall have removable screw terminal blocks that can accommodate wire sizes 14-22 AWG.
11. Shall support pulse counting up to 16 Hz.
12. Shall support direct connections up to 128 inputs, 72 outputs and 128 accumulator objects.
13. Shall support up to 1000 Analog Value Objects, 1000 Binary Value Objects and up to 256 Multi-state Value Objects.
14. Shall support up to 32 Loop Objects.
15. Shall support up to 32 Program Objects.
16. Shall support up to 32 Schedule Objects and up to 32 Calendar Objects.
17. Shall support up to 256 Trend Objects.

#### 2.04 INTEROPERABLE BACnet CONTROLLER (IBC)

- A. Controls shall be microprocessor based BACnet Advanced Application Controllers (AAC) in accordance with the ANSI/ASHRAE Standard 135-2004. The Native BACnet AAC's shall be provided for Air Handling Units, Chilled and Hot Water Control, Fan Coils and other applications as shown on the drawings. The application control program shall be resident within the same enclosure as the input/output circuitry, which translates the sensor signals. The system supplier must provide a PICS document showing the installed systems compliance level to the ANSI/ASHRAE Standard 135-2004.
- B. All Native BACnet AAC's shall be fully application programmable and shall at all times maintain their BACnet compliance. Controllers offering application selection only (non-programmable) are not acceptable. All control sequences within or programmed into the BACnet AAC's shall be stored in non-volatile memory, which is not dependent upon the presence of a battery, to be retained.
- C. Whether stand-alone or networked, the BTL Listed Advanced Application Controllers shall be used to provide direct digital control of HVAC equipment. In addition to their standalone capabilities to execute the operating sequences described later in this document, they shall also be capable to be networked in a peer-to-peer, BACnet MS/TP field network to other BACnet AAC's, or as part of a complete facilities management system which integrates multiple field networks. These controllers may be used to optimize the energy consumption by implementing various Energy Management strategies such as demand limiting, duty cycling, outside air optimization, temperature setup/setback, optimum start/stop routines, etc.
  1. Standard features for all field devices features shall include:
    - a. Stand-alone or networked peer-to-peer capabilities as MS/TP Masters; slave devices are not acceptable.
    - b. BACnet MS/TP LAN with configurable baud rate from 9600 to 76.8k baud.

#### 2.05 MICROPROCESSOR BASED LCD Display SPACE (MBS) SENSOR

- A. The MBS Sensor shall connect directly to the BACnet AAC's and shall not utilize any of the I/O points of the controller. The MBS Sensor shall provide a communication connection to the controller. The MBS Sensor shall provide a communications jack for connection to the BACnet communication trunk to which the BACnet AAC is connected. The MBS Sensor, the connected controller, and all other devices on the BACnet bus shall be accessible by the Portable Operator's Terminal (POT). Microprocessor based sensors whose port only allows communication with the controller to which it is connected shall not be acceptable.

## 2.06 OTHER CONTROL SYSTEM HARDWARE

- A. Control Damper Actuators: Two-position or proportional electric actuators shall be direct-mount type sized to provide a minimum of 5 in-lb torque per square foot of damper area. Damper actuators shall be spring return type. Provide one actuator per damper minimum.
- B. Control Valves: Control valves shall be 2-way or 3-way pattern as shown constructed for tight shutoff and shall operate satisfactorily against system pressures and differentials. Two-position valves shall be 'line' size. Proportional control valves shall be sized for a maximum pressure drop of 5.0 psi at rated flow (except as may be noted on the drawings). Valves with sizes up to and including 2 inches shall be "screwed" configuration and 2-1/2 inch and larger valves shall be "flanged" configuration. Electrically controlled valves shall include spring return type actuators sized for tight shut-off against system pressures and furnished with integral switches for indication of valve position (open-closed).
- C. Duct Mount, Pipe Mount and Outside Air Temperature Sensors: 10,000-ohm thermistor temperature sensors with an accuracy of  $\pm 0.2^{\circ}\text{C}$ . Outside air sensors shall include an integral sun shield.
- D. Current Sensitive Switches: Solid state, split core current switch that operates when the current level (sensed by the internal current transformer) exceeds the adjustable trip point. Current switch to include an integral LED for indication of trip condition and a current level below trip set point.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work and in the regular employment of the temperature control system manufacturer or its exclusive factory authorized installing contracting field office (representative). The installing office shall have a minimum of five years of installation experience with the manufacturer and shall provide documentation in submittal package verifying longevity of the installing company's relationship with the manufacturer. Supervision, calibration and checkout of the system shall be by the employees of the local exclusive factory authorized temperature control contracting field office (branch or representative).
- B. Drawings of temperature control systems are diagrammatic only and any apparatus not shown, such as relays, accessories, etc., but required to make the system operative to the complete satisfaction of the Architect shall be furnished and installed without additional cost.

### 3.02 WIRING

- A. All electrical control wiring and power wiring to the control panels shall be the responsibility of the FMCS contractor.
- B. The electrical contractor (Div. 16) shall furnish all power wiring to electrical starters and motors.
- C. All wiring shall be in accordance with the Project Electrical Specifications (Division 16), the National Electrical Code and any applicable local codes. All FMCS wiring shall be installed in the conduit types specified in the Project Electrical Specifications (Division 16) unless otherwise allowed by the National Electrical Code or applicable local codes. Where FMCS plenum rated cable wiring is allowed it shall be run parallel to or at right angles to the structure, properly supported and installed in a neat and workmanlike manner.

3.03 ACCEPTANCE TESTING

- A. Upon completion of the installation, the Temperature Control sub-contractor shall load all system software and start-up the system. The Temperature Control sub-contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to insure that the system is functioning in full accordance with these specifications.
- B. Upon completion of the performance tests described above, repeat these tests in presence of Owner's Representative, as required. Properly schedule these tests so testing is complete at a time directed by the Owner's Representative.
- C. System Acceptance: Satisfactory completion is when the Temperature Control sub-contractor has performed successfully all the required testing to show performance compliance with the requirements of the Contract Documents to the satisfaction of the Owner's Representative.

3.04 OPERATOR INSTRUCTION, TRAINING

- A. During system commissioning and at such time acceptable performance of the FMCS hardware and software has been established the Temperature Control sub-contractor shall provide on-site operator instruction to the owner's operating personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories.
  - 1. The Temperature Control sub-contractor shall provide 40 hours of instruction to the owner's designated personnel on the operation of the FMCS and describe its intended use with respect to the programmed functions specified.

**PART 4 - LABORATORY AIR FLOW GUIDE SPECIFICATION (PHOENIX CONTROLS)**

Part 1.0 General

1.01 Description:

- A. A laboratory airflow control system shall be furnished and installed to control the airflow into and out of laboratory rooms with fume hoods. The exhaust flow rate of a laboratory fume hood shall be controlled precisely to maintain a constant average face velocity into the fume hood. The laboratory control system shall vary the amount of supply air into the room to operate the laboratories at the lowest possible airflow rates necessary to maintain laboratory pressurization in relation to adjacent spaces (negative). The laboratory airflow control system shall be integrated with the Building Management System (BMS).

1.02 Acceptable Manufacturers

- A. The plans and specifications for the laboratory airflow control system are based on systems and equipment manufactured by Phoenix Controls Corporation.
- B. Only those systems specifically named in this specification or by addendum shall be considered for approval. Other systems submitted after the bid opening will be returned without review.

1.03 Warranty Period

- A. Warranty shall commence upon the date of shipment and extend for a period of 36 months, whereupon any defects in materials or laboratory airflow control system performance shall be repaired by the supplier at no cost to the owner.

Part 2.0 System Performance Requirements / System Components

2.01 Airflow Control System Description

- A. Each laboratory shall have a dedicated laboratory airflow control system.
- B. The laboratory airflow control system shall employ individual average face velocity controllers that directly measure the area of each fume hood's sash opening and proportionally control each hood's exhaust airflow to maintain a constant face velocity over a minimum range of 20% to 100% of sash travel. The corresponding minimum hood exhaust flow turndown ratio shall be 5 to 1.
- C. The hood exhaust airflow control device shall respond to the fume hood sash opening by achieving 90% of its commanded value within one second of the sash reaching 90% of its final position (with no more than 5% overshoot/undershoot) of required airflow. Rate of sash movement shall be from one to one and one-half feet per second.
- D. The hood exhaust airflow control device shall be switched to a decommissioned mode when class is over. This mode shall be initiated from the fume hood monitor or through the BMS network. In this mode, the exhaust valve is brought to its physical minimum of 90 CFM. The mode is exited automatically when the sash is opened.
- E. The laboratory airflow control system shall maintain specific airflow ( $\pm 5\%$  of signal within one second of a change in duct static pressure) regardless of the magnitude of the pressure change, airflow change or quantity of airflow control devices on the manifold (within 0.3" to 3.0" wc).
- F. The laboratory airflow control system shall use volumetric offset control to maintain room pressurization. The system shall maintain proper room pressurization polarity regardless of any change in room/system conditions, such as the raising and lowering of any or all fume hood sashes or rapid changes in duct static pressure. Systems using differential pressure measurement or velocity measurement to control room pressurization are unacceptable.

2.02 Airflow Control Device—General

- A. The airflow control device shall be a field proven venturi valve.
- B. The airflow control device shall be pressure independent over its specified differential static pressure operating range. An integral pressure independent assembly shall respond and maintain specific airflow within one second of a change in duct static pressure irrespective of the magnitude of pressure and/or flow change or quantity of airflow controllers on a manifolded system.
- C. The airflow control device shall maintain accuracy within  $\pm 5\%$  of signal over an airflow turndown range of no less than 16 to 1.
- D. No minimum entrance or exit duct diameters shall be required to ensure accuracy and/or pressure independence.

- E. The airflow control device shall be constructed of 16-gauge aluminum. The device's shaft and shaft support brackets shall be made of 316 stainless steel. The pivot arm and internal mounting link shall be made of aluminum (for supply air) or 316 or 303 stainless steel (for fume hoods or formaldehyde exhaust). The pressure independent springs shall be a spring-grade stainless steel. All shaft bearing surfaces shall be made of a Teflon, polyester or PPS (polyphenylene sulfide) composite. Fume hood or formaldehyde exhaust valves shall have a baked-on, corrosion-resistant phenolic coating. The device's shaft shall be made of 316 stainless steel with a Teflon coating. The internal nuts, bolts and rivets shall be stainless steel.
- F. Actuation –a UL 916 listed electronic actuator shall be factory mounted to the valve. Loss of main power shall cause the valve to position itself in an appropriate failsafe state.
- G. The controller for the airflow control devices shall be microprocessor based and operate using peer-to-peer control architecture. The room-level airflow control devices shall function as a standalone network.
- H. There shall be no reliance on external or building-level control devices to perform room-level control functions. Each laboratory control system shall have the capability of performing fume hood control and room pressurization control, and implement occupancy and emergency mode control schemes.
- I. The laboratory airflow control systems shall be integrated with the BMS via BACnet.
- J. Certification:
  - a. Each airflow control device shall be factory calibrated to the job specific airflows as detailed on the plans and specifications using NIST traceable air stations and instrumentation having a combined accuracy of no more than  $\pm 1\%$  of signal over the entire range of measurement. Electronic airflow control devices shall be further calibrated and their accuracy verified to  $\pm 5\%$  of signal at a minimum of 48 different airflows across the full operating range of the device.
  - b. Each airflow control devices shall be marked with device-specific factory calibration data. At a minimum, it should include the tag number, serial number, model number, eight-point characterization information (for electronic devices), and quality control inspection numbers. All information shall be stored by the manufacturer for use with as-built documentation.

#### 2.03 Sash Sensing and Monitoring Equipment for VAV Fume Hoods

- A. For variable air volume (VAV) fume hood exhaust systems, a sash sensor shall be provided to measure the height of each vertically moving fume hood sash. A sash sensor shall also be provided for horizontal overlapping sashes. Control systems employing sidewall-mounted velocity sensors shall be unacceptable.
- B. The airflow at the fume hood shall vary in a linear manner between two adjustable minimum and maximum flow set points to maintain a constant face velocity throughout this range. A minimum volume flow shall be set to assure flow through the fume hood even with the sash totally closed.
- C. A fume hood monitor shall be provided to receive the sash sensor output and de-commissioning input. This same monitor shall generate an exhaust airflow control signal for the appropriate airflow control device in order to provide a constant average face velocity. Audible and separate visual alarms shall be provided for both flow alarm and emergency exhaust conditions.

2.04 Control Functions

- A. The airflow control devices shall utilize peer-to-peer, distributed control architecture to perform room-level control functions. Master-slave control schemes shall not be acceptable. Control functions shall include, at a minimum, pressurization control, as well as respond to occupancy and emergency control commands.
- B. Pressurization Control
  - 1. The laboratory control system shall control supply and auxiliary exhaust airflow devices in order to maintain a volumetric offset (either positive or negative). Offset shall be maintained regardless of any change in flow or static pressure. This offset shall be field adjustable and represents the volume of air, which will enter (or exit) the room from the corridor or adjacent spaces.
  - 2. The pressurization control algorithm shall sum the flow values of all supply and exhaust airflow devices and command appropriate controlled devices to new set points to maintain the desired offset. The offset shall be adjustable.
  - 3. Volumetric offset shall be the only acceptable means of controlling room pressurization. Systems that rely on differential pressure as a means of control shall provide documentation to demonstrate that space pressurization can be maintained if fume hood sashes are changed at the same time a door to the space is opened.
  - 4. The pressurization control algorithm shall support the ability to regulate the distribution of total supply flow across multiple supply airflow control devices in order to optimize air distribution in the space.
- C. Emergency Mode Control
  - 1. The laboratory control system shall provide a means of overriding temperature and pressurization control in response to a command indicating an emergency condition exists, and airflow control devices are to be driven to a specific flow set point. The system shall support up to four emergency control modes. The emergency control modes may be initiated either by a local contact input or BMS command.
  - 2. Once an emergency mode is invoked, pressurization and temperature control are overridden for the period that the mode is active. Emergency modes shall have a priority scheme allowing a more critical mode to override a previously set condition.

2.05 Interface to Building Management Systems

- A. The laboratory airflow control system network shall have the capability of digitally interfacing with the BMS. The required software interface drivers shall be developed and housed in a dedicated interface device furnished by the laboratory airflow control system supplier.
- B. The interface device shall be a BTL Certified BACnet Level 4 gateway, and shall communicate via BACnet over IP.
- C. All room-level points shall be available to the BMS for monitoring or trending. The gateway shall maintain a cache of all points to be monitored by the BMS. The room-level airflow control devices shall update this cache continually.

Part 3.0 Execution

3.01 Installation

- A. The laboratory airflow control system (LACS) contractor shall install the sash sensors, interface boxes, and fume hood monitor on the fume hood. Reel-type sash sensors and their stainless steel cables shall be hidden from view. Bar-type sash sensors shall be affixed to the individual sash panels. Sash interface boxes with interface cards shall be mounted in an accessible location.
- B. The LACS contractor shall install all routers and repeaters in an accessible location in or around the designated laboratory room.
- C. The LACS shall install an appropriately sized and fused 24 VAC transformer suitable for NEC Class II wiring.
- D. All cable shall be furnished and installed by the LACS contractor. The LACS contractor shall terminate and connect all cables as required.
- E. The mechanical contractor shall install all airflow control devices in the ductwork and shall connect all airflow control valve linkages.
- F. Each pressurization zone shall have either a dedicated, single-phase primary circuit or a secondary circuit disconnect.

3.02 System Start-up, Project Support, Documentation and Training

- A. The laboratory startup and commissioning shall be performed by a factory-authorized representative of the laboratory airflow control system manufacturer. The representative must have at least five (5) factory trained technicians under their direct employment in the State of California. The representative will provide the initial engineering, project support and project commissioning for this project. Start-up shall include calibrating the fume hood monitor and any combination sash sensing equipment, as required. Start-up shall also provide electronic verification of airflow (fume hood exhaust, formaldehyde exhaust, and make-up air), system programming and integration to the BMS.
- B. The laboratory airflow control system supplier shall furnish a minimum of four hours of owner training by factory trained and certified personnel. The training will provide an overview of the job specific airflow control components, verification of initial fume hood monitor calibration, general procedures for verifying airflows of air valves and general troubleshooting procedures. Operation and maintenance manuals, including as-built wiring diagrams and component lists, shall be provided for each training attendee.

END OF SECTION 23 09 13

SECTION 27 10 00 STRUCTURED CABLING

PART 1 – GENERAL

1.01 SUMMARY

- A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.
- B. The provisions of Section 26 00 00 General Electrical Provisions, and Section 26 05 00 Basic Electrical Materials and Methods, apply to this section as if fully repeated herein.
- C. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Structured Cabling, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to, the following:
  - 1. Copper Communications Cabling – Unshielded.
  - 2. Copper Communications Cabline – Shielded.
  - 3. Copper Telephone Cabling.
  - 4. Fiber Optic Communications Cabling.
  - 5. Coax Television Cabling.
  - 6. Audio/Visual Cabling.
- D. This section specifies standards of materials and execution in the provision of wiring, cable and related terminations to be provided under the work of Division 27 Sections. Refer to the requirements of such sections for the functional requirements of systems to be provided using the materials and methods of this section, as well as the additional standards, material, and execution specific to each section.

1.02 SUBMITTALS

- A. In addition to the requirements of Division 01, submit as applies, all materials for review arranged in same order as Specifications, individually reference to specification section, paragraph and contract drawing number. Conform in every detail as applies to each referencing section.
- B. Coordination Drawings: Prepare coordination drawings in accordance with the provisions in Section 01 30 00.
- C. Make each specified submittal as a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.
- D. Progress Schedule: Include duration and milestones for at least the following:
  - 1. All submittals specified.
  - 2. Shipment to site.
  - 3. Installation.
  - 4. Field testing.
- E. Manufacturer's Product Data:
  - 1. List of Material. For each item include:
    - a. Manufacturer.
    - b. Model number.



- c. Listing: UL or none.
- d. Quantity.

F. Shop Drawings:

- 1. Floor Plans indicating rough-in, mounting height, conduit size, wire type, and wire fill.
- 2. Sections/Elevations with mounting location reference.
- 3. Enlarged plans as necessary.
- 4. Wire run sheets (if used) indicating wire number, source, designation, signal type, and wire type.
- 5. Provide full size front elevation details of patch bays with layout and text designations.

G. Samples: Samples for review by the Architect of all finishes/materials which will be visible to the public, including but not limited to:

- 1. Receptacles and controls with associated trim plate.
- 2. For other items, provide at least 2" x 2" sample.

H. Shop and Project Site Test Reports:

- 1. Schedule: Submit test reports in timely manner relative to project schedule such that the representative of the Architect may conduct verification of submitted test data without delay of progress.
- 2. Shop test report: Submit prior to shipping completed equipment racks to project site.
- 3. Project site test report: Submit the following system completion and prior to and as condition precedent to acceptance review and testing of the work of this section.
- 4. Pull tension study: The contractor shall furnish a cable pull tension study for all inter-building cables greater than 200 feet in length or containing more than 180 degrees of bend in the conduit path. The study shall utilize a three dimensional computer generated model of the conduit path. The study shall calculate pull tensions, sidewall pressures, and jamming ratios as a minimum. The study shall be performed in both pull directions and shall recommend a pull direction that generates lesser tension. The pull tension study shall be submitted and reviewed by the District prior to the installation of any cables.
- 5. Content: Include at least:
  - a. Time and date of test.
  - b. Personnel conducting test.
  - c. Test equipment, including serial and date of calibration.
  - d. Test object.
  - e. Procedure used.
  - f. Results of test – numerical or graphical presentation.

1.03 QUALITY ASSURANCE

Comply with the requirements of Division 01 and the following:

- A. Company: Work of each section in this Division shall be performed by an installer who has at least eight (8) years direct experience with the devices, equipment and systems of the type and scope specified herein, and who has fully staffed and equipped maintenance and repair facility, and who is licensed to perform work of this type in the project jurisdiction. Raceway installation shall be performed by a licensed C-10 contractor. All other work shall be performed by parties licensed to perform such work.
- B. Personnel: Use adequate numbers of skilled workers 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. Supervisors shall have at least eight (8)

years direct experience in similar work. Installation and maintenance personnel shall have at least five (5) years direct experience in similar work.

- C. Designated supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the project site during all phases of installation and testing of the work of this section. This supervisor shall be the same individual through the execution of the work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the contractor intervene.
- D. Coordination: Coordinate the work of this section with the work of all other sections. Comply with Division 01.
- E. Verification: Verify dimensions and conditions at the project site. Submit any conflicts in a timely manner for resolution.
- F. Project site installation and testing: Install as specified herein. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Request verification of project site test in a timely manner.
- G. Verification of submitted test data: Re-test in presence of designated representatives of the Architect at reasonable mutual convenience. Provide services of the designated supervisor and an additional technician familiar with work of this section. Provide all test equipment. Provide complete set of latest stamped, actioned submittals of record for reference. Provide complete set of shop and project site test reports, as applies. Provide a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
- H. Reference/Project record documents: At all times when the work is in progress, maintain at the workplace, fabrication shop or project site as applies, a complete set of the latest stamped, actioned submittals of record for reference. Also maintain a separate, clean undamaged set for preparation of Project Record Documents. Also maintain at the workplace a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
- I. Schedule: Comply with the project schedule. Make all submittals specified herein in a timely manner. Failure to make timely submittals complete as specified herein is considered to be lack of substantial progress of the work of this section.
- J. Deliver all equipment, devices and material required for the work of this section and install, test and ready all work for acceptance testing at least 14 days prior to the completion date for the associated area of the project.

#### 1.04 DELIVERY, STORAGE, AND HANDLING

Comply with requirements of Division 01, Section 27 10 05 and the following:

- A. Shipping conditions:
  - 1. All cable shall be shipped on reels with a drum diameter at least 13 times the diameter of the cable.
- B. Storage:
  - 1. Retain factory cable protection until installation. Supplement with heavy gauge plastic sheeting if factory protective membrane is pierced prior to installation. Tape ends and seams water and dust tight.
  - 2. Equipment and cable shall be stored with protection from the weather, humidity and temperature variation, dirt and dust, or other contaminants.

1.05 REGULATORY REQUIREMENTS

- A. Codes and regulations: Perform all work in strict accordance with all applicable Federal, State, County and City codes, regulations, and ordinances.

1.06 APPLICABLE STANDARDS & AGENCIES

- A. Conform to the following:

1. CEC California Electrical Code.
2. NFPA National Fire Protection Association.
3. CBC California Building Code.
4. UL Underwriters Laboratories.
5. ANSI American National Standards Institute.
6. ASTM American Society for Testing Materials.
7. TIA Telecommunications Industry Association
8. ICEA Insulated Cable Engineers Association.

1.07 PERFORMANCE STANDARDS

- A. Voice and Data Category 6A, to ANSI/TIA Category 6A.

- B. Fiber Optic Cabling:

1. Optical Budget: For specified cabling, not more than 2 dB over the cabling manufacturer's specified loss for that same length plus .4dB for each connector and 0.3 dB for each splice measured at 1300 nm.
2. Bandwidth: 500 MHz/km or per cable specification, whichever is more restrictive.

1.08 OPERATING AND MAINTENANCE DATA

- A. Manuals: In addition to the requirements of Division 01, submit two (2) additional sets. Submit in three (3) post binders (not ring binders) with tabs.

- B. Include:

1. Index.
2. Reduced set of system record drawings.
3. Maintenance and spare parts schedule.
4. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, instruction and service manuals for each item. For each set, provide manufacturer's original printed copies only. Photocopies not acceptable.

- C. As-Built drawings:

1. Quantity: Three (3) sets.
2. Format: CAD and PDF files on CD-ROM or DVD-ROM.
3. Content: All drawings required under "Shop Drawings". Show "as installed" condition. Where room designations according to project permanent signage differ from construction designations in the contract documents, show both designations.

- D. Warranty certificates: Comply with Division 01.

1.09 WARRANTY SERVICE

In addition to provisions of Division 01, provide the following:

- A. Warranty: Warrant all of the work of this section to be free from defects in materials and workmanship for a period of twelve (12) months from the date of District acceptance.
- B. Response time: Provide a qualified technician familiar with the work at the project site within twenty-four (24) hours after receipt of a notice of malfunction. Provide the District with the telephone number attended eight (8) hours a day, five (5) days a week, to be called in the event of a malfunction.
- C. Off-site service: Conduct all warranty repairs and services at the project site, unless in violation of manufacturer's standard product warranty. Provide substitute systems, equipment, and/or devices acceptable to the District for the duration of off-site repairs. Provide transportation for substitute and/or test systems, equipment, devices, materials, parts and personnel to and from project site.

## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

#### A. Copper Communications Cabling

- 1. Belden <https://www.belden.com>

#### B. Copper Telephone Cabling

- 1. Belden <https://www.belden.com>

#### C. Fiber Optic Communications Cabling

- 1. CommScope <http://www.commscope.com>

#### D. COAX Television Cabling

- 1. CommScope <http://www.commscope.com>

#### E. Audio/Visual Cabling

- 1. Belden, Inc. <http://www.belden.com>

### 2.02 COPPER COMMUNICATIONS CABLING – UNSHIELDED: CAT6A UTP

#### A. Horizontal Cabling

- 1. Model: Belden #10GXS13 CAT6A Enhanced (625MHz), 4- unbonded-pair.
- 2. Rating: CMP rated.
- 3. Spares: Provide (1) spare cable to each audio-video system.

#### B. Termination

- 1. MDF/IDF Rooms: CAT6A patch panels with rear cable manager.
- 2. Wall/Ceiling Plate: RJ45 Category 6A 10GX modular jack.
- 3. Floor Mount: RJ45 Category 6A 10GX modular jack.

#### C. Patch Cords – As Required

1. Model: Belden or Uniprise.
2. Category: As require for equipment being connected.
3. Length: As required.
4. Quantity: As required.
5. Color: Per Owner's standard.

2.03 COPPER COMMUNICATIONS CABLING – SHIELDED: CAT6A F/UTP

A. Horizontal Cabling

1. Model: Belden #10GX63F CAT6A Enhanced (625MHz), 4 shielded bonded-pair.
2. Rating: CMP rated.

B. Termination

1. MDF/IDF Rooms: CAT6A patch panels with rear cable manager.
2. Wall/Ceiling Plate: RJ45 Category 6A 10GX modular jack.
3. Floor Mount: RJ45 Category 6A 10GX modular jack.

C. Patch Cords – As Required

1. Model: Belden or Uniprise.
2. Category: As require for equipment being connected.
3. Length: As required.
4. Quantity: As required.
5. Color: Per Owner's standard.

2.04 COPPER TELEPHONE CABLING

A. Inter Building Backbone: CAT3 UTP

1. None this project.

B. Intra Building Backbone: CAT3 UTP

1. None this project.

C. Horizontal Cabling: CAT6A UTP

1. Model: Belden #10GXS13.
2. Rating: CMP rated.
3. Conductors: 4 pair.
4. Color: Per Owner's standard.

D. Termination

1. The VoIP phone system shall run on the buildings main data network.
2. Wall Plate: CommScope Uniprise UNF-WL4-1P-ST.
  - a. 1 port stainless steel wall phone faceplate where wall mounted phone occurs.

2.05 FIBER OPTIC COMMUNICATIONS CABLING

A. Inter Building Backbone – Armored

1. Innerduct: Not required with armored cable.
2. Single Mode: CommScope R-012-DZ-8W-FSUBK.
  - a. Mode: Singlemode.
  - b. Rating: OFNR rated.
  - c. Strands: 12 Strand Cable.
  - d. Armor Type: Interlocking Aluminum.
  - e. Fiber Type: (OS1) G.652.D and G.657.A1.
  - f. Standard: ANSI/ICEA S-83-596.
3. Multimode: None this project.

B. Intra Building Backbone

1. None this project.

C. Fiber Termination

1. Cable Ends: LC-type connectors.
2. Housing: CommScope Uniprise
  - a. LC-type connectors mounted inside LC Duplex connector panels within the Closet Connector Housing.
  - b. 4U sized housing at MDF.
  - c. 1U sized housing at BDF's.
3. Connectors: Provide fusion splice-on connectors (SOC), mechanical connectors not permitted.

2.06 COAX TELEVISION CABLING

A. Inter Building Backbone

1. None this project.

B. Intra Building Backbone

1. None this project.

2.07 AUDIO/VISUAL CABLING

A. HDMI Over CAT6A Cable

1. Model: Belden #10GX63F shielded twisted bonded-pair.
1. Rating: CMP rated.
2. Conductors: 8 total, 4 bonded twisted pair.
3. Termination: HDMI transmitters and receivers per drawings.
4. Color: Per Owner's standard.

B. DisplayPort Cable

1. Model: Belden 24 AWG.
2. Rating: CMP rated.

3. Conductors: 20.
4. Termination: Ortronics 2226-18405-ADT.
5. Termin. Face Plate: Ortronics OR-40300158, 3 module single gang, fog white.

C. HDMI Cable

1. Model: Belden 23.5 AWG shielded twisted bonded-pair.
2. Rating: CMP rated.
3. Conductors: 19.
4. Termination: Ortronics OR-KSHDMI, keystone, fog white.
5. Termin. Face Plate: Ortronics OR-40300158, 3 module single gang, fog white.

D. Audio Cable

1. Model: Belden 14 AWG, shielded.
2. Rating: CMP rated.
3. Conductors: 4.
4. Termination: Ortronics OR-60900235, triplex RCA/phono, 110 connected, fog white.
  - a. Provide 1/8" mini jack inputs as per drawings.
5. Termin. Face Plate: Ortronics OR-40300158, 3 module single gang, fog white.

E. Speaker Wire

1. Model: Belden 14 AWG, shielded.
2. Rating: CMP rated.
3. Conductors: 2.

PART 3 - EXECUTION

3.01 GENERAL

- A. All system cabling and terminations to be installed in accordance with the manufacturer's instructions and as shown.
- B. All necessary interconnections, services, and adjustments required for a complete and operable system shall be provided. All installation work must be done in accordance with the safety requirements set forth in the general requirements of ANSI C2 and NFPA 70.

3.02 TEST EQUIPMENT

- A. Provide at least one (1) each of the following items or approved functional equivalents for the duration of each test:
  1. Level 11, Cat 6 Cable Pair Tester.
  2. Time Domain Reflectometer.
  3. True RMS Audio Digital Volt-Phm-Millimeter.
  4. Tone Test Sets.
  5. Optical Power Meter.
  6. Site Portable Communication Systems.
  7. Any other items of equipment or materials required to demonstrate conformance with the contract documents.

8. Voice Cabling Plant Tester – Capable of detecting shorts, opens, reversals, mis-wiring and crosstwists.
9. All testing equipment models to be approved by District Information Services Department.

### 3.03 WIRE AND CABLE INSTALLATION

- A. All wire and cable shall be continuous and splice-free for the entire length of run between designated connections or terminations.
- B. Identify data and voice cables distinctly by using different color overall jacket or insulation.
- C. Verify that all raceways have been de-burred and properly joined, coupled and terminated prior to installation of cables. Verify that all raceway is clear of foreign matter and substances prior to installation of wire or cable.
- D. Inspect all conduit bends to verify proper radius. Comply with Code for minimum permissible radius and maximum permissible deformation.
- E. Apply a chemically inert lubricant to all wire and cable prior to pulling in conduit. Do not subject wire and cable to tension greater than that recommended by the manufacturer. Use multi-spool rollers where cable is pulled in place around bends. Do not pull reverse bends.
- F. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Provide tool formed thermal expansion loops at cable at manholes, handholes and at both sides of all fixed mounted equipment. Cable loops and bends shall not be bent at a radius greater than that recommended by the manufacturer.
- G. Cable Tray Exposed Cable Installation: To conform to EIA/TIA 569, 10.4. Provide at least twice the listed separation for all high intensity EMF sources (including but not limited to motors, transformers, and copiers).
- H. Placement: Do not obscure access to access doors, hatches, air dampers, valves, cable trays, junction boxes, pull boxes or similar areas of access.
- I. All wall and floor penetrations to have pipe sleeves.

### 3.04 SIGNAL POLARITY AND COLOR CODE CONVENTION

- A. RJ45 – Per EIA 568B.

### 3.05 WIRING AND CABLE INSTALLATION, SUPPLEMENTAL OUTSIDE PLANT PROCEDURES

- A. Cable Pulling: Test existing duct lines with a mandrel and thoroughly swab out to remove foreign material before pulling cables. Pull cables down grade with the feed-in point at the manhole or buildings of the highest elevation. Use flexible cable feeds to convey cables through manhole opening and into duct runs. Accumulate cable slack at each manhole or junction box where space permits by training cable around the interior to form one complete loop. Maintain minimum allowable bending radii forming such loops. Do not exceed the specified cable bending radii when installing cable under any conditions, including turnips into outdoor pedestals or other enclosures. Cable with tape shield shall have a bending radius not less than 12 times the overall diameter of the completed cable. If basket-grip type cable-pulling devices are used to pull cable in place, cut off the section of cable under the grip before splicing and terminating.
- B. Cables in Manholes and Handholes. Do not install cables utilizing the shortest route, but route along those walls providing the longest route and the maximum spare cable lengths. Form cables to closely



parallel walls, not to interfere with duct entrances, and support on brackets and cable insulators. In existing manholes and handholes where new ducts are to be terminated or where new cables are to be installed, locate the existing installation of cables, cable supports and grounding as required for a uniform installation with cables carefully arranged and supported. Install cables at middle and bottom of cable racks, leaving top space opening or future cables, except as otherwise indicated for existing installations.

1. No splices allowed in manholes, provide continuous inter building cabling.

C. Cable tags in manholes and handholes. Provide cable markers (or tags) per TIA/EIA 606.

### 3.06 WIRING PRACTICE

A. Coordinate insulation displacement (quick connect) terminal devices with wire size and type. Comply with manufacturer's recommendations. Make connections with automatic impact type tooling set to recommended force.

B. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections. No wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.

C. Correct any and all of the following unacceptable wiring conditions:

1. Deformed, brittle, or cracked insulation.
2. Torn or worn cable jacket.
3. Excessively scored cable jackets.
4. Insulation shrunken or stripped further than 1/8" away from the actual point of connection within a connector, or on a punch block.
5. Ungrommeted, unbushed, or uninsulated wire or cable entries.
6. Deformation or improper radius of wire or cable.

### 3.07 VOICE AND DATA CABLING WIRING PRACTICE

Conform to the following in addition to the general requirements above:

A. Limit cable bends to a minimum radius of eight (8) times the cable diameter except where otherwise noted herein.

B. Box Loops: At data cabling, form circular radius bends of eight (8) times the cable diameter minimum. Up to two (2) flat bends of 90 degrees or less are permitted in any single cable run where necessary to accommodate field wiring conditions. Flat bends exceeding 90 degrees will not be accepted.

C. Receptacle Loop: At the receptacle, a single bend of 90 degrees or less and a 1 inch radius shall be permitted subject to the cable manufacturer certification of such an installation meeting Category 6 requirements. Contractor to field verify the performance of the proposed installation in a mockup using the proposed cabling, jacks, raceway and listed test equipment prior to proceeding.

D. Secure: Tie wraps to be hand (not tool) tightened.

E. Run Lengths:

1. Station, Horizontal, and Closet Links:

- a. Horizontal distribution runs (including vertical portions) shall not exceed 90 meters (295 feet) from station outlet to the associated communications closet.
  - b. Station cabling runs to be three (3) meters (10 feet) or less.
  - c. Closet distribution wiring not to exceed 6 meters (19.5 feet).
- F. Lightning Protection: Provide solid-state lightning protection system for all incoming voice copper cable pairs. Lightning protection system shall allow for the easy removal/replacement of protector units. All incoming copper voice cable pairs shall be cross connected from the lightning protection system to a rack-mounted patch panel.

### 3.08 LABELING

#### A. Cable and MDF/IDF Labeling:

1. The Contractor shall label and document all components of the installed data cable infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.
2. All label printing will be machine generated using indelible ink ribbons or cartridges. Self laminating labels will be used on cable jackets, appropriately sized to the outside diameter of the cable, and placed within view at the termination point on each end. Outlet labels will be the manufacturer's labels provided with the outlet assembly.
3. Faceplates:
  - a. Each faceplate shall be labeled as follows:
    - i. At the top of the faceplate: The name of the MDF/IDF (or name provided by the District Information Systems Department) where the destination's cable is located.
    - ii. If more than one rack is located in the MDF or IDF room, a rack number shall also be included in the label.

#### MDF/IDF Closets:

- a. Each telecommunications rack shall be labeled with the MDF/IDF labeling from the drawings or as provided by the District Information Systems Department.
- b. If more than one rack is located in the room, each rack shall be numerically labeled in sequence starting from the left and working around to the right.
- c. Data Patch Panel:
  - i. Each port of each patch panel shall be labeled with the cable destination's room number. One label can be used to cover a group of ports as long as a marker is used to indicate a change in room numbering.
  - ii. Each patch panel row shall be labeled with an alpha character indicating that row. Labeling shall go in sequence from the top to bottom.
- d. Phone Patch Panel:
  - i. Each port shall be labeled in numeric sequence from left to right. Since phone cables come in groups of 25, the 25th pair shall not be used. Therefore, the start of the next row will start with the next available number. For Example: 26, 51, 76, etc.
  - ii. Each patch panel group shall be labeled with the MDF/IDF of the cable's destination.

### 3.09 TESTING

#### A. Category 6 System:

1. Test and report on each segment separately, including station cabling, horizontal distribution (each segment, if multiple) and telecommunications closet wiring.
2. Test each collective segment as a whole.
3. Note exceptions to Category 6 standards, as applies. Remedy and retest.
4. Submit copy of final results on CD-ROM or DVD-ROM organized by circuit number, consistent with circuit numbering scheme used in preparing submittal drawings and in labeling receptacles and terminations.

### 3.10 EQUIPMENT ENCLOSURE (RACK) AND EQUIPMENT BACKBOARD FABRICATION

- A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.
- B. Provide a permanent label on the front of each equipment rack including the rack designation, and the circuit breaker number and associated electrical distribution panel designation servicing same.
- C. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawer to insure complete access to terminal and interior components.
- D. Fasten removable covers containing any wired component with a continuous hinge along one side, with associated wiring secured and dressed to provide an adequate service loop. Provide an appropriate stop lock to hold all hinged panels and drawers in a serviceable position.
- E. Provide permanent labels for all equipment and devices. Where possible, fasten such labels to the rack frame or to blank or vent panels, which will remain in place when active equipment is removed for possible service.
- F. At jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contact for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.
- G. Coordinate the design and execution of wire harnessing of multi-bay rack ensembles with conditions of delivery to installation locations at project site, and with the requirement herein for the test of the completely wired system in the shop prior to delivery to the project site. Organize the wiring harnesses such that they will fold within one shippable unit without risk of damage, or provide polarized multipin connectors and related interconnect systems as specified elsewhere herein.

### 3.11 ACCEPTANCE REVIEW AND TESTING PROCEDURES

Complete all work of this section. Submit test report. Submit review copies of Operating and Maintenance Manuals, less reduced set of Record Drawings. Notify the Architect in writing that the work of this section is complete and fully complies with the contract documents. Request acceptance and review testing. The representative of the Architect will conduct verification of submitted test data and otherwise direct testing and adjustment of this work. These procedures may be performed at any hour of the day or night as required by the representative of the Architect to comply with the project schedule and avoid conflict with these procedures from possible ongoing work of other sections. Provide all specified personnel and equipment at any time without claim for additional cost or time.

- A. Personnel: Provide services of the designated supervisor and additional technicians familiar with work of this section. Provide quantity of technicians as required to comply with project schedule.
- B. In addition, provide the following:
  1. All testing equipment.

2. Complete set of the latest stamped, actioned submittals of record for reference.
3. Complete set of shop and project site test reports.
4. Complete set of manufacturer's original operation, instruction and service manual for each equipment item for reference.

- C. Demonstrate complete operation of all systems.
- D. Make adjustments as directed by the representative of the Architect.
- E. Correct all items that fail to comply with contract documents, as reasonably determined by the representative of the Architect, in a timely manner.

### 3.12 FIBER TESTING

- A. Fiber – in accordance with the current TIA standard ANSI/TIA-568-B.3 specifications for fiber optic cable.
  1. All test results and fiber lengths shall be provided to District Information Systems Department.

### 3.13 CLOSEOUT

- A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit test report. Notify Architect of completion of punch list.
- B. Portable Equipment: Furnish all portable equipment and spares to the designated representative of the District, along with complete documentation of the materials presented. Where applicable, furnish portable equipment in the original manufacturer's packing.
- C. Submit Operating and Maintenance Data Manuals.
- D. Submit Project Record Documents.
- E. If applicable, replace construction locks with permanent locks. Transmit keys to District.
- F. Conduct specified training.
- G. Submit warranty dated to run from date of District's acceptance of the work.

### 3.14 DISTRICT'S RIGHT TO USE EQUIPMENT

Acceptance of the work of this section will be after completion of corrections and adjustments required by the Punch List which results from acceptance review and testing of the completed installation. The District reserves the right to use equipment, material, and services provided as part of the work of this section, prior to acceptance, without incurring any obligation to accept any equipment or completed systems until all punch list work is complete and all systems comply with the contract documents, or accept any claim for additional cost or time.

END OF SECTION 27 10 00

SECTION 27 11 00 COMMUNICATIONS EQUIPMENT

PART 1 – GENERAL

1.01 SUMMARY

- A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.
- B. The provisions of Section 16011, “General Requirements, Electrical”, and Section 16050, “Basic Electrical Materials and Methods”, apply to this section as if fully repeated herein.
- C. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Communications Equipment, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to, the following:
  - 1. Equipment enclosure systems including relay racks, wall mount racks, and accessories.
  - 2. Uninterruptable power systems and surge suppressors.
  - 3. BDF and IDF switches.
  - 4. Grounding.
  - 5. Wireless LAN.
- D. This section specifies common standards of materials and execution for the work of Division 16700 Sections. Refer to the requirements of such sections for the functional requirements of systems to be provided using the materials and methods of this section, as well as the additional standards, material, and execution specific to each section.

1.02 SUBMITTALS

- A. In addition to the requirements of Division 01, submit as applies, all materials for review arranged in same order as Specifications, individually referenced to specification section, paragraph and contract drawing number. Conform in every detail as applies to each referencing section.
- B. Submit all drawings on sheets of the same size.
- C. Make each specified submittal as a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.
- D. Progress Schedule: Include duration and milestones for at least the following:
  - 1. All submittals specified.
  - 2. Completion of equipment buyout.
  - 3. Completion of equipment receipt at fabrication shop.
  - 4. Shop fabrication.
  - 5. Shop testing.
  - 6. Shipment to site.
  - 7. Installation.
  - 8. Field testing.
  - 9. District’s first event date.
- E. Manufacturer’s Product Data:
  - 1. List of Material. For each item include:

- a. Manufacturer.
  - b. Model number.
  - c. Listing: UL or none.
  - d. Quantity.
2. Manufacturer's Product Data Sheets: In sequence of List of Materials, data sheet for each item, including all accessories, marked for proposed product.
- F. Shop Drawings:
1. Floor Plans indicating rough-in, mounting height, conduit size, wire type, and wire fill.
  2. Sections/Elevations with mounting location reference.
  3. Enlarged plans and mounting details as necessary.
  4. Wire run sheets (if used) indicating wire number, source, designation, signal type, wire type, and operating level or voltage (if applicable).
  5. Provide full size front elevation details of patch bays with layout and text designations.
- G. Samples: Samples for review by the Architect of all finishes/materials which will be visible to the public, including but not limited to:
1. Receptacles and controls with associated trim plate.
  2. For other items, provide at least 2" x 2" sample.
- H. Samples: Samples for review by the Architect of all finishes/materials which will be visible to the public, including but not limited to:
1. Receptacles and controls with associated trim plate.
  2. For other items, provide at least 2" x 2" sample.
- I. Shop and Project Site Test Reports:
1. Schedule: Submit test reports in timely manner relative to project schedule such that the representative of the Architect may conduct verification of submitted test data without delay of progress.
  2. Shop test report: Submit prior to shipping completed equipment racks to project site.
  3. Project site test report: Submit the following system completion and prior to and as condition precedent to acceptance review and testing of the work of this section.
  4. Content: Include at least:
    - a. Time and date of start of burn-in.
    - b. Time and date of test.
    - c. Personnel conducting test.
    - d. Test equipment, including serial and date of calibration.
    - e. Test object.
    - f. Procedures used.
    - g. Results of test – numerical or graphical presentation.

### 1.03 QUALITY ASSURANCE

Comply with the requirements of Division 01 and the following:

- A. Company: Work of each section in this Division shall be performed by an installer who has at least five (5) years direct experience with the devices, equipment and systems of the type and scope specified herein, and who has a fully staffed and equipped maintenance and repair facility, and who is licensed to perform work of this type in the project jurisdiction. Raceway installation shall be

performed by a licensed C-10 contractor. All other work shall be performed by parties licensed to perform such work.

- B. Personnel: Use adequate numbers of skilled workers 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. Supervisors shall have at least five (5) years direct experience in similar work. Installation and maintenance personnel shall have at least three (3) years direct experience in similar work.
- C. Designated supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the project site during all phases of installation and testing of the work of this section. This supervisor shall be the same individual through the execution of the work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the contractor intervene.
- D. Coordination: Coordinate the work of this section with the work of all other sections. Comply with Division 01.
- E. Verification: Verify dimensions and conditions at the project site. Submit any conflicts in a timely manner for resolution.
- F. Project site installation and testing: Install as specified herein. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Request verification of project site test in a timely manner.
- G. Verification of submitted test data: Re-test in presence of designated representatives of the Architect at reasonable mutual convenience. Provide services of the designated supervisor and an additional technician familiar with work of this section. Provide all test equipment. Provide complete set of latest stamped, actioned submittals of record for reference. Provide complete set of shop and project site test reports, as applies. Provide a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
- H. Reference/Project record documents: At all times when the work is in progress, maintain at the workplace, fabrication shop or project site as applies, a complete set of the latest stamped, actioned submittals of record for reference. Also maintain a separate, clean undamaged set for preparation of Project Record Documents. Also maintain at the workplace a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
- I. Schedule: Comply with the project schedule. Make all submittals specified herein in a timely manner. Failure to make timely submittals complete as specified herein is considered to be lack of substantial progress of the work of this section.
- J. Deliver all equipment, devices and material required for the work of this section and install, test and ready all work for acceptance testing at least 14 days prior to the completion date for the associated area of the project unless specifically instructed otherwise by the Architect
- K. Shop Fabrication and Testing: Assemble and fully wire equipment racks and equipment backboards at a fabrication shop off the project site. Burn in for not less than one hundred sixty-eight (168) hours. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Request verification of shop test in timely manner. Following verification of shop test and when installation locations are ready as specified herein, deliver such equipment racks and equipment backboards to the project site and install.
- L. Temporary Equipment: Provide and operate, without claim for additional cost or time, temporary equipment and/or systems to provide reasonably equivalent function, as determined by the Architect, in lieu of the work of this section which is incomplete or found not in conformance with the Contract

Documents as of seven (7) days prior to the completion date. Provide such temporary equipment until acceptance of the work of this section. Thereafter, remove such temporary equipment.

#### 1.04 DELIVERY, STORAGE, AND HANDLING

Comply with requirements of Division 01 and the following:

- A. Deliver materials in manufacturer's original undamaged packages or in bulk packing which provides equivalent protection.
- B. Store packaged materials off ground or slab in manner to protect them from elements, especially moisture damage.
- C. Deliver equipment to associated equipment rooms at the project site when major work of all other sections is complete, equipment room ventilation is operating with clean filters in place, the area is clean and free from airborne contaminants, and continuing work of other trades will not produce airborne contaminants or permit transport of such airborne contaminants to the equipment rooms.

#### 1.05 REGULATORY REQUIREMENTS

- A. Codes and regulations: Perform all work in strict accordance with all applicable Federal, State, County and City codes, regulations, and ordinances.
- B. Unlisted Equipment: Certain equipment specified herein does not bear listing by Underwriters Laboratories (UL). Such equipment is specified herein only where no equipment is known to exist bearing such listing which will perform the function required by the District. In such case, apply for field inspection of such equipment. Pay cost of such inspection.

#### 1.06 APPLICABLE STANDARDS & AGENCIES

- A. Conform to the following:
  - 1. CEC California Electrical Code.
  - 2. NFPA National Fire Protection Association.
  - 3. CBC California Building Code.
  - 4. UL Underwriters Laboratories.

#### 1.07 OPERATING AND MAINTENANCE DATA

- A. Manuals: In addition to the requirements of Division 01, submit two (2) additional sets. Submit in three (3) post binders (not ring binders) with tabs.
- B. Include:
  - 1. Index.
  - 2. Systems operating instructions.
  - 3. Maintenance and spare parts schedule.
  - 4. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, instruction and service manuals for each equipment item. For each set, provide manufacturer's original printed copies only. Photocopies not acceptable.
  - 5. Reduced set of system record drawings.
  - 6. Key schedule.
- C. As-Built drawings:



1. Quantity: Three (3) sets.
2. Format: CAD and PDF files on CD-ROM or DVD-ROM.
3. Content: All drawings required under "Shop Drawings". Show "as installed" condition. Where room designations according to project permanent signage differ from construction designations in the contract documents, show both designations.

D. Warranty certificates: Comply with Division 01.

#### 1.08 WARRANTY SERVICE

In addition to provisions of Division 01, provide the following:

- A. Warranty: Warrant all of the work of this section to be free from defects in materials and workmanship for a period of twelve (12) months from the date of District acceptance.
- B. Response time: Provide a qualified technician familiar with the work at the project site within twenty-four (24) hours after receipt of a notice of malfunction. Provide the District with the telephone number attended eight (8) hours a day, five (5) days a week, to be called in the event of a malfunction.
- C. Off-site service: Conduct all warranty repairs and services at the project site, unless in violation of manufacturer's standard product warranty. Provide substitute systems, equipment, and/or devices acceptable to the District for the duration of off-site repairs. Provide transportation for substitute and/or test systems, equipment, devices, materials, parts and personnel to and from project site.

### PART 2 - PRODUCTS

#### 2.01 ACCEPTABLE MANUFACTURERS

A. Equipment Enclosures and Accessories

1. Chatsworth Products, Inc. <http://www.chatsworth.com>
2. APC <http://www.apc.com>
3. Approved Equal

B. Uninterruptable Power Systems and Surge Suppressors

1. Tripp Lite <http://www.tripplite.com>
2. APC <http://www.apc.com>
3. Approved Equal

C. BDF and IDF Switches

1. Hewlett-Packard <http://www.hp.com>
2. Approved Equal

D. Wireless LAN

1. Brocade Communications Systems, Inc. <http://www.brocade.com>
2. Approved Equal

E. Grounding

1. Chatsworth Products, Inc. <http://www.chatsworth.com>
2. Approved Equal

F. Audio-Visual Equipment Enclosures and Accessories

1. Middle Atlantic Products <http://www.middleatlantic.com>

2.02 EQUIPMENT ENCLOSURES AND ACCESSORIES

A. Rack Cabinet: Wall Mounted, swing out frame for rear access

1. Model: Chatsworth #11792-725.
2. Size: 73.5" x 19" x 25".
3. Color: Black.
4. Accessories: Ground lug.
5. Quantity: As per drawings.
6. Mounting: Bolt to wall.

B. Relay Rack: open side and back

1. Model: Chatsworth #55053-703.
2. Size: 84" x 19" x 3".
3. Color: Black.
4. Accessories: Chatsworth #41050-719 rack base dust cover, splice kit, ground lug.
5. Quantity: As per drawings.
6. Mounting: Bolt to floor.

C. Wire Management

1. Vertical 4.4" Wide: Chatsworth #30091-703, MCS single sided.
2. Vertical 6" Wide: Chatsworth #30092-703, MCS single sided.
3. Horizontal 2U: Chatsworth #30530-719.

2.03 UNINTERRUPTABLE POWER SYSTEMS AND SURGE SUPPRESSORS

A. Uninterruptable Power System (UPS): BDF Data Room

1. Model: Tripp-Lite 3000RTXL3UHV.
2. Outlets: (6) NEMA 6-15/20R, (2) NEMA L6-20R.
3. Power Capacity: 3000 VA/2400 Watt.
4. Quantity: As per drawings.
5. Mounting: Rack mounted.
6. Rack Unit Size: 3U.
7. Furnished/Installed: Contractor Furnished / Contractor Installed.

B. Surge Suppressors: Data Room

1. Model: Tripp-Lite IBAR12-20ULTRA.
2. Outlets: 12.
3. AC Suppression: 1280 joules.
4. Quantity: As per drawings.
5. Mounting: Rack mounted.
6. Rack Unit Size: 1U.
7. Furnished/Installed: Contractor Furnished / Contractor Installed.

C. Surge Suppressors: AV Control System/Lectern

1. Model: Tripp-Lite ISOBAR8ULTRA.
2. Outlets: 8.
3. AC Suppression: 2350 joules.
4. Quantity: Provide (1) per cabinet/lectern.
5. Mounting: Wall mount inside cabinet.
6. Rack Unit Size: N/A.
7. Furnished/Installed: Contractor Furnished / Contractor Installed.

## 2.04 BDF AND IDF SWITCHES

### A. BDF Switches

1. Model: ProCurve E5412-92G-PoE+/2XG-SFP+ v2 zl (J9532A).
2. Quantity: 1 per BDF data room.
3. 10GbE Module: HP J9536A.
  - a. Quantity: Included with base switch.
  - b. Ports (each): 2 port 10GbE SFP+ with 20 port 10/100/1000 PoE+.
  - c. Transceiver: Provide (2) HP 10GbE X2-SC LR Optic (J8437A).
  - d. Connection: Fiber intraconnect cabling.
4. GBIC Module: HP ProCurve J9308A.
  - a. Quantity: 1.
  - b. Ports (each): 4 open mini-GBIC slots with 20-port 10/100/100 PoE+.
  - c. Transceiver: Provide (4) HP ProCurve 1Gb (J4859C).
  - d. Connection: Fiber intraconnect cabling.
5. Copper Module: HP ProCurve J9534A.
  - a. Quantity: Provide (4) total: (3) included with base switch, (1) additional.
  - b. Ports (each): 24 port 10/100/1000 PoE+.
  - c. Connection: RJ-45.
6. Power Supply: Redundant HP 1500W PoE+ zl (J9306A).
  - a. Quantity: (2) Included with base switch.
7. Management: HP ProCurve Manager Plus Software (J9174A).
  - a. License: Provide additional 50 device license (J9173A).
8. Mounting: Rack mounted.
9. Rack Unit Size: 7U.
10. Furnished/Installed: Contractor Furnished / Contractor Installed.

### B. IDF Switches

1. None This Project.

### C. Security

1. Model: Palo Alto Networks PAN-PA-2050.
2. Quantity: 1 per BDF data room.
3. Ports (each): 16 port 10/100/1000, 4 port Gigabit SFP.

4. Throughput:
  - a. Firewall: 1 Gbps.
  - b. Threat Prev.: 500 Mbps.
  - c. IPSec VPN: 300 Mbps.
5. Sessions: 250,000 max.
6. Mounting: Rack mounted.
7. Rack Unit Size: 2U.
8. Subscription: (3) years prepaid.
  - a. Threat Prevention (PAN-PA-5020-TP-3YR).
  - b. URL Filtering (PAN-PA-5020-URL-3YR).
  - c. Premium Support (PAN-SVC-PREM-5020-3YR).
9. Bypass Switch: Datacom Systems Inc. DURAstream 1G (DS-4000-4BT).
  - a. Rack mount 1U.
10. Furnished/Installed: Contractor Furnished / Contractor Installed.

## 2.05 WIRELESS LAN

### A. Wireless LAN Switch

1. Model: Brocade RFS7000.
2. Access Points: 256 “thin” 802.11a/b/g Brocade Mobility 300 access points.
3. Wired LAN Ports: 4 x 10/100/1000 Cu/SPF.
4. Security: BR-RFS7000-L-ADSEC, advanced security upgrade.
5. AP License: BR-RFS7000-L-AP128, starter license for 128 access point radios.
6. Quantity: Provide (1) per Data Room.
7. Mounting: Rack mounted.
8. Rack Unit Size: 1U.
9. Furnished/Installed: Contractor Furnished / Contractor Installed.

### B. Radio Access Point: Dual-radio

1. Model: Brocade 7131N (BR-AP7131N66S40).
2. Standards: 802.11a/b/g/n.
3. Antennas: Integrated.
4. Coverage: Multiple overlapping blanket.
5. Quantity: As per drawings.
6. Mounting: Above ceiling.
7. Rack Unit Size: N/A.
8. Furnished/Installed: Contractor Furnished / Contractor Installed.

### C. Radio Access Point: Tri-radio

1. Model: Brocade 7131N (BR-AP7131N66S78).
2. Standards: 802.11a/b/g/n.
3. Antennas: Provide exterior wall mounted.
4. Coverage: Multiple overlapping blanket.
5. Quantity: As per drawings.
6. Mounting: Above ceiling.
7. Rack Unit Size: N/A.

8. Furnished/Installed: Contractor Furnished / Contractor Installed.

D. Security

1. Model: Brocade AirDefense SV-1250-P-1.
2. Quantity: Provide (1) per WLAN switch.
3. Mounting: Rack mounted.
4. Rack Unit Size: 1U.
5. Licensing:
  - b. Intrusion Prevention: AD-SNFL-P-1, Enterprise base Wireless Intrusion Prevention.
  - c. Forensic Analysis: AD-FESN-P-1, Advanced Forensic Analysis.
  - d. Troubleshooting: AD-ATSN-P-1, Advanced Troubleshooting.
  - e. Quantaty: Provide (40) licenses of each.

6. Furnished/Installed: Contractor Furnished / Contractor Installed.

2.06 GROUNDING

A. Busbar: Wall Mounted

1. Model: Chatsworth Standard #10622-010.
2. Size: 10" ground busbar with min. 4 AWG ground wire.
3. Quantity: Provide (1) per Data room.

2.07 AUDIO-VISUAL EQUIPMENT ENCLOSURES AND ACCESSORIES

A. 4-Post Rack

1. Model: Middle Atlantic #CFR-14-18.
2. Size: 19.25" x 18" x 25.44" (14 rack units).
3. Color: Black.
4. Accessories: Provide (3) Middle Atlantic #UTR1, 1U-rack mount.
5. Quantity: Provide (1) per AV system.
6. Mounting: Inside Lectern or Mobile Instructor Table.

PART 3 - EXECUTION

3.01 GENERAL

- A. Perform the work of this section in accordance with acknowledged industry and professional standards and practices and the procedures specified herein.
- B. Furnish and install (herein, "provide") all materials, devices, components, and equipment required for complete, operational systems.

3.02 TEST EQUIPMENT

- A. Furnish, store and maintain test equipment for both routine and acceptance testing of the work of this section:
  1. Provide all items of equipment or materials required to demonstrate conformance with the contract documents.

3.03 FINISHES

- A. Finishes and materials for equipment mounting in furniture or casework, and in general any item or component herein which is visible shall adhere to the following:
  - 1. Finish shall be as directed by the Architect.
  - 2. Wooden speaker back boxes and baffles shall be painted flat black if not otherwise finished or stained.

3.04 EQUIPMENT ENCLOSURE (RACK) AND EQUIPMENT BACKBOARD FABRICATION

- A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.
- B. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.
- C. Provide permanent labels for all equipment and devices. Where possible, fasten; such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.
- D. At jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contacts for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.

3.05 SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

- A. Upon completion of the installation of all equipment in an area, perform the following tests and record results. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Correct all non-conforming conditions prior to requesting acceptance review testing. Perform at least the following procedures:
  - 1. Mechanical Verification:
    - a. Integrity of all support provisions.
    - b. Absence of debris of any kind, tools, etc.
  - 2. Power and Isolated Ground Verification:
    - a. Isolation of Isolated Ground System from raceway and related ground.
    - b. Grounding of devices and equipment. Integrity of signal and technical power system ground connections.
    - c. Proper provision of power to devices and equipment.
  - 3. Signal Wiring Verification:
    - a. Integrity of all insulation, shield terminations and connections.
    - b. Routing and dressing of wire and cable.
    - c. Continuity, including conformance with wire designations on running sheets, field and shop drawings.
    - d. Absence of ground faults.

e. Polarity.

4. Use the proper sequence of energizing systems to minimize the risk of damage. Energize.

### 3.06 ACCEPTANCE REVIEW AND TESTING PROCEDURES

- A. Complete all work of this section. Submit test report. Submit review copies of Operating and Maintenance Manuals, less reduced set of Record Drawings. Notify the Architect in writing that the work of this section is complete and fully complies with the contract documents. Request acceptance review testing. The representative of the Architect will conduct verification of submitted test data, and otherwise direct testing and adjustment of this work. These procedures may be performed at any hour of the day or night as required by the representative of the Architect to comply with the project schedule and avoid conflict with these procedures from possible ongoing work of other sections. Provide all specified personnel and equipment at any time without claim for additional cost or time.
- B. Personnel: Provide services of the designated supervisor and additional technicians familiar with work of this section. Provide quantity of technicians as required to comply with the project schedule.
- C. In addition, provide:
  - 1. Set of hand and power tools appropriate for performance of adjustment of and corrections to this work. Include spare wire and connectors and specified tooling for application.
  - 2. Ladders, scaffolding and/or lifts as required to access high devices.
  - 3. All test equipment.
  - 4. Complete set of latest stamped, actioned submittals of record for reference.
  - 5. Complete set of shop and project site test reports.
  - 6. Complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
- D. Demonstrate complete operation of all systems and equipment including portable equipment.
- E. Adjust as directed by the representative of the Architect.
- F. Correct, in a timely manner, any work that fails to comply with the contract documents as reasonably determined by the representative of the Architect.

### 3.07 CLOSEOUT

- A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit test report. Notify Architect of completion of punch list.
- B. Portable Equipment: Furnish all portable equipment and spares to the designated representative of the District along with the complete documentation of the materials presented.
- C. Submit Operating and Maintenance Data manuals.
- D. Submit project record documents.
- E. Conduct specified training.
- F. Submit warranty, dated to run from the date of acceptance of the work.

### 3.08 DISTRICT'S RIGHT TO USE EQUIPMENT

- A. Acceptance of the work of this section will be after completion of corrections and adjustments required by the Punch List which results from acceptance review and testing of the completed installation. The District reserves the right to use equipment, material, and services provided as part of the work of this section, prior to acceptance, without incurring any obligation to accept any equipment or completed systems until all punch list work is complete and all systems comply with the contract documents, or accept any claim for additional cost or time.

END OF SECTION 27 11 00





Section 28 13 00

Access Control

Part 1 General

1.1 Section Includes

- A. Provide a scalable, open architecture access control system for security management, including engineering, supply, installation, and activation.

1.2 Related Sections

- A. Section 260500 – Common Work Results for Electrical, for interface and coordination with building electrical systems and distribution.
- B. Section 280513 – Conductors and Cables for Electronic Safety and Security, for cabling between system servers, panels, and remote devices.
- C. Section 280528 – Pathways for Electronic Safety and Security, for conduit and raceway requirements.
- D. Section 281600 – Intrusion Detection, for interface to building intrusion detection system.
- E. Section 282300 – Video Surveillance, for interface to video surveillance system.

1.3 References

- A. Reference Standards: Systems specified in this section must meet or exceed the following requirements:
  - 1. Federal Communications Commission (FCC)
    - a. FCC Part 15 – Radio Frequency Device
    - b. FCC Part 68 – Connection of Terminal Equipment to the Telephone Network
  - 2. Underwriters Laboratories (UL):
    - a. UL294 – Access Control Systems Units

3. Electronic Industries Alliance (EIA):
  - a. RS232C – Interface between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange
  - b. RS485 – Electrical Characteristics of Generators and Receivers for use in Balanced Digital Multi-Point Systems
4. Federal Information Processing Standards (FIPS):
  - a. Advanced Encryption Standard (AES) (FIPS 197)
  - b. FIPS 201-2: Open Options DNA Fusion FIPS in conjunction with an E2-SSP-D2-FIPS, NSC-100-FIPS, RSC-2-FIPS and other listed components will provide an access control solution that is fully FIPS 201-2 compliant.
  - c. Personal Identity Verification (PIV) of Federal Employees and Contractors
5. Homeland Security Presidential Directive 12 (HSPD-12)

#### 1.4 Access Control and Security Management System Description

- A. The Access Control and Security Management System (ACSMS) shall function as an electronic physical access and situational control system and shall integrate the alarm monitoring, Video Management System (VMS), ID badging, and database management into a single executable application. The ACSMS shall function as the primary means of controlling all access and situational control needs. A scalable, open architecture and network ready solution shall allow for an assured access and alarm monitoring solution.

#### 1.5 Submittals

- A. Manufacturer's Product Data: Submit the manufacturer's data sheets indicating systems and components proposed for use.
- B. Shop Drawings: Submit complete shop drawings indicating system components, wiring diagrams and load calculations.
- C. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings for the Security Management System not later than Substantial Completion of the project.

- D. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, customized to the Security Management System installed. Include system and operator manuals.
- E. Maintenance Service Agreement: Submit a sample copy of the manufacturer's maintenance service agreement, including cost and services for a two year period for Owner's review.

## 1.6 Quality Assurance

### A. Manufacturers

1. A minimum of ten years' experience in manufacturing and design of access control systems using the Authentic Mercury Security hardware platform.
2. Recognized as a Mercury Security Platinum Elite Partner

### B. Suppliers

1. Authorized by Open Options as resellers.

### C. Fabricators

### D. Installers

1. Minimum of 1 technician that has successfully completed Open Options' certification training course will be present at the project site to supervise installation and test system during commissioning.

## 1.7 Delivery, Storage, and Handling

- A. Deliver materials in original packaging. Store and handle in accordance with the manufacturer's requirements.

## 1.8 Warranty

- A. Provide Manufacturer's warranty covering [1] year from date of shipment for replacement or repair of defective equipment.

## 1.9 Definitions

- A. Access Card: A coded employee card, usually the size of a credit card, recognizable to the access control system and read by a reader to allow access. It can be used for photo identification of the cardholder and for other data collection purposes. Card technologies include magnetic strips, wiegand-effect, proximity (active/passive), barium ferrite, smart/intelligent cards, and NFC enable applications on mobile devices.

- B. Access Control System: An interconnected set of controllers, managing the entrance and exit of people through secure areas.
- C. Access Level: The door or combination of doors and/or barriers an individual is authorized to pass through.
- D. Anti-Pass back (Anti-Tailgating): This feature protects against more than one person using the same card or number. It defines each system card reader and card ID number as IN, OUT or other. Once a card is granted access to an IN reader, it must be presented to an OUT reader before another IN reader access is granted. Cards will continue to have access to all authorized OTHER readers.
- E. Alarm: A signal that indicates a problem.
- F. Alarm input: A device that is monitored by the access control panel. An alarm signal will be generated if the device is activated.
- G. Badge: Badge is a template or a design for creating a card. WIN-PAK includes a full-featured badge layout utility for designing, creating, and printing badges. Badge design includes magnetic stripe encoding, bar coding, signatures, and so on.
- H. Bar Code: A method of encoding information using lines and blank spaces of varying size and thickness to represent alphanumeric characters.
- I. Biometrics: A general term for the verification of individuals using unique biological characteristics (i.e. fingerprints, hand geometry, voice analysis, the retinal pattern in the eye).
- J. Card and Card Holder: A card is an identity proof of a person and a card holder is a person who holds the card. Multiple cards can be assigned to a single card holder to provide different access.
- K. Controller: A microprocessor based circuit board that manages access to a secure area. The controller receives information that it uses to determine through which doors and at what times cardholders are granted access to secure areas. Based on that information, the controller can lock/unlock doors, sound alarms, and communicate status to a host computer.
- L. Card Reader: A device that retrieves information stored on an access card and transmits that information to a controller.

- M. Digital Video Recorder (DVR): A security system device that records the video from the surveillance cameras (IP and Analog) on a hard disk.
- N. Door: A generic term for a securable entry way. In many access control applications a "door" may actually be a gate, turnstile, elevator door, or similar device.
- O. Duress: Forcing a person to provide access to a secure area against that person's wishes.
- P. Input: An electronic sensor on a controller that detects a change of state in a device outside the controller.
- Q. Keypad: An alphanumeric grid which allows a user to enter an identification code. A flat device which has buttons that may be pressed in a sequence to send data to a controller, and which differs from a typewriter-like computer board.
- R. Output Relay: A device that changes its state upon receiving a signal from a controller. Typically the state change prompts an action outside of the controller such as activating or inactivating a device. The auxiliary relays found in access control panels or NODES that control external devices.
- S. Shunt Time: The length of time a door open alarm is suppressed (shunted) after a valid card access or free egress request. This time should be just enough to allow a card user to open a door or gate, pass through, and then close it.
- T. Time Schedules: Schedules that allow cards to function or not function depending on the time of day. This is used to limit access to the facility. The schedule may include not only time but which days of the week a card is valid.
- U. Video Management System (VMS): An enterprise-class video management and storage solution.

## Part 2 Products

### 2.1 Manufacturer

- A. DNA Fusion Access Control and Security Management System (ACSMS) by Open Options, L.P. 16650 Westgrove, Suite 150, Addison, TX 75001

### 2.2 Access Control and Security Management System Components

The ACSMS shall consist of three components: Database Server, Application Server, and User Interface. These components shall run on a single computer, virtual or physical, or on multiple computers allowing scalability in the configured architecture.

1. Database Server
2. Application Server
3. User Interface

In addition to the above three components, the ACSMS offers the following components that can be added to the system in order to provide enhanced functionality.

1. Open DX – Personnel data exchange tool used for provisioning personnel/cardholder information and access level assignment within the DNA Fusion ACSMS there by creating a logical link to the authoritative data source. The authoritative data source shall be one or more ActiveX Data Objects (ADO) compliant connections. Some examples of ADO compliant connections are Microsoft Active Directory, PeopleSoft, SQL Server database, CSV file, etc.
2. Flex API – A robust Application Programmer’s Interface to be used for the integration of 3<sup>rd</sup> party systems in order to expand the overall ACSMS. These system can include, but are not limited to, visitor management systems, video managements systems, identity management systems, intrusion detection systems, and physical security integration modules (PSIM).

### 2.3 Access Control and Security Management System Operational Requirements

- A. The ACSMS shall be a highly scalable, robust access control and security management system developed using the latest in development technology. The ACSMS shall provide a singular interface capable of controlling multiple, geographically independent sites and provide alarm monitoring, video management integration, ID badging, personnel and cardholder management, and situational control of all connected devices from a single application.
- B. The ACSMS must fully support the Authentic Mercury Security Corporation controllers and sub-controllers.
- C. The ACSMS must support credential readers that communicate via wiegand, RS-485, or clock and data communications formats.

- D. The ACSMS must support the Open Supervised Device Protocol (OSDP).
- E. A sufficient number of controllers and sub-controllers will be provided to monitor all credential reader, monitor point, and relay point locations shown on plan.

1. Capacities

- a. Maximum intelligent controllers per application server: 256
  - i. Intelligent controllers can be geographically independent
  - ii. Must support IP and/or RS-485 communication methods.
- b. Maximum sub-controllers per controller: 32
  - i. This number varies per model of controller.
  - ii. Some controller models may have a smaller number for maximum sub-controllers.
- c. Maximum doors per controller: 64
  - i. This number varies per model of controller.
  - ii. Some controller models may have a smaller number for maximum doors
- d. Maximum pin digits: 15
- e. Maximum card formats: Unlimited
- f. Maximum Time Schedules per intelligent controller: 255
- g. Maximum holidays per intelligent controller: 255
- h. Maximum number of personnel records: Unlimited
- i. Maximum number of operators: Unlimited
- j. Maximum number of client connections: Unlimited

- F. The ACSMS shall be capable of the following features:

- 1. Multi-User/Network Capabilities: The ACSMS shall support multiple operator workstations via local area network/wide area network (LAN/WAN). The communications between the workstations and the server computer shall utilize the TCP/IP standard over industry standard IEEE 802.3 (Ethernet). The communications between the server and workstations shall be supervised, and shall provide the

ability to generate alarm messages when the server is unable to communicate with a workstation.

2. Operating Environment: The ACSMS shall be a 3-tier client/server, ODBC compliant application based on Microsoft tools and standards. The ACSMS application shall operate in the following environments: Microsoft Windows® Server 2008 R2 SP1, Microsoft Windows® 7 Professional SP1 (64-bit), Windows Server 2012 R2, Windows 8.1 Enterprise/Professional, and Windows 10 Enterprise/Professional.
3. Multi-level Password Protection: The ACSMS application shall provide multi-level password protection, with user-defined operator name/password combinations. Name/password log-on shall restrict operators to selected areas of the program. The application shall allow the assignment of operator levels to define the system components that each operator has access to view, operate, change, or delete.
4. Strong Password Enforcement: The ACSMS application shall have an option to enforce strong passwords and by setting minimum character lengths and complexity requirements.
5. Graphical User Interface: The ACSMS shall be fully compliant with Microsoft Graphical User Interface (GUI) standards, with the look and feel of the software being that of a standard Windows application, including hardware tree-based system configuration.
6. Concurrent Licensing: The ACSMS shall support concurrent client workstation licensing. The ACSMS application shall be installed on any number of client workstations, and shall provide the ability for any of the client workstations to connect to the application server as long as the maximum number of concurrent connections purchased has not been exceeded.
7. Access Control Software Suite: The ACSMS shall be a scalable application such that there is no requirement for separate tiers or editions of software. The same code set used for smaller, more localized installations, shall be the same code set used for enterprise system deployments.
8. Relational Database Management System: The ACSMS shall support industry standard relational database management systems (RDMS). This shall include the following: Microsoft SQL Server 2012 Express/Enterprise Edition, Microsoft SQL Server 2008 R2 Express/Enterprise Edition, and Microsoft SQL Server 2014 Express/Enterprise Edition.



9. System Partitioning/Filtering: The ACSMS shall provide the option to restrict access to data based on login and profile.
10. Encryption: The ACSMS shall provide multiple levels of data encryption.
  - a. True 128-bit AES data encryption between the host and intelligent controllers. The encryption shall ensure data integrity that is compliant with the requirements of FIPS-197 and SCIF environments. Master keys shall be downloaded to the intelligent controller, which shall then be authenticated through the Access Control and Security Management System based on a successful match.
  - b. Transparent database encryption, including log files and backups.
  - c. SQL secure connections via SSL.
11. Industry Standard Panel Communication: The ACSMS shall communicate with the access control intelligent controllers via LAN/WAN connections utilizing industry standard communication protocols.
12. Supervised Alarm Points: The ACSMS shall provide both supervised and non-supervised alarm point monitoring with the ability to specify custom values of resistance. On recognition of an alarm, the ACSMS shall be capable of switching and displaying the video from the camera connected to the video management system that is associated with the alarm point.
13. Multiple Account Support: The ACSMS shall allow support for multiple accounts allowing separate access to the personnel database, badge layout, operator access, and reporting. Physical hardware may be filtered by profile level into "sites". "Sites" may be assigned to one or more operator profiles. The system shall allow control of common areas between operator profiles. Access levels and time schedules shall be global to allow for easy administration and filtering. The global access levels and time schedules shall be capable of being used by one or more operator profiles.
14. Video Management System Support: The ACSMS shall integrate with the major brands of video management systems (VMS).
15. Camera Support: The ACSMS shall support, via integrated VMS platforms, pan, tilt, zoom, and touring features.
16. Display Live Video: The ACSMS shall support an option to view live video from a camera connected to an integrated VMS. The cameras from the integrated VMS shall

- be able to be associated with any hardware device programmed in the ACSMS and opened automatically on any system event or operator initiated command sequence.
17. Global/Anti-Passback: The ACSMS shall support multiple modes of anti-passback, by which cardholders must follow a specified sequence of card reads in the configured areas.
  18. Alarm Events: The ACSMS shall include a feature where alarm events with defined priorities shall be able to pop-up automatically in an Alarm event window for operator attention. The pop-up shall display the following information: description of the event, time, date, point description, if a card event the card number, type of event and cardholder name. An event counter shall also display the number of times the event was reported to the Alarm event monitor prior to Acknowledgement or Clearing the event. Event instructions shall be made available by double clicking on the event. The Alarm shall also display an icon to indicate that a camera is associated to the device. The Alarm event window shall allow the operator to initiate a physical response to the event as well as a written response. Responses shall include but not be limited to: acknowledge, clear, open a pre-programmed floor plan, activate, deactivate, pulse, time pulse, add comment, retrieve archived video, and bring up live video, disarm, or arm.
  19. Global Device Control: The ACSMS shall allow manual control of one or more selected inputs, outputs, and doors. Global device control shall include pulse, timed pulse, and energize/de-energize or return to normal options for output points and arm/disarm or return to normal options for input points. For global control of doors the ACSMS shall include Disabled, Unlocked, Locked, Facility Code Only, Card Only, PIN Only, Card and PIN, Override Mode, and Cancel Override Mode.
  20. Global Edit: The ACSMS shall support, by way of a multi-select function, a method to globally edit input points, output points, doors, readers, personnel and cards.
  21. Levels of System Operation: The ACSMS shall include a feature to define the levels of system operation for each individual operator using passwords and profiles. System operation for individual operators shall include, but not be limited to, restricted time periods for login, inactivity notifications, and lockout for failed logon attempts. Operator actions range from no view or control rights to basic monitoring including the ability to block the viewing of card and or personal identification numbers, to full control of the system including programming.
  22. Distributed Processing: All the control components of the ACSMS shall utilize “Distributed-Processing” design. The distributed processing shall include the ability

to download operating parameters to any field panel, thus allowing the field panel to provide full operating functions independent of the ACSMS application server.

- G. The ACSMS shall have the major functional capabilities (considered essential for the system described in this specification) categorized as follows:

1. General Application Requirements

- a. All transactions and audits shall be logged by date and time to the database.
- b. The end-user shall have the ability to make any system configuration changes such as, but not limited to door open time, door contact shunt time, point and door names, when and where a cardholder is authorized, and the ability to add or modify personnel records at any time and without assistance from the manufacturer or system installer.
- c. Shall support Global Anti-pass back, feature allowing cardholders to enter/exit any such defined card reader area on any intelligent control panel provided they follow the required in/out flow.
- d. Anti-pass back modes shall include: hard (no forgiveness), soft (allows access but generates an alarm event) and timed for all readers on the intelligent controller, on specified reader or card for a definable period of time up to 1092 minutes.
- e. Shall support a Duress PIN feature that is configurable in operation by which the cardholder either adds a specified digit to their unique PIN or appends a specified digit to their unique PIN.
- f. Shall support Two Card Control on any door, by which two different credentials with the proper access must be presented at the same door within a 5 second window of time.
- g. Shall support a Photo Recall option with four separate, configurable windows that displays the photo(s) associated with the personnel records as the credentials are used. The Photo Recall windows shall be configurable to show the credential reads from all doors, or only specific doors. In addition, the Photo Recall window shall be configurable as to what system data will be displayed for each transaction.
- h. Shall support the scheduling of any system or custom system reports.

- i. Shall support Auto-Email function, by which any event or point in the system can be configured to send an email using replacement parameters. The replacement parameters shall be used to query data from the database for insertion into the body, subject line, or address field of the email.
- j. All updates and changes to the programming in the intelligent controllers shall take place real-time and will not require manual downloads to propagate system changes.
- k. Shall have an available Application Program Interface (API) built on current development technologies that allows the integration of third party programs or systems.
- l. Shall be an intuitive Graphical User Interface (GUI) that implements a multi-document layout. An operator will not be required to close or switch views to another part of the application in order to edit or view any aspect of the system. The GUI must be fully customizable allowing for an infinite number of operator views to be created and assigned. The GUI must support drag and drop functions within the multi-document interface.
- m. Shall support global I/O functions, by which any point in programmed in the system can be configured to control any other point on the system regardless of which intelligent controllers they reside on.
- n. All necessary system drivers shall run as Windows services and as such do not require the Operating System to be logged in on the application server.
- o. Shall have support for thick client, web client and mobile client applications that provide system management functions.
- p. Shall support a Situation Level Manager that provides five different states that can be initiated by clicking on a single, color coded button. The Situation Levels shall be configurable on the following objects: Doors, Time Schedules, Input Points, Output/Relay Points, and Credentials.
- q. Shall provide intuitive Info-Ready™ reporting by which an operator must only right click on an object to run a Trace History Report, Has Access To, Who Has Access, Who Does Not Have Access, Last Used, and Non-Use.

- r. The GUI shall be developed in such a manner that any place that a personnel record or hardware device is shown that an operator can right click on it and open the properties or execute control functions.
- s. Shall support a method of controlling any device connected to the system in order to effectively change the state of a single point or group of points where supported by the hardware.
- t. Shall support Direct Commands, which allow the creation of a single button to control a single or all devices simultaneously by clicking one button, based on operator privileges.
- u. The Direct Commands shall be one of many ways to incorporate facility lockdowns and return to normal or all clear states.
- v. Shall support the ability to password protect the Direct Commands to require additional authentication when executing them.
- w. Must support the ability to remove an input point from service, where by any change of state on that point is ignored, regardless of the point arm/disarm state. Removing a point from service goes beyond disarming the point, as it can be rearmed via a programmed or manual event, thereby reporting alarm conditions once again. A point that has been removed from service must be returned to service in order to see change of state events on it.
- x. Must support Override Modes on doors, whereby the current mode of the door can be overridden to another state. I.E. Card Only, Card & PIN, Locked, Disabled. When the mode of door has been overridden, it will remain in that state, regardless of any scheduled commands or manual control initiated based on time or operator execution. When the override mode is canceled, the door will revert to the state that it is supposed to be in. I.E. if a time schedule has activated to unlock the door, then it will revert to that state without any additional programming or intervention from the operator.
- y. Removal from service and override modes must be selectable with the following options:
  - 1. Indefinite – Meaning the state will remain until it has been canceled
  - 2. For a specified number of minutes.

3. Until a specific time of the current day.

2. Personnel and Cardholder Management

- a. Shall provide a personnel browser method of managing personnel data in a hierarchical tree. The personnel browser shall be sortable by in field of data stored in the personnel record.
- b. Shall have the ability to create custom personnel groups that personnel records can be assigned to where by personnel records can be assigned to one or more personnel groups.
- c. Shall have the ability to assign default access levels to custom personnel groups that cardholders will inherit or disinherit as they are added or removed to or from custom personnel groups.
- d. Shall have the ability to assign one or more credentials to a single personnel record.
- e. Shall support a maximum of 128 access levels per credential per intelligent controller.
- f. Shall support Precision Access Levels, by which an operator need not create an access level to assign access to a single door, but only click and drag said door into the access level assignment window of the credential and associate a time schedule with it.
- g. Shall support a Vacation Start function on credentials to allow the temporary disabling of cards for a specified number of days.
- h. Shall support a Temporary Upgrade of Access Levels by which an operator can temporarily assign an access level with start and stop dates.
- i. Shall support an activation and deactivation date and time of a credential down to the minute within a day.
- j. Shall support the capture of personnel photos and signatures to be used for ID badge printing.
- k. Shall support the ability for any personnel or credential field to be retrieved and printed on an ID badge.

- l. Shall support the ability for any or all credentials activate or deactivate based on a system controlled Situation Level.
- m. Shall support Info-Ready™™ reports on personnel groups providing the following information: Last Used and Non-Use.
- n. Shall support the ability to assign/re-assign credentials to personnel records by way of a drag and drop convention.

### 3. Time Schedules and Holidays

- a. Shall support up to 255 individual time schedules per time schedule set.
- b. Shall support up to 255 individual time schedule sets that are then assignable to intelligent controllers.
- c. Shall support up to 12 different start and stop intervals for each day, including holidays.
- d. Shall support time schedule templates to quickly build common time schedules.
- e. Shall support a copy feature to copy time schedules between time schedule sets.
- f. Time schedules shall be assignable to any or all access levels or precision access levels.
- g. Shall support the ability to manually control any or all time schedules programmed in the system by providing the following commands: Temporary Off, Temporary On, Override Off, Override On, and Resume Normal State.
- h. Shall support the ability for any or all time schedules to be manually controlled by the changing of the Situation Level Manager.
- i. Shall support up to 255 holiday sets that are then assignable to intelligent controllers.
- j. Shall support creating a holiday to span up to 365 days.
- k. Shall support up to eight different holiday types.

#### 4. Access Levels

- a. Shall support an unlimited number of access levels.
- b. Access levels shall be capable of being global or intelligent controller based.
- c. Shall support the option to assign activation and deactivation dates/times to access levels.
- d. Shall support three types of escort requirements for access levels: Not an Escort, Is an Escort, and Requires an Escort.
- e. Shall support a default time schedule to be assigned to the access level or separate time schedules to individual doors within the access level.
- f. Shall support eight different access level categories that can then be assigned to operator profiles granting rights to assign the category of access level or not.
- g. Shall support an Info-Ready™™ report named Assigned To that provides a list of all credentials the access level is assigned to with the ability to remove the access level from cardholders directly from the result set window.
- h. Shall support a click and drag method of assigning access levels to a single credential, personnel record, or group of personnel records.

#### 5. Hardware

- a. Shall support a browser based, hierarchical tree structure that displays the programmed hardware with current states and provides command and control capabilities based on operator privileges.
- b. The tree structure shall be developed in such a way that it is intuitive for the operator to navigate.
- c. The tree structure shall provide, based on operator privileges, the ability to group edit and control similar devices.
- d. The tree structure shall have an option to display a tooltip upon hovering over a specific device to obtain detailed status information.



## 6. Integrated ID Badging

- a. Shall have an integrated photo capture and ID badging module.
- b. The integrated ID badging module shall support an unlimited number of badge templates.
- c. The badging station shall include a badge designer to create badge templates.
- d. The badge designer shall allow any data field associated with a personnel record to be printed or otherwise used on the credential.
- e. The integrated ID badging module shall support a dedicated, high end photo badging camera from Valcam (Model# 9000-628).
- f. The integrated ID badging module shall support, through the use of a third party TWAIN Driver, the ability to use any TWAIN compliant USB camera.
- g. The badge designer shall provide scripting capabilities to create a robust and streamlined template process by which the layout of a single template can be edited based on data retrieved from the personnel record.
- h. The integrated ID badging module shall support a cropping mechanism in order to resize photos and select the printable area of the picture.
- i. The integrated ID badging module shall support any credential printer that has a Windows print driver
- j. The integrated ID badging module shall offer, depending upon the printer selected, the ability to create a template that will read the encoded card number from the credential as it passes through the printer during the printing process and then associate it with the personnel record automatically, thereby removing the need for the operator to manually enter the credential number. This feature will require a reader/encoder be installed inside the printer prior to setup.
- k. The integrated ID badging module shall provide a print preview function that allows the operator to verify the credential format prior to actually printing it.

- I. The integrated ID badging module shall support the capturing of signatures during the credentialing process.

## 7. Integrated Graphics Maps

- a. Shall provide, with no additional licensing fees required, an integrated and robust graphical map module allowing for the importation of floor plans and other .JPG or .BMP files for use in plotting hardware and other connected devices programmed in the system onto the graphic layouts.
- b. Shall support the ability to assign a graphic map as a homepage of any point in the system, thereby linking that device to that map and allowing the system to automatically load the graphic upon an alarm condition from any point that is plotted on it.
- c. Shall support any command and control or reporting functions available in the Hardware Browser for any point that is plotted on a graphic map.
- d. Shall support the hyperlinking of graphic maps to one another, thereby creating a “drill down” effect.
- e. Shall support the ability to plot any camera that is integrated to the core application onto a graphics map and display the live video in a tooltip window upon the operator hovering over the icon, or displaying of live video in a video container window upon left clicking the camera icon.
- f. Shall support the real-time status updating of points that are plotted on a graphics map by configurable colors, shapes, or icons.
- g. Shall support the ability to plot the same device on a single graphic map multiple times to get varying states of status reported simultaneously.
- h. Shall support the ability to create buttons on the graphic maps which can then be linked to Direct Commands.

## 8. Mobile Applications

- a. Must have auxiliary mobile application supported on Android and iOS devices
- b. Mobile applications will be native applications and not remote/mobile browser solutions.

- c. Mobile applications will be available for download from the respective application markets, and will not require side loading of any kind.
- d. Mobile applications will utilize profiles established in the DNA Fusion system to control what the operator has the ability to do via the mobile application.
- e. Mobile application will support the following features:
  - i. Secure login using SSL
  - ii. Alarm viewing/acknowledgement
  - iii. Door status and control
  - iv. Personnel control, to include adding access levels and taking photos using the devices camera
  - v. Direct Command execution allowing for site or system lockdowns.
  - vi. Trace History reporting
  - vii. Live camera viewing from supported/integrated Video Management Systems.

## 9. Integrated Video Management Systems

- a. Shall support the integration of Digital Video Recorders (DVR) and Network Video Recorders (NVR) from the following manufacturers:
  - i. Milestone
    - 1. Corporate
    - 2. Enterprise
    - 3. Professional
  - ii. ONSSI
    - 1. Ocularis
  - iii. ExacQ Vision
  - iv. Aimetis
  - v. Pelco DS
  - vi. Video Insight
  - vii. Bosch
  - viii. Salient Systems
  - ix. Panasonic
  - x. 3XLogic
  - xi. Avigilon
  - xii. March Networks
  - xiii. Act-I

- b. Shall support the ability to associate cameras from DVR/NVR to devices in DNA Fusion.
- c. Shall support, at minimum, the ability to launch live and recorded video based on a right click command in the DNA Fusion software, or automatically based on a pre-programmed event based action.
- d. Shall support the ability to initiate presets or PTZ controls

## 10. Integrated Biometrics

- a. Shall support an integration with the following biometric solutions

- i. Morpho

- 1. Morpho 3D Face Reader
    - 2. MorphoAccess SIGMA Series
    - 3. Outdoor MorphoAccess 500 Series
    - 4. MorphoAccess J Series
    - 5. MorphoAccess 500+ Series
    - 6. MorphoAccess VP Series
    - 7. MorphoSmart 300 Series (Enrollment Only)

- ii. Suprema

- 1. BioEntry Plus
    - 2. BioEntry W
    - 3. BioLite Net
    - 4. BioStation
    - 5. BioStation T2
    - 6. FaceStation

- iii. Allegion

- 1. HK
    - 2. HKII

- b. The integration shall be direct, by which the biometric templates are captured via DNA Fusion and will not require manual entry via 3<sup>rd</sup> party application.

## 11. Integrated Wireless/Intelligent Locks

- a. Shall support the following wireless/intelligent lock sets from Allegion/Schlage:
  - i. AD300/400
  - ii. AD301/401
    - 1. Must support Wake On Radio (WOR) function for AD400/401 locks to remotely control the lock states via wireless communication.
    - 2. Must support the following modes on the Allegion/Schlage locksets:
      - a. Classroom
      - b. Privacy
      - c. Office
      - d. Apartment
      - e. Toggle Credentials
      - f. Deadbolt
    - 3. Must support the ability to initiate linking mode, to link the AD400 lockset to the PIM device, via the ACSMS software, without using the Handheld Device (HHD).
    - 4. Must support Over the Network Re-Provisioning (ONR) of the firmware to the PIM, AD300, AD400, AD301 and AD401.
  - iii. Engage NDE
    - 1. Engage Gateway – RS485 device communicating to DController, SSP-DP or SSP-LX to provide support for up to 10 NDE locks using Bluetooth Low Energy (BLE).
    - 2. Must support a wake on radio function to control the connected NDE locks
    - 3. Must support the ability to initiate linking mode in order to link the NDE lock to the NDE Gateway
    - 4.

## 12. Integrated Intrusion Detection Systems

- a. Shall support an integration with the following Intrusion Detection Systems (IDS) by providing real-time event reporting and control capabilities.
  - i. Bosch
    1. 7412GV2
    2. 9412GV2
  - ii. DMP
    1. XR500N
- b. Shall show in the Hardware Browser real-time states of the areas and zones from the IDS panels.
- c. Shall support right click functionality for controlling the arm/disarm states of the areas/zones.
- d. Shall allow for the areas/zones from the IDS panels to be plotted on graphic maps in DNA Fusion.
- e. The following IDS receivers shall be supported by the ACSMS to provide monitoring only capabilities of connected IDS panels.
  - i. Bosch D6600
  - ii. DMP SCS1R

## 13. Integrated Visitor Management Systems

- a. Shall provide a mechanism, Flex API, which allows for the integration of the following 3<sup>rd</sup> party Visitor Management Systems.
  - i. HID EasyLobby
  - ii. iVisitor
- b. The integrated Visitor Management Systems shall be certified as an approved integrated solution by Open Options.

## 14. Integrated Intercom Systems

- a. Shall provide a means to integrate intercom master and sub-stations into the application
- b. The master and sub-stations shall be displayed in the Hardware tree in a hierarchical manner (i.e. Master station with associated sub-stations)
- c. The status of the connected devices shall be represented in the Hardware tree notated by the following colors:
  - i. Green – Station is online and idle (i.e. ready for a call)
  - ii. Blue – Station is busy
  - iii. Red – Station is currently connected to another station (in a call)
  - iv. Black – Offline or non-existent
- d. Shall provide a means in which to control the connected devices by a right-click menu option to execute the following functions:
  - i. Make Call – Initiates a call to the selected station
  - ii. Cancel Call – Terminates the current call in progress
  - iii. Answer Call – Opens communications for the incoming call
- e. Shall provide the ability to plot the intercom devices on a graphics map.
  - i. Intercom devices on the map shall provide the ability to indicate status
  - ii. Intercom devices on the map shall provide the ability to control the connected devices
- f. Shall provide the ability for automatic camera call up on intercom device status changes (i.e. Incoming call from sub-station calls up a live camera view)
- g. Shall provide a means of triggering system or hardware control actions based on status changes of the connected intercom hardware
- h. Supported Intercom Solutions
  - i. Zenitel – Stentofon AlphaCom with supported master and sub-stations

## 2.4 ACSMS Computer Requirements

## 1. DNA Fusion Application Server Requirements

- a. DNA Fusion Application Server controlling 50 doors or less and 10 clients or less
  - i. Processor (Intel Core i7 or equivalent) or greater
  - ii. 4 GB RAM or greater
  - iii. 500GB HDD or greater
  - iv. 10/100 NIC or greater
  - v. Windows 7 Enterprise, Windows 8/8.1 Enterprise, Windows 10 Enterprise, Windows Server 2008 R2, Windows Server 2012 (\*Operating systems must be Professional/Enterprise versions and not Home/Personal editions.)
  
- b. DNA Fusion Application Server controlling 50 doors or more and 10 clients or more
  - i. Processor (Intel Core i7 or equivalent) or greater
  - ii. 8 GB RAM or greater
  - iii. 500GB HDD or greater
  - iv. 10/100 NIC or greater
  - v. Windows Server 2008 R2, Windows Server 2012
  
- c. Open Options fully supports virtualized environments provided the specifications meet the minimums listed above.

## 2. DNA Fusion Client Workstation Requirements

- a. DNA Fusion Standard and Photo ID Workstations
  - i. Processor (Intel Core i7 or equivalent) or greater
  - ii. 4 GB RAM or greater
  - iii. 500GB HDD or greater
  - iv. 10/100 NIC or greater
  - v. Windows 7 Enterprise, Windows 8/8.1 Enterprise, Windows 10 Enterprise (\*Operating systems must be Professional/Enterprise versions and not Home/Personal editions.)

## 2.5 Access Control Hardware Requirements



1. The access control hardware will be a distributed intelligence, open architecture platform capable of scalability.
2. The access control hardware shall be offered in two form factors: as board only product or as enclosed product.
3. The enclosed product shall be offered as a factory, pre-wired unit and must be a UL recognized assembly.
4. The enclosed products must be offered as a 1U rack mountable intelligent controller or as a plenum rated poly carbonate enclosure.
5. The access control hardware will be in use and deployed by a minimum of 10 access control manufacturers.
6. The access control hardware shall work in a hierarchical structure, by which an intelligent controller is deployed and control downstream Reader Interface Modules (RIM) or Input/Output Modules (I/OM).
7. The access control hardware shall support the following communication protocols:
  - a. TCP/IP
  - b. RS485
8. The access control hardware shall be manufactured by Mercury Security Products in Long Beach, CA
9. The access control hardware shall consist of the following part numbers:
  - a. Intelligent Controllers
    - i. SSP-D2
    - ii. SSP-EP
    - iii. DController
    - iv. NController
    - v. M5-IC
  - b. Reader Interface Modules
    - i. RSC-1
    - ii. RSC-2
    - iii. NSC-100

- iv. RSC-DT
- v. M5-2RP
- vi. M5-2SRP
- vii. M5-8RP

c. Input/Output Modules

- i. ISC-16
- ii. OSC-16
- iii. M5-20IN
- iv. M5-16DO
- v. M5-16DOR

d. RS485 Multiplexers

- i. CI-8
- ii. OptoHub
- iii. M5-COM

## Part 3 Execution

### 3.1 EXAMINATION

1. Examine site conditions to determine site conditions are acceptable without qualifications. Notify Owner in writing if deficiencies are found. Starting work is evidence that site conditions are acceptable.

### 3.2 INSTALLATION

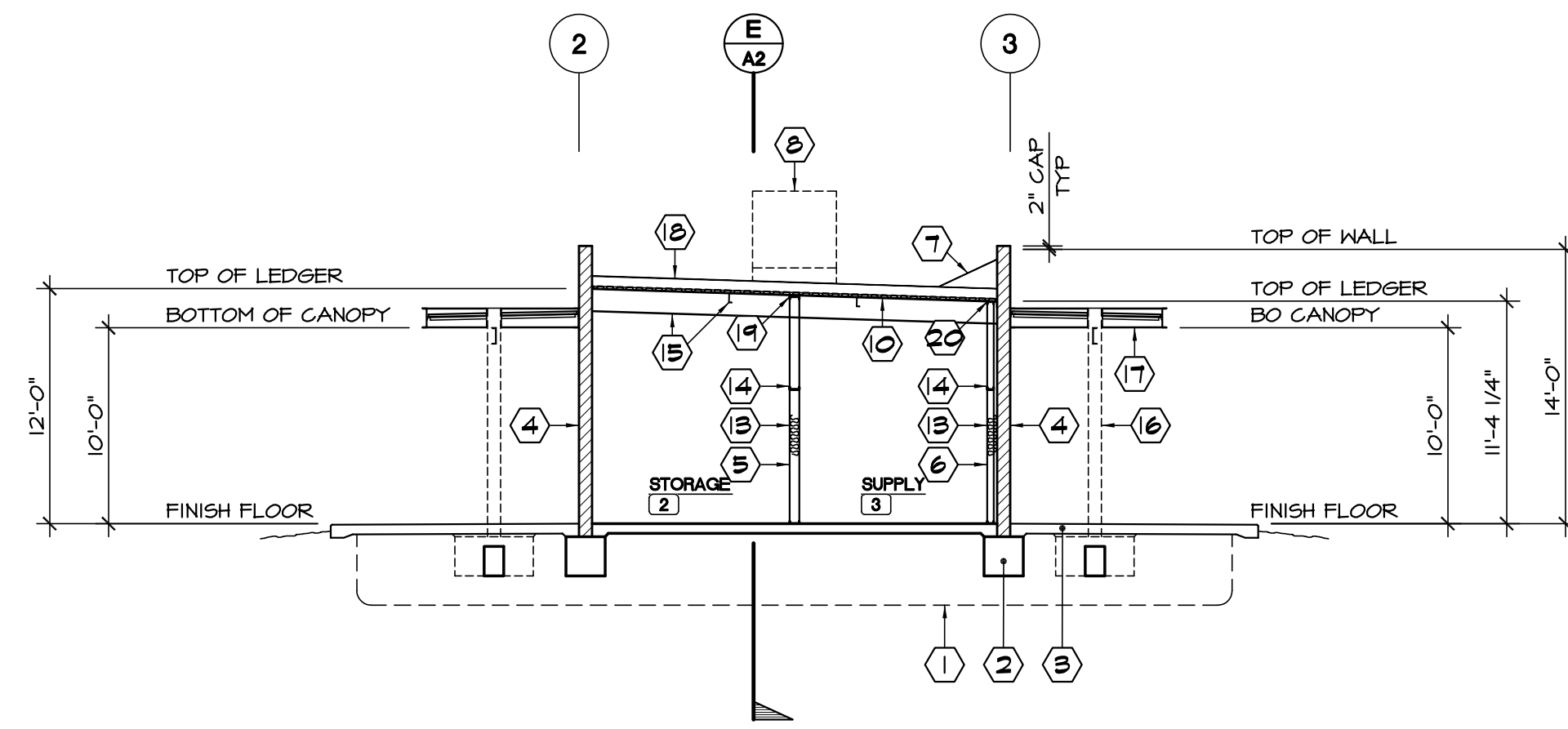
1. Integrated Security Management System, including but not limited to access control, alarm monitoring, CCTV, and ID badging system shall be installed in accordance with the manufacturer's installation instructions.
2. Supervise installation to appraise ongoing progress of other trades and contracts, make allowances for all ongoing work, and coordinate the requirements of the installation of the Security Management System.

### 3.3 FIELD TESTING AND CERTIFICATION

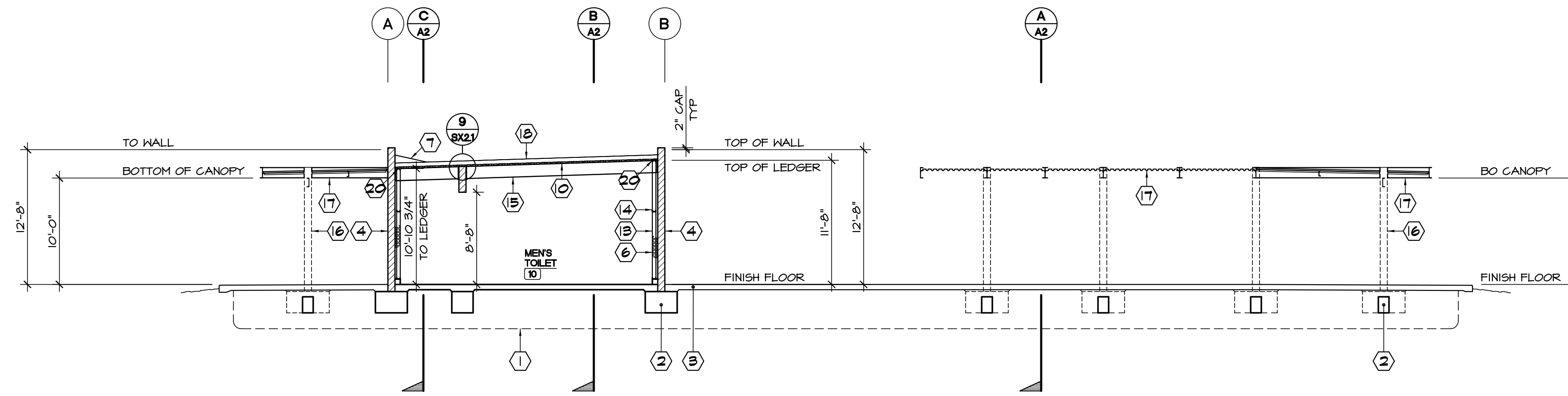
1. Testing: The access control, alarm monitoring, CCTV, and ID badging system shall be tested in accordance with the following:

- a. Conduct a complete inspection and test of all installed access control and security monitoring equipment. This includes testing and verifying connection to equipment of other divisions such as life safety and elevators.
- b. Provide staff to test all devices and all operational features of the Security Management System for witness by the Owner's representative and authorities having jurisdiction as applicable.
- c. Correct deficiencies until satisfactory results are obtained.
- d. Submit written copies of test results.

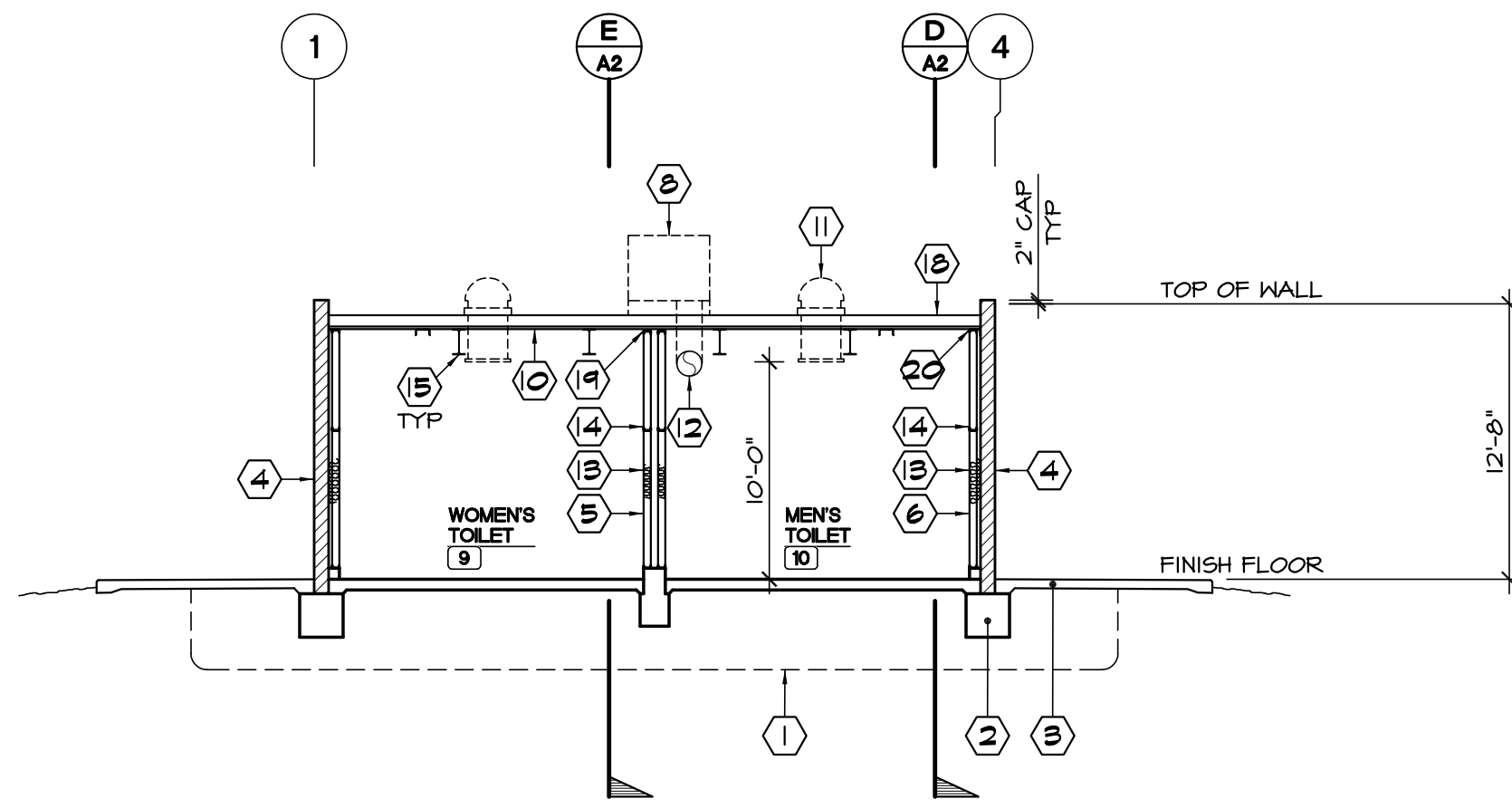
END OF SECTION



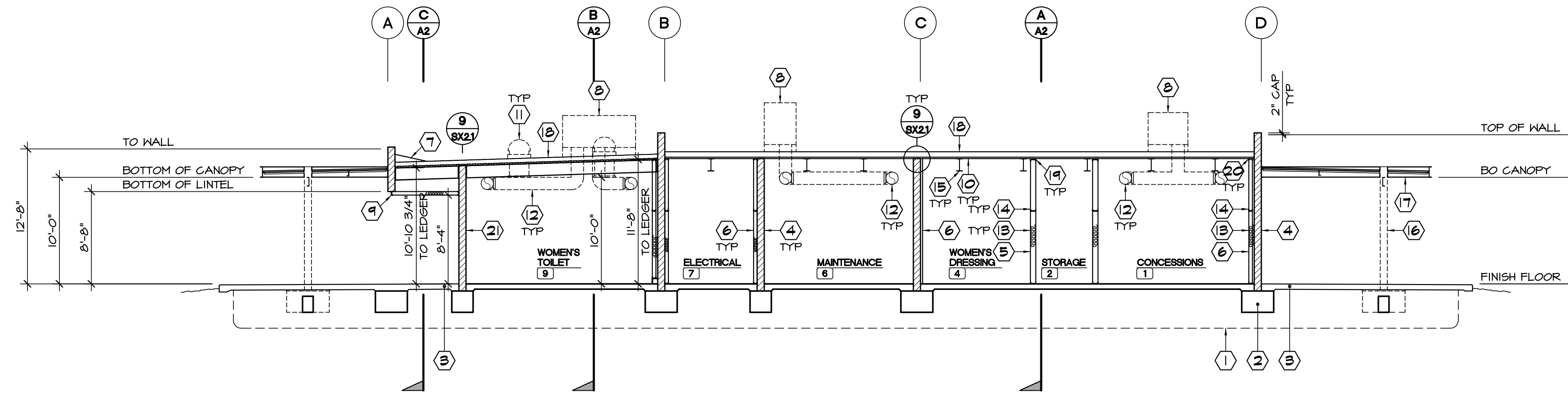
SECTION A SCALE: 1/8" = 1'-0"



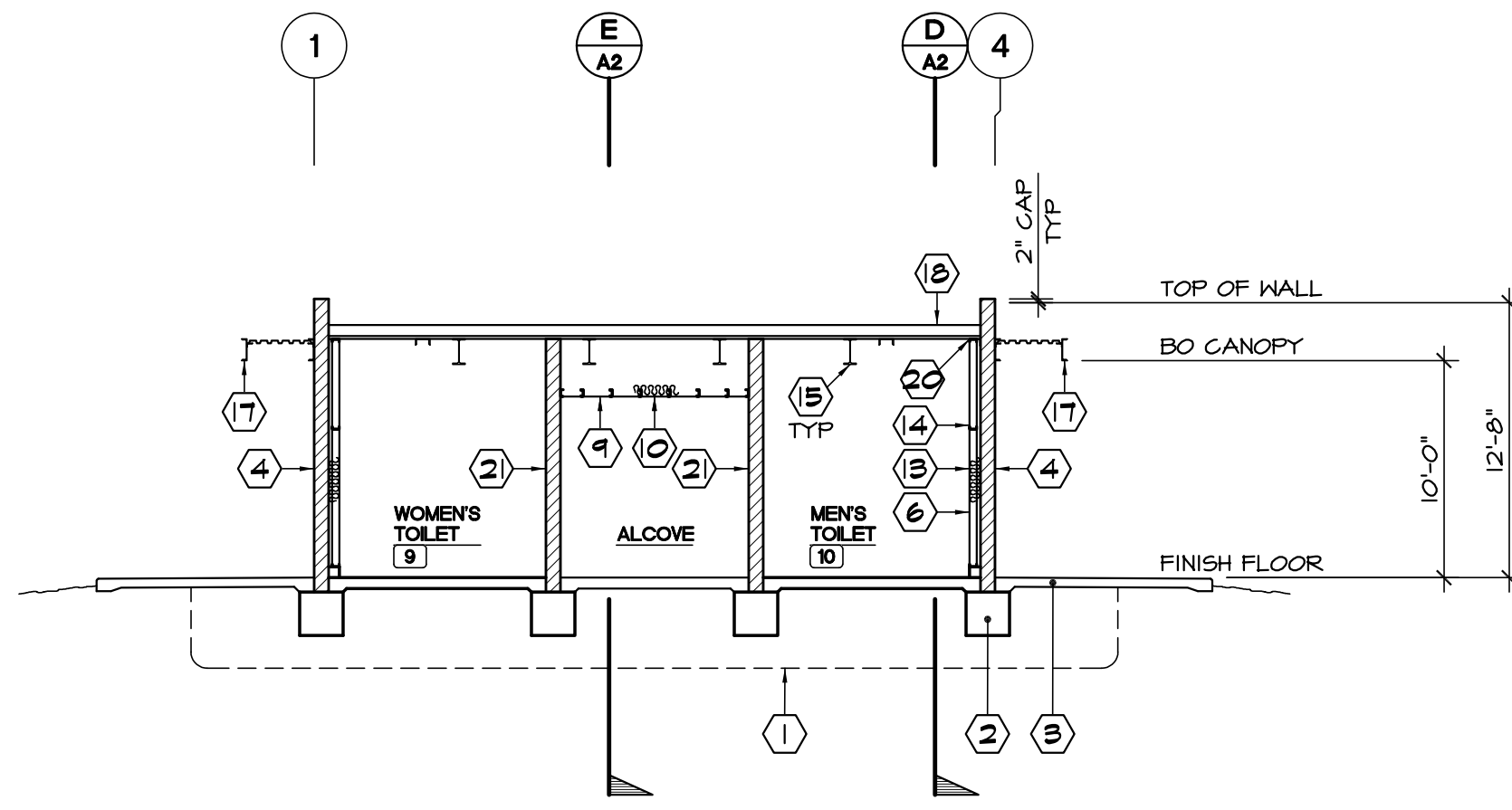
SECTION B SCALE: 1/8" = 1'-0"



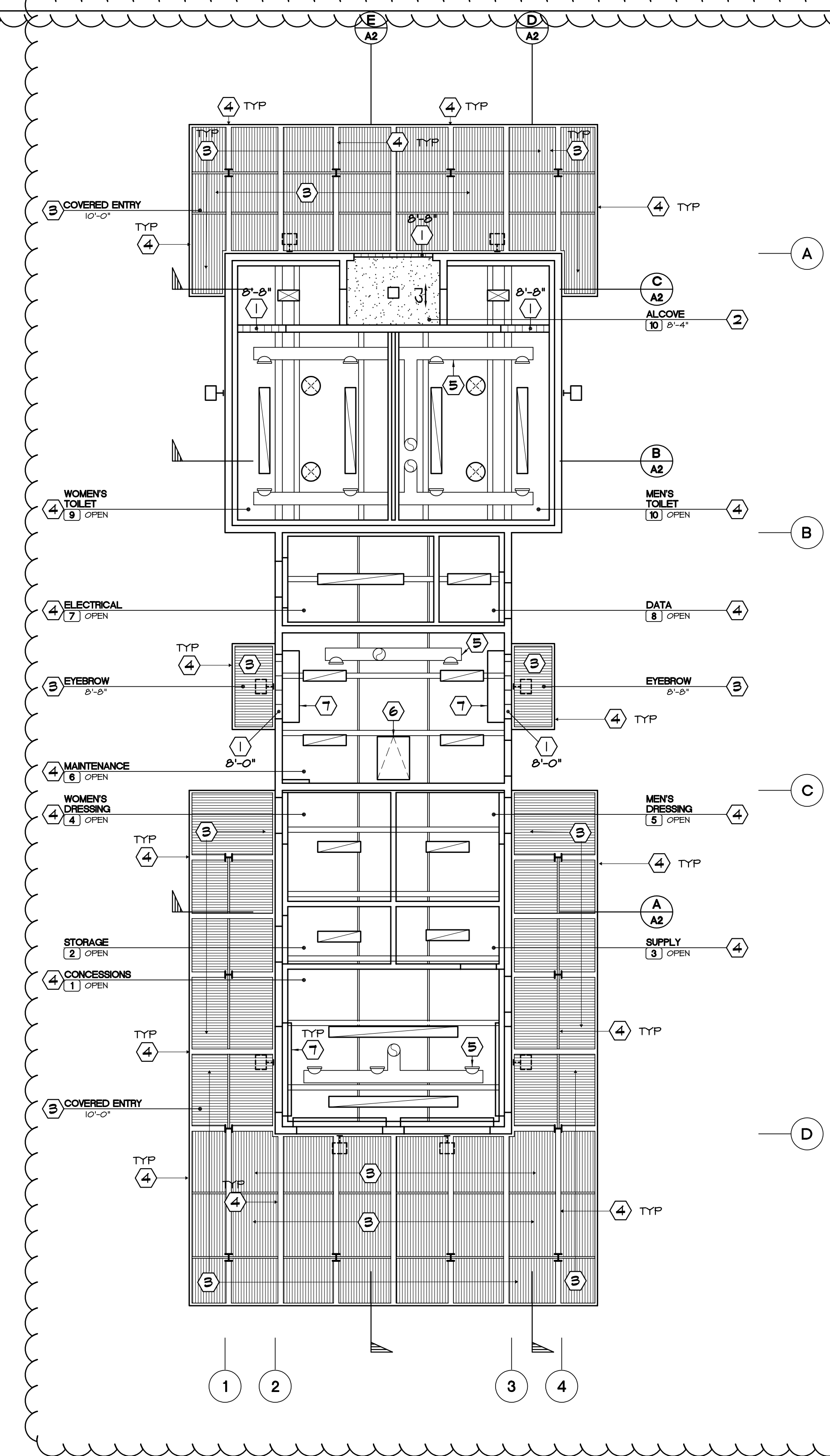
SECTION C SCALE: 1/8" = 1'-0"



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



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



REFLECTED CEILING PLAN SCALE: 1/8" = 1'-0"

**APPROVALS**

**SECTION KEYNOTES:**

- 1 ENGINEERED BUILDING PAD - SEE STRUCTURAL AND ARCHITECTURAL SITE DRAWINGS
- 2 CONCRETE FOUNDATION - SEE STRUCTURAL DRAWINGS
- 3 SITE CONCRETE - SEE ARCHITECTURAL SITE DRAWINGS
- 4 MASONRY WALL PER PLAN
- 5 STUD WALL PER PLAN
- 6 WALL FURRING PER PLAN
- 7 CRICKET - SEE ROOF PLAN
- 8 MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS
- 9 PLASTER FINISH - SEE EXTERIOR ELEVATIONS OR REFLECTED CEILING PLAN
- 10 CEILING LINE - SEE REFLECTED CEILING LINE
- 11 TUBULAR SKYLIGHT - SEE WINDOW SCHEDULE
- 12 HVAC DUCT - SEE MECHANICAL DRAWINGS
- 13 INSULATION PER PLAN
- 14 FIRE BLOCKING PER CBC 708.2
- 15 ROOF FRAMING - SEE STRUCTURAL DRAWINGS
- 16 STEEL COLUMN - SEE STRUCTURAL DRAWINGS
- 17 STEEL ROOF DECKING / FRAMING - SEE STRUCTURAL
- 18 INSULATED ROOF ASSEMBLY
- 19 METAL STUD WALL TOP CONNECTION
- 20 EXTEND GYP-BRD TO BOTTOM OF METAL DECK
- 21 CANTILEVERED MASONRY WALL PER PLAN

**NOTES:**

1. FOR TYPICAL STUDWALLS SEE 1
2. FOR CEILING JOIST FRAMING SEE 12, 13 FOR PLASTER LATH SEE 7
3. FOR FINISH SCHEDULE SEE SHEET
4. FOR WALL FURRING ATTACHMENT SEE 19
5. FOR EQUIPMENT SCHEDULE SEE SHEET
6. FLAME SPREAD RATING FOR WALL INSULATION NOT TO EXCEED 25 AND SMOKE DEVELOPED INDEX NOT TO EXCEED 450 WHEN TESTED IN ACCORDANCE WITH ASTM E 84.
7. ALL FURRINGS ON EXTERIOR WALLS TO HAVE BATT INSULATION (R-11 @ 6", R-11 @ 4")
8. ALL FRAMED INTERIOR HALLS TO HAVE SOUND ATTENUATION BATT INSULATION.

**REFLECTED CEILING KEYNOTES:**

- 1 CMU LINTEL TO MATCH WALL
- 2 ACRYLIC STUCCO OVER PLASTER
- 3 EXPOSED STEEL ROOF DECKING / FRAMING - PAINT PRIME COLOR
- 4 EXPOSED ROOF FRAMING / METAL DECK - PAINT
- 5 EXPOSED GALVANIZED SPIRAL DUCTWORK - PAINT ACCENT COLOR, SEE MECHANICAL DRAWINGS
- 6 ROOF ACCESS HATCH
- 7 LINE OF COILED DOOR / SHUTTER ENCLOSURE BELOW CEILING

**LEGEND:**

- ☐ PENDANT FLUORESCENT LIGHT FIXTURE - SEE ELECTRICAL DRAWINGS
- ☐ PENDANT FLUORESCENT LIGHT FIXTURE - SEE ELECTRICAL DRAWINGS
- ☐ LIGHT FIXTURE - SEE ELECTRICAL DRAWINGS
- ☐ WALL MOUNT LIGHT FIXTURE - SEE ELECTRICAL DRAWINGS
- ☐ TUBULAR SKYLIGHT DIFFUSER - SEE SPECIFICATIONS
- ↔ CEILING JOIST SPAN DIRECTION

**NOTES:**

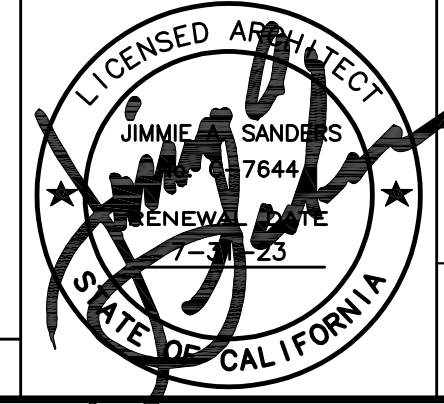
1. FOR SUPPORT OF PENDANT LIGHT FIXTURES SEE 18 PER DSA IR 16-1 2014 CBC.

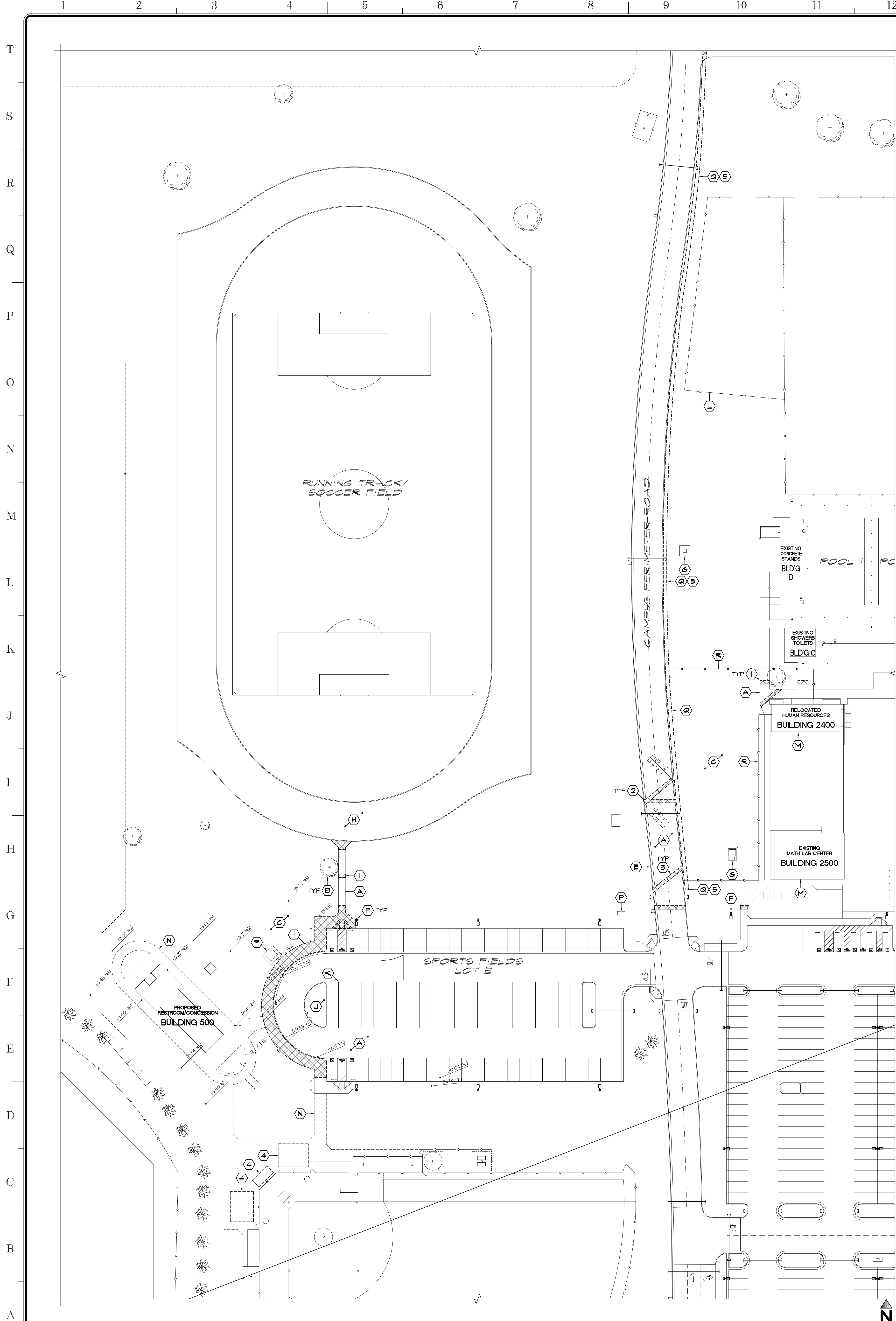
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Project Title  
**IMPERIAL VALLEY COLLEGE  
 RESTROOM/CONCESSION BUILDING**

Sheet Title  
**ARCHITECTURAL SECTIONS,  
 REFLECTED CEILING PLAN**

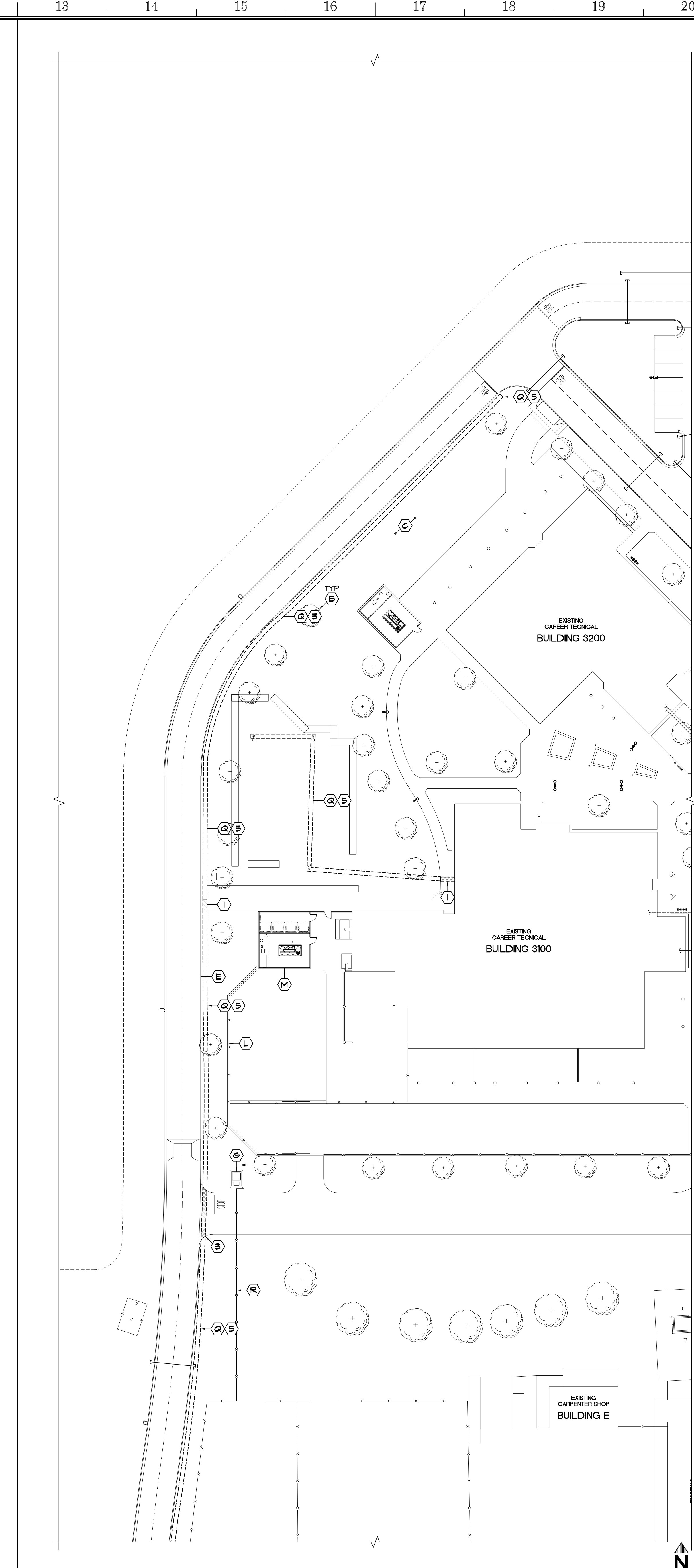
Document Date 04-01-22	Project Number 22-091V
Date Last Revised 12-15-22	Reference Sheet A2
Sheet Number AD-3_A2	





SITE SURVEY AND DEMOLITION PLAN - SOUTH

SCALE: 1" = 40'-0"



SITE SURVEY AND DEMOLITION PLAN - NORTH

SCALE: 1" = 40'-0"

**APPROVALS**

**KEYNOTES:**

- (A) EXISTING CONCRETE / ASPHALT PAVING - PROTECT
- (B) EXISTING TREE / SHRUB - PROTECT
- (C) EXISTING LANDSCAPING - PROTECT
- (D) NOT USED
- (E) EXISTING CONCRETE CURB / GUTTER - PROTECT
- (F) EXISTING LIGHT STANDARD - PROTECT
- (G) EXISTING ELECTRICAL EQUIPMENT - PROTECT
- (H) EXISTING RUNNING TRACK - PROTECT
- (I) EXISTING PLANTER - PROTECT
- (K) EXISTING STRIPING - PROTECT
- (L) EXISTING CHAINLINK FENCE - PROTECT
- (M) EXISTING BUILDING - PROTECT
- (N) PROPOSED HARDSCAPE
- (P) PROPOSED ELECTRICAL EQUIPMENT
- (Q) PROVIDE TRENCHING FOR NEW ELECTRICAL LINES
- (R) CONSTRUCTION FENCING, CHAINLINK W/ VISUAL FABRIC BARRIER

**DEMOLITION KEYNOTES:**

- (1) SAKCUT AND REMOVE EXISTING CONCRETE WALK
- (2) SAKCUT AND REMOVE EXISTING CONCRETE CURB / GUTTER
- (3) SAKCUT AND REMOVE EXISTING CONCRETE / ASPHALT PAVING
- (4) REMOVE EXISTING NON-COMPLIANT BLEACHERS
- (5) REMOVE AND RE-INSTALL IRRIGATION LINES AS REQUIRED TO ALLOW NEW ELECTRICAL LINES FOR NEW LIGHT STANDARDS

**LEGEND:**

- 10.76 BENCH MARK, BUILDING #14, LIBRARY, MUSIC, CLASSROOMS FINISH FLOOR ELEVATION 10.76
- (50.42) EXISTING NATURAL SOIL ELEVATION (NO)
- EXISTING ELEVATION (SITE CONCRETE UNO)
- FIRE HYDRANT
- POWER POLE
- NS NATURAL SOIL
- TC TOP OF CURB
- FL FLOOR LINE
- AC ASPHALT PAVING
- TP TOP OF AC PAVING

**NOTES:**

1. DEMOLITION KEYNOTES ARE NOT INTENDED TO SHOW ALL DEMOLITION REQUIRED FOR PROPOSED IMPROVEMENTS. CONTRACTOR IS RESPONSIBLE TO REMOVE ALL EXISTING IMPROVEMENTS/CONDITIONS REQUIRED TO COMPLETE WORK FOR PROPOSED IMPROVEMENTS.
2. CONTRACTOR SHALL ENCOUNTER EXISTING IRRIGATION LINES DURING DEMOLITION. CONTRACTOR SHALL CAP LINE AWAY FROM PROPOSED IMPROVEMENTS, NOTIFY ARCHITECT/SCHOOL DISTRICT, AND ADJUST LINES ACCORDINGLY.
3. PROVIDE TRENCHING FOR NEW ELECTRICAL LINES.

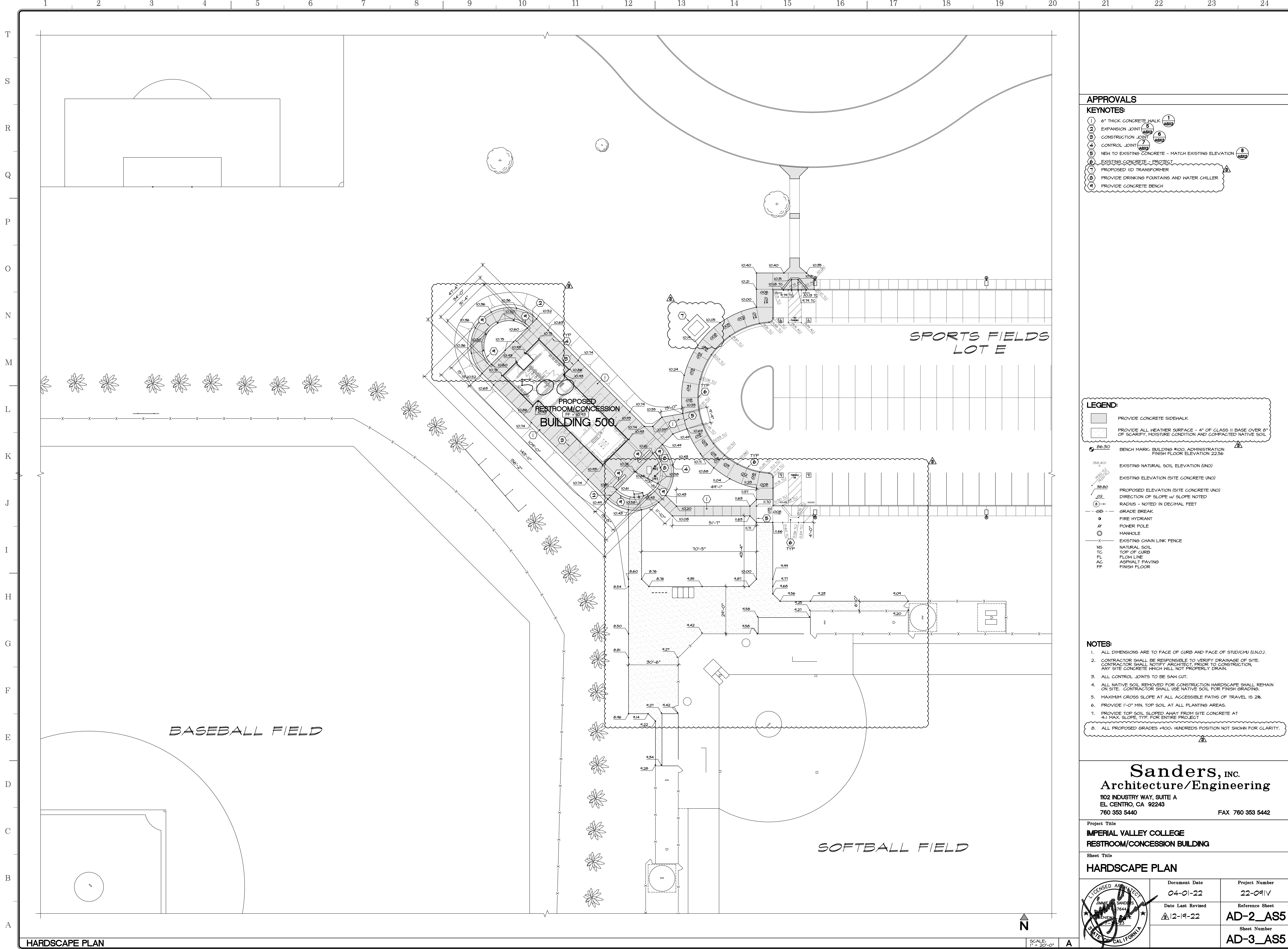
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Project Title  
**IMPERIAL VALLEY COLLEGE  
 RESTROOM/ CONCESSION BUILDING**

Sheet Title  
**SITE SURVEY AND DEMOLITION PLAN**

	Document Date 04-01-22	Project Number 22-091V
	Date Last Revised	Sheet Number <b>AS3</b>





**APPROVALS**

**KEYNOTES:**

- 1 6" THICK CONCRETE WALK
- 2 EXPANSION JOINT
- 3 CONSTRUCTION JOINT
- 4 CONTROL JOINT
- 5 NEW TO EXISTING CONCRETE - MATCH EXISTING ELEVATION
- 6 EXISTING CONCRETE - PROTECT
- 7 PROPOSED IID TRANSFORMER
- 8 PROVIDE DRINKING FOUNTAINS AND WATER CHILLER
- 9 PROVIDE CONCRETE BENCH

**LEGEND:**

- PROVIDE CONCRETE SIDEWALK
- PROVIDE ALL WEATHER SURFACE - 4" OF CLASS II BASE OVER 8" OF SCARIFY, MOISTURE CONDITION AND COMPACTED NATIVE SOIL
- BENCH MARK: BUILDING #100 ADMINISTRATION FINISH FLOOR ELEVATION 22.56
- EXISTING NATURAL SOIL ELEVATION (N.O.)
- EXISTING ELEVATION (SITE CONCRETE UND)
- PROPOSED ELEVATION (SITE CONCRETE UND)
- DIRECTION OF SLOPE W/ SLOPE NOTED
- RADIUS - NOTED IN DECIMAL FEET
- GRADE BREAK
- FIRE HYDRANT
- POWER POLE
- MANHOLE
- EXISTING CHAIN LINK FENCE
- N.S. NATURAL SOIL
- T.C. TOP OF CURB
- F.L. FLOW LINE
- AC ASPHALT PAVING
- FF FINISH FLOOR

**NOTES:**

1. ALL DIMENSIONS ARE TO FACE OF CURB AND FACE OF STUD/CHU (N.O.).
2. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY DRAINAGE OF SITE. CONTRACTOR SHALL NOTIFY ARCHITECT, PRIOR TO CONSTRUCTION, ANY SITE CONCRETE WHICH WILL NOT PROPERLY DRAIN.
3. ALL CONTROL JOINTS TO BE SAW CUT.
4. ALL NATIVE SOIL REMOVED FOR CONSTRUCTION HARDSCAPE SHALL REMAIN ON SITE. CONTRACTOR SHALL USE NATIVE SOIL FOR FINISH GRADINGS.
5. MAXIMUM GROSS SLOPE AT ALL ACCESSIBLE PATHS OF TRAVEL IS 2%.
6. PROVIDE 1'-0" MIN. TOP SOIL AT ALL PLANTING AREAS.
7. PROVIDE TOP SOIL SLOPED AWAY FROM SITE CONCRETE AT 4:1 MAX. SLOPE, TYP. FOR ENTIRE PROJECT.
8. ALL PROPOSED GRADES +100; HUNDREDS POSITION NOT SHOWN FOR CLARITY.

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Project Title  
**IMPERIAL VALLEY COLLEGE  
 RESTROOM/CONCESSION BUILDING**

Sheet Title  
**HARDSCAPE PLAN**

	Document Date	Project Number
	04-01-22	22-091V
Date Last Revised	Reference Sheet	
12-19-22	AD-2_AS5	
	Sheet Number	
	AD-3_AS5	

## ROOM FINISH SCHEDULE

BUILDING	RM NO	NAME	FLOOR	HT	BASE MATERIAL	WALLS				WAINSCOT		CEILING		CABINETS		REMARKS
						NORTH	EAST	SOUTH	WEST	HT	MATERIAL	HT	MATERIAL	HT	MATERIAL	
BUILDING	1	CONCESSIONS	POLISHED LEVEL 1	6"	RUBBER/SEAL CONCRETE	GYP BD, PINK/GRN TILE	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	STAINLESS STEEL	EXPOSED STEEL DECK/SS FRAMING PAINT
	2	STORAGE	SEALED CONCRETE	6"	RUBBER/SEAL CONCRETE	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	MASONRY	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT
	3	SUPPLY	SEALED CONCRETE	6"	RUBBER/SEAL CONCRETE	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	STAINLESS STEEL	EXPOSED STEEL DECK/SS FRAMING PAINT
	4	WOMEN'S DRESSING	SEALED CONCRETE	6"	RUBBER/SEAL CONCRETE	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	GYP BD, MASONRY	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT
	5	MEN'S DRESSING	SEALED CONCRETE	6"	RUBBER/SEAL CONCRETE	GYP BD, PAINT	GYP BD, MASONRY	GYP BD, PAINT	GYP BD, PAINT	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT
	6	MAINTENANCE	SEALED CONCRETE	6"	RUBBER/SEAL CONCRETE	MASONRY	GYP BD, MASONRY	GYP BD, MASONRY	GYP BD, MASONRY	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT
	7	ELECTRICAL	SEALED CONCRETE	6"	RUBBER/SEAL CONCRETE	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT
	8	DATA	SEALED CONCRETE	6"	RUBBER/SEAL CONCRETE	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	GYP BD, PAINT	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT
	9	WOMEN'S TOILET	POLISHED LEVEL 1	N/A	N/A	CERAMIC TILE	CERAMIC TILE	CERAMIC TILE	CERAMIC TILE	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT
	10	MEN'S TOILET	POLISHED LEVEL 1	N/A	N/A	CERAMIC TILE	CERAMIC TILE	CERAMIC TILE	CERAMIC TILE	N/A	N/A	OPEN	METAL/SS - PAINT	N/A	N/A	EXPOSED STEEL DECK/SS FRAMING PAINT

## DOOR SCHEDULE

BUILDING	NO	TYPE	DOOR				FRAME	HARDWARE	SECURITY LOCK	FIRE RATING	GLAZING		FRAME DETAILS - SHEET AX14 UNO				REMARKS
			SIZE	THICKNESS	CORE	MATERIAL					TYPE	LOW-E / TINT	JAMB	SILL	HEAD	MULLION	
BUILDING	1	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	2	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	3	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	4	R-2	6'-0" x 8'-0"	18 GA	N/A	STEEL	STEEL	N/A	N	NR	N/A	N/A	23	N/A	23	N/A	MOTORIZED COILING DOOR, CONTROLS 48" MAX AFF
	5	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	6	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	2	N	NR	N/A	N/A	1	14	1	N/A	
	7	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	8	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	9	R-2	6'-0" x 8'-0"	18 GA	N/A	STEEL	STEEL	N/A	N	NR	N/A	N/A	23	N/A	23	N/A	MOTORIZED COILING DOOR, CONTROLS 48" MAX AFF
	10	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	11	S-1	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	1	N	NR	N/A	N/A	1	14	1	N/A	
	12	S-2	3'-0" x 7'-0"	1 3/4"-16 GA	POLYURETHANE	STEEL	MTL-16 GA	3	N	NR	N/A	N/A	3	14	3	N/A	

## WINDOW SCHEDULE

BUILDING	NO	TYPE	WINDOW			FRAME	TYPE	FIRE RATING	FRAME DETAILS - SHEET AX14 UNO				REMARKS
			SIZE	TYPE	LOW-E / TINT				JAMB	SILL	HEAD	MULLION	
BLDG	1	B 4 C	8'-0" x 4'-6"	1/4" LAMINATED SOLARBAN 10XLBK2	ALUMINUM	FIXED/SLIDE	NR	T, 22, 23	T, 22, 23	T, 22, 23	13 (5M)	MOTORIZED COILING SHUTTER, CONTROLS 48" MAX AFF	
	2	B 4 C	8'-0" x 4'-6"	1/4" LAMINATED SOLARBAN 10XLBK2	ALUMINUM	FIXED/SLIDE	NR	T, 22, 23	T, 22, 23	T, 22, 23	13 (5M)	MOTORIZED COILING SHUTTER, CONTROLS 48" MAX AFF	
	3	B 4 C	8'-0" x 4'-6"	1/4" LAMINATED SOLARBAN 10XLBK2	ALUMINUM	FIXED/SLIDE	NR	T, 22, 23	T, 22, 23	T, 22, 23	13 (5M)	MOTORIZED COILING SHUTTER, CONTROLS 48" MAX AFF	
	4	B 4 C	8'-0" x 4'-6"	1/4" LAMINATED SOLARBAN 10XLBK2	ALUMINUM	FIXED/SLIDE	NR	T, 22, 23	T, 22, 23	T, 22, 23	13 (5M)	MOTORIZED COILING SHUTTER, CONTROLS 48" MAX AFF	
	5-B	D	21" DIA	INSULATED SOLARBAN 10XLBK2	MTL-16 GA	FIXED	NR	N/A	N/A	N/A	N/A	SEE DETAIL 16/AX14	

## EQUIPMENT SCHEDULE:

ITEM	DESCRIPTION	QTY	SIZE				ELECTRICAL				PLUMBING AND MECHANICAL				CLASSIFICATION (SEE NOTES)	ANCHORAGE DETAIL	REMARKS
			WIDTH	DEPTH	HEIGHT	VOLTS	PHASE	KW	HP	AMPS	CONNECTION	COLD	WATER	HOT			
1	FIRE EXTINGUISHER	1	-	-	-	-	-	-	-	-	-	-	-	-	-	M/AX13	4" MAX PROJECTION FROM WALL FINISH (INCLUDING HANDLE)
2	REFRIGERATOR / FREEZER COMBO	1	-	-	-	120	-	-	-	-	-	-	-	-	-	O	
3	STAINLESS STEEL CART	2	54"	24"	36"	-	-	-	-	-	-	-	-	-	-	C	
4	STEEL STATIONARY SHELVING	3	VARIES	18"	12"	-	-	-	-	-	-	-	-	-	-	I7/AX13	SIZE TO FIT PER PLAN
5	MIRROR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6	BENCH - 20"Dx48"Wx18"H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

### APPROVALS

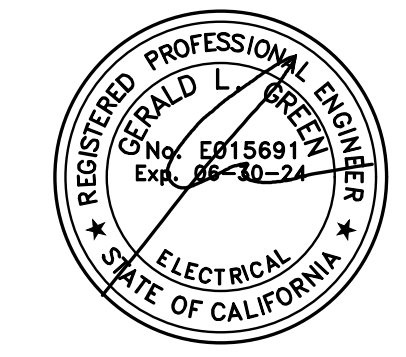
#### ROOM FINISH SCHEDULE NOTES:

- ALL OUTSIDE GYP-BRD CORNERS & WALLS AND SOFFITS SHALL BE FINISHED WITH BULLNOSE PAPER FACED METAL CORNER BEAD.
- GYPSUM BOARD FINISH AT WALLS & CEILING: TEXTURED LIGHT SKIP TROWEL. PROVIDE SAMPLE FOR APPROVAL.
- ALL INTERIOR FINISHES SHALL COMPLY W/ CBC CHAPTER 8, CFC CHAPTER 8, AND CCR TITLE 19, 3.08 AND 3.21.
- SLIP RESISTANT TILE, SLIP RESISTANT TILE SHALL HAVE SUFFICIENT ABRASIVES ADDED SUCH THAT THE STATIC COEFFICIENT OF FRICTION (SCF) SHALL BE NOT LESS THAN 0.6 FOR WALKING SURFACES AND 0.8 FOR RAMPS WHEN TESTED IN ACCORDANCE W/ ASTM DESIGNATION: C 1029.
- ALL ONE HOUR RATED CEILING AND WALLS SHALL BE AS PER C.B.C. TABLE 1201, 14-1.3.
- ALL INTERIOR FINISHES SHALL BE OF MAX FLAME SPREAD CLASS II W/ AN INDEX OF 26-75.
- SEE SHEET (AX14) FOR FLOORING TRANSITION DETAIL.

#### DOOR SCHEDULE NOTES:

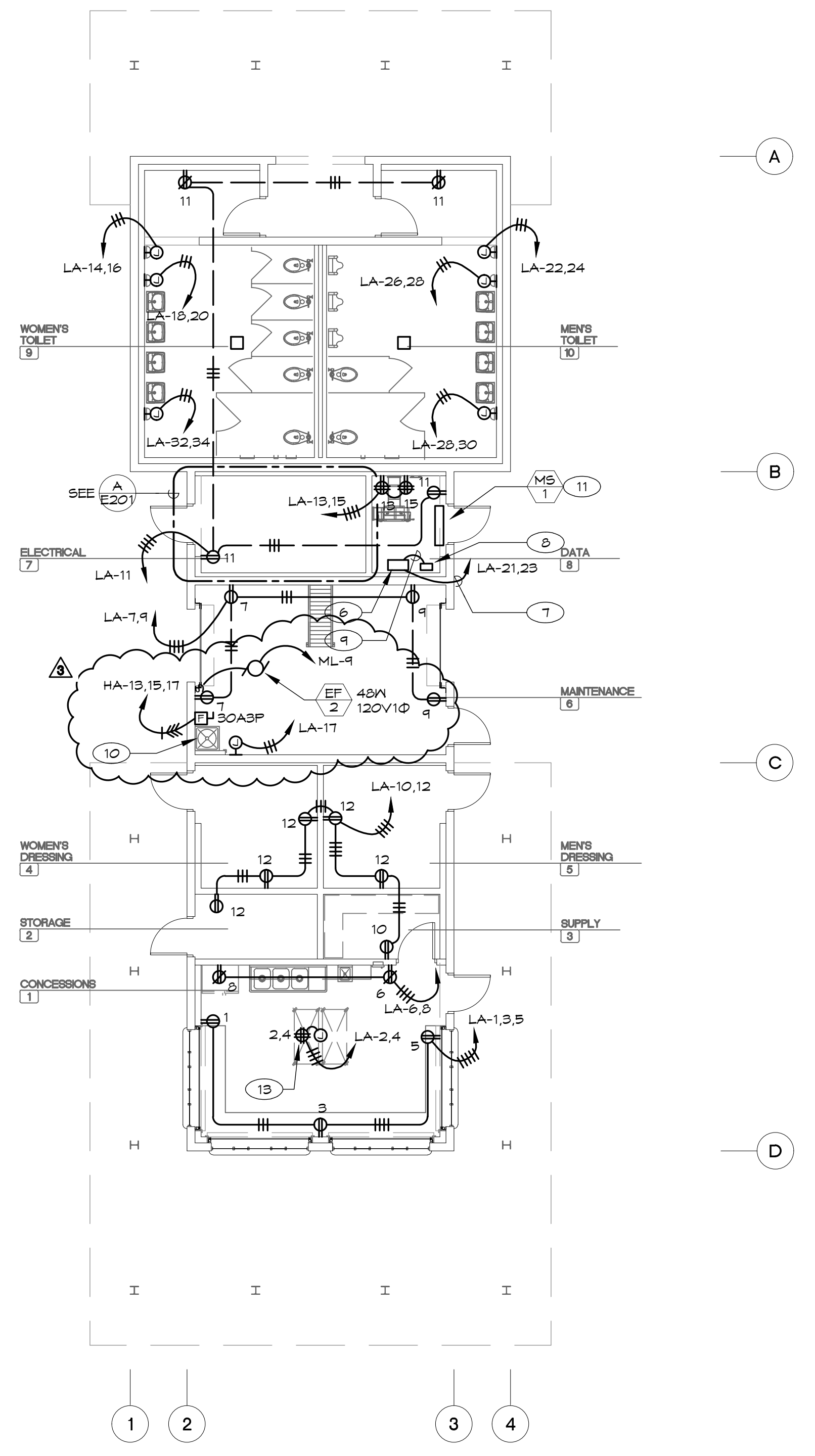
- FOR DOOR TYPES SEE (A) (AX1) (AX2) (AX3) (AX4) (AX5) (AX6) (AX7) (AX8) (AX9) (AX10) (AX11) (AX12) (AX13) (AX14) (AX15) (AX16) (AX17) (AX18) (AX19) (AX20) (AX21) (AX22) (AX23) (AX24) (AX25) (AX26) (AX27) (AX28) (AX29) (AX30) (AX31) (AX32) (AX33) (AX34) (AX35) (AX36) (AX37) (AX38) (AX39) (AX40) (AX41) (AX42) (AX43) (AX44) (AX45) (AX46) (AX47) (AX48) (AX49) (AX50) (AX51) (AX52) (AX53) (AX54) (AX55) (AX56) (AX57) (AX58) (AX59) (AX60) (AX61) (AX62) (AX63) (AX64) (AX65) (AX66) (AX67) (AX68) (AX69) (AX70) (AX71) (AX72) (AX73) (AX74) (AX75) (AX76) (AX77) (AX78) (AX79) (AX80) (AX81) (AX82) (AX83) (AX84) (AX85) (AX86) (AX87) (AX88) (AX89) (AX90) (AX91) (AX92) (AX93) (AX94) (AX95) (AX96) (AX97) (AX98) (AX99) (AX100) (AX101) (AX102) (AX103) (AX104) (AX105) (AX106) (AX107) (AX108) (AX109) (AX110) (AX111) (AX112) (AX113) (AX114) (AX115) (AX116) (AX117) (AX118) (AX119) (AX120) (AX121) (AX122) (AX123) (AX124) (AX125) (AX126) (AX127) (AX128) (AX129) (AX130) (AX131) (AX132) (AX133) (AX134) (AX135) 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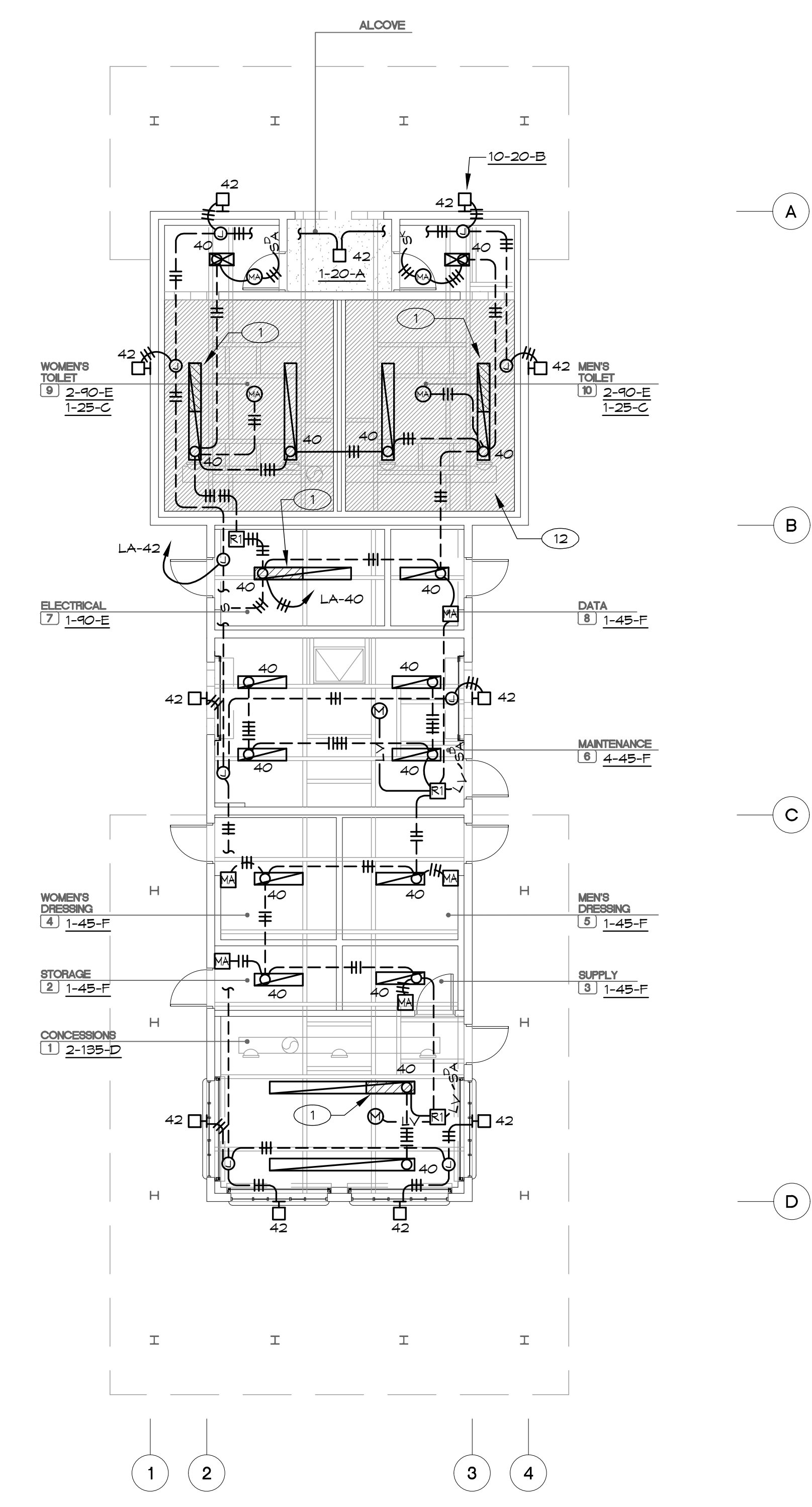


**APPROVALS**

- NOTES**
- 1 THIS FIXTURE IS TO BE PROVIDED WITH AN EMERGENCY BATTERY PACK. PROVIDE CONSTANT HOT CHARGING WIRE
  - 2 MAIN SWITCHBOARD "MS", 2T/480V, 3Ø
  - 3 75 KVA 480V//120/208V, 3Ø, 4W DRY TYPE TRANSFORMER
  - 4 PANEL "LA"
  - 5 MUSCO CONTROL PANEL
  - 6 LBU UNIT PROVIDED BY OTHERS
  - 7 1 1/2" C, 3#2 CU, 1#4 CU GND
  - 8 GPS UNIT PROVIDED BY OTHERS
  - 9 1" C.O.
  - 10 WATER HEATER, 22A, 460V, 3Ø
  - 11 FED FROM ROOF TOP UNIT
  - 12 SHADING INDICATES SKYLIT AREA, TYPICAL
  - 13 RECEPTACLE DROP FROM CEILING, VERIFY MOUNTING HEIGHT. PROVIDE STRAIN RELIEF
  - 14 FUTURE MUSCO CONTROL PANEL
  - 15 36" x 60" x 24" DEEP PULLBOX
  - 16 (B) 2" PVC C.O.
  - 17 (B) 1 1/2" PVC C.O.
  - 18 4" PVC C.O.
  - 19 PANEL "HA"
  - 20 (B) 1 1/2" PVC C.O. (SPARE)
  - 21 (B) 4" PVC C.O. (SPARE)
  - 22 FUTURE PANEL "HB"
  - 23 PANEL "MH"
  - 24 PANEL "ML"
  - 25 165 KVA 480V//120/208V, 3Ø, 4W DRY TYPE TRANSFORMER ABOVE PANEL



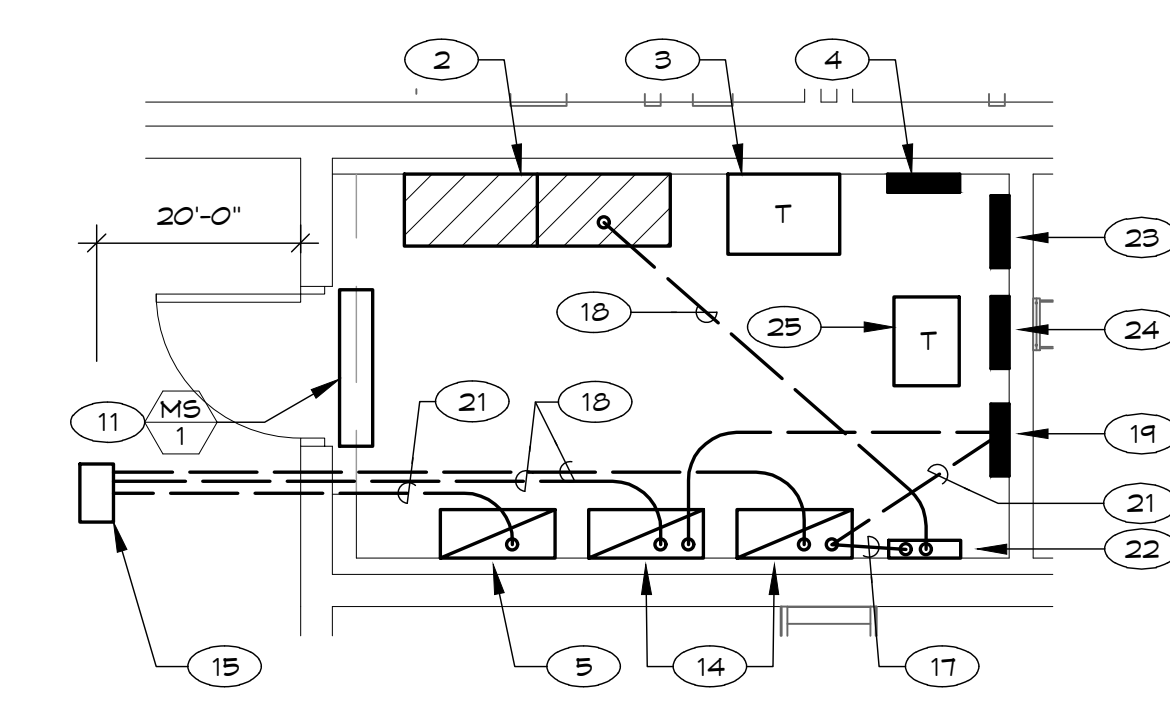
CONCESSION POWER PLAN



CONCESSION LIGHTING PLAN

**LIGHTING NOTE**  
VERIFY MOUNTING HEIGHT OF ALL FIXTURES WITH ARCHITECT

WATTSTOPPER CONTROL DEVICES	
SYMBOL	DESIGNATION
Ⓛ	LOAD CONTROLLER #LMRC-111
Ⓞ	CEILING MOUNT OCCUPANCY SENSOR #LMDC-100
Ⓜ	WALL MOUNTED MOTION SENSOR #PM100
Ⓢ	DIMMING SWITCH #LMDM-101
Ⓣ	TIME CLOCK #LMZC-301
Ⓞ	CEILING MOUNT OCCUPANCY SENSOR #DT-395



ELECTRIC ROOM DETAIL  
1/4"=1'-0"

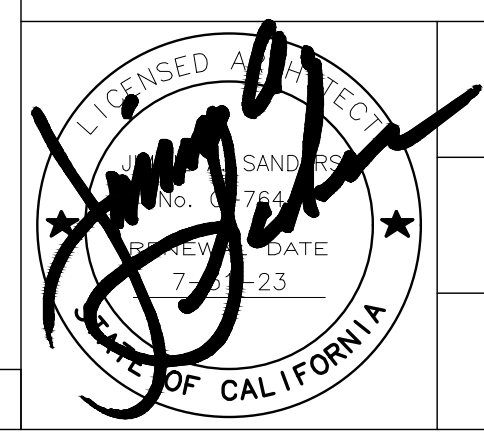


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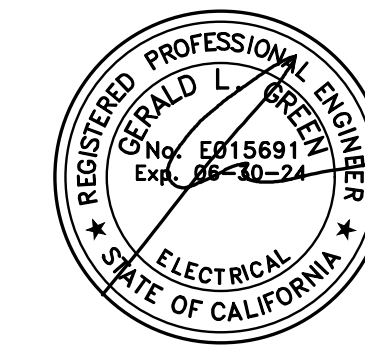
Project Title  
**IMPERIAL VALLEY COLLEGE  
RESTROOM/CONCESSION BUILDING**

Sheet Title  
**CONCESSION POWER + LIGHTING PLAN**

Document Date 04-01-22	Project Number 22-091V
Date Last Revised 12-19-22	Reference Sheet <b>E201</b>
Sheet Number <b>AD-03_E201</b>	







APPROVALS

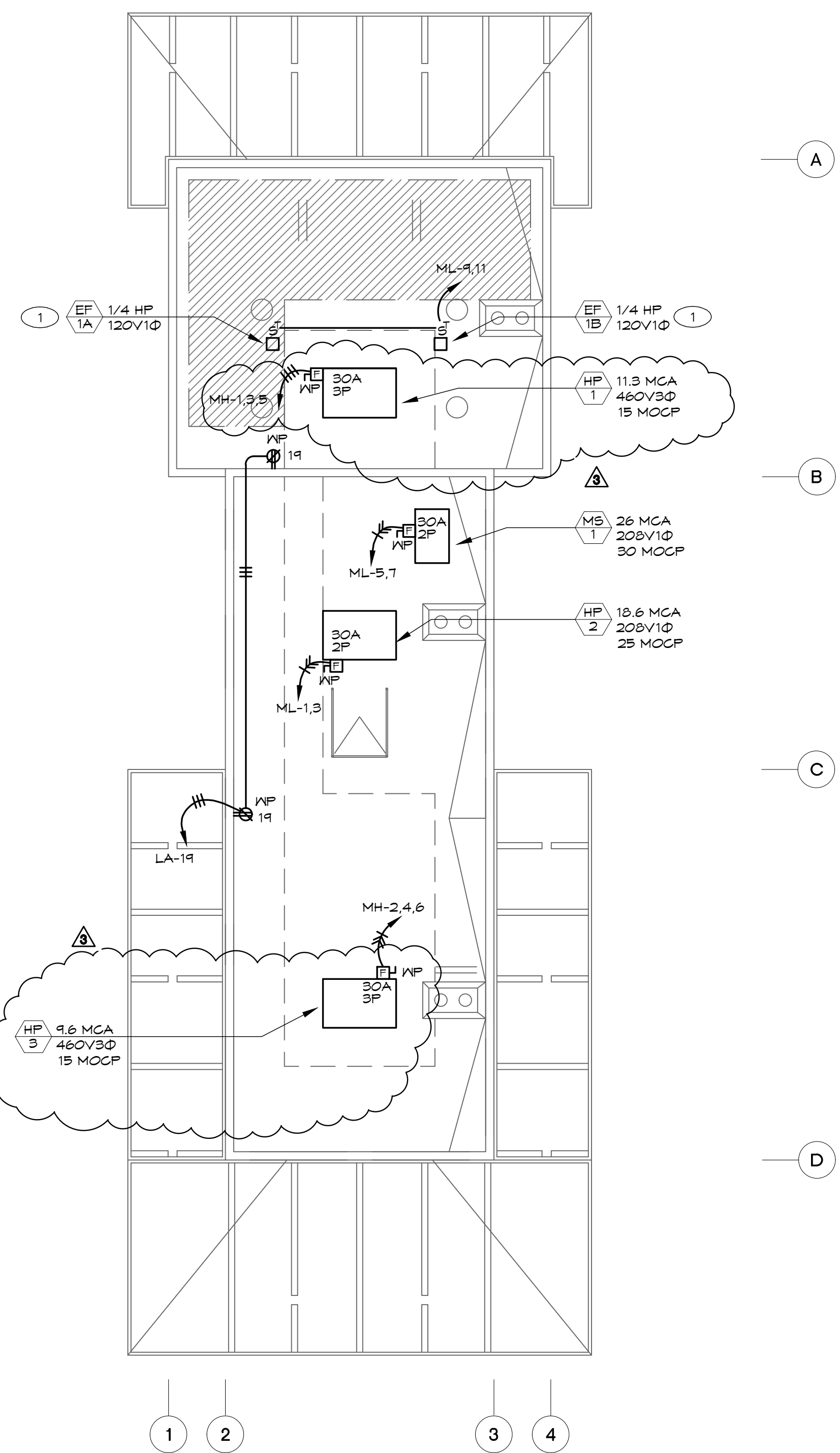


Table with 5 columns: VOLTAGE, PHASE, WIRE, A/C, LOCATION, PANEL, FEEDER, MOUNTING, MAINS BUSSING, MAINS FEED.

Table with 12 columns: LOCATION, WATTAGE (ΦA, ΦB, ΦC), LTG, REC, MS, BKR, CR, OR, CR, BKR, MS, REC, LTG, WATTAGE (ΦA, ΦB, ΦC), LOCATION.

\* = ROUTE CIRCUIT THROUGH 20A1P TIME CLOCK

Table with 5 columns: VOLTAGE, PHASE, WIRE, A/C, LOCATION, PANEL, FEEDER, MOUNTING, MAINS BUSSING, MAINS FEED.

Table with 12 columns: LOCATION, WATTAGE (ΦA, ΦB, ΦC), LTG, REC, MS, BKR, CR, OR, CR, BKR, MS, REC, LTG, WATTAGE (ΦA, ΦB, ΦC), LOCATION.

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NOTES: 1 COORDINATE CONTROL WIRING REQUIREMENTS WITH HVAC CONTRACTOR

Table with 5 columns: VOLTAGE, PHASE, WIRE, A/C, LOCATION, PANEL, FEEDER, MOUNTING, MAINS BUSSING, MAINS FEED.

Table with 12 columns: LOCATION, WATTAGE (ΦA, ΦB, ΦC), LTG, REC, MS, BKR, CR, OR, CR, BKR, MS, REC, LTG, WATTAGE (ΦA, ΦB, ΦC), LOCATION.

\* = PROVIDE NEW BREAKER AND CONNECT NEW LOAD

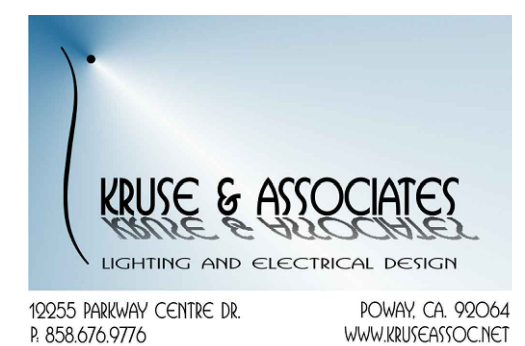
○ = EXISTING

Table with 5 columns: VOLTAGE, PHASE, WIRE, A/C, LOCATION, PANEL, FEEDER, MOUNTING, MAINS BUSSING, MAINS FEED.

Table with 12 columns: LOCATION, WATTAGE (ΦA, ΦB, ΦC), LTG, REC, MS, BKR, CR, OR, CR, BKR, MS, REC, LTG, WATTAGE (ΦA, ΦB, ΦC), LOCATION.

\* = ROUTE THIS CIRCUIT THROUGH EXISTING TITLE 24 CONTROL PANEL, PROVIDE NEW BREAKER

○ = EXISTING



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Project Title: IMPERIAL VALLEY COLLEGE RESTROOM/CONCESSION BUILDING

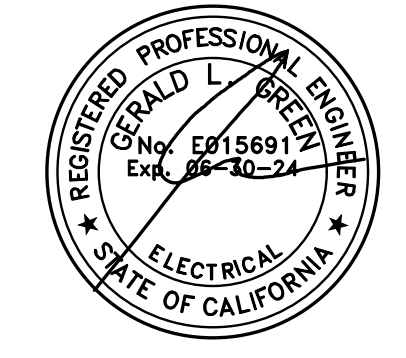
Sheet Title: CONCESSION ROOF PLAN

Table with 3 columns: Document Date (04-01-22), Project Number (22-091V), Date Last Revised (12-19-22), Reference Sheet (E202), Sheet Number (AD-03\_E202).

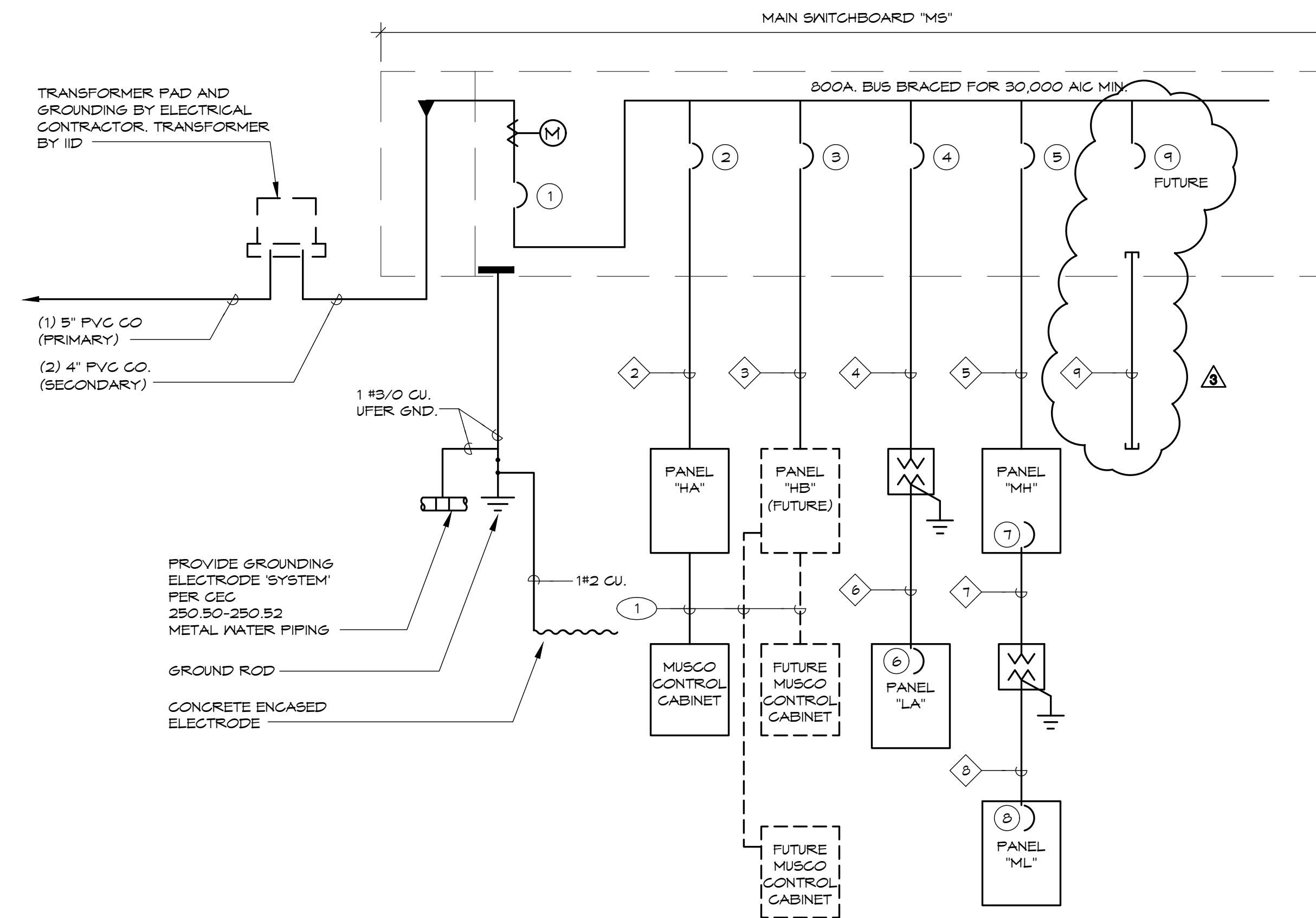
SCALE: 1/8" = 1'-0"

CONCESSION ROOF PLAN





APPROVALS



**POWER SINGLE LINE DIAGRAM**  
NO SCALE

**NOTES**  
① SEE SITE PLAN AND BUILDING PLAN FOR CONDUITS

**LOAD REQ'D**  
PANEL "HA" 115330 W  
PANEL "HB" 100000 W  
PANEL "LA" 50830 W  
PANEL "MH" 26291 W  
TOTAL 242451 W = 352 A @ 277/480, 3Ø

DEVICE NUMBER	C.B. OR S.W. SIZE	FUSE SIZE	FUSE TYPE	FEEDER NUMBER	CONDUITS & CONDUCTORS						LENGTH	Ø/Ø V.D.
					CONDUIT TYPE	CONDUIT SIZE	CNDCTR. QUANTITY	CNDCTR. SIZE	CNDCTR. TYPE	GND. CU.		
①	600A 3Ø	-	-	①	-	-	-	-	-	-	-	-
②	300A 3Ø	-	-	②	PVC	4"	4	350 MCM	CU	2	-	-
③	100A 3Ø	-	-	③	PVC	1 1/2"	-	-	-	-	-	-
④	100A 3Ø	-	-	④	PVC	1 1/2"	3	2	CU	Ø	-	-
⑤	100A 3Ø	-	-	⑤	PVC	1 1/2"	4	2	CU	Ø	-	-
⑥	225A 3Ø	-	-	⑥	PVC	2"	4	4/0	CU	2	-	-
⑦	30A 3Ø	-	-	⑦	EMT	1"	3	10	CU	12	-	-
⑧	30A 3Ø	-	-	⑧	EMT	1 1/2"	4	4	CU	Ø	-	-
⑨	200A 3Ø	-	-	⑨	PVC	2"	-	-	-	-	-	-

- SINGLE LINE DIAGRAM NOTES**
- VERTICAL BUS MAY BE TAPERED TO NOT LESS THAN 1/3 THE AMPACITY RATING OF THE MAIN HORIZONTAL BUS.
  - HORIZONTAL AND VERTICAL BUS SHALL BE FULL LENGTH, AND BE RATED NO LESS THAN THE NOTED AIC RATED VALUE.
  - CONTRACTOR SHALL SUBMIT SWITCHBOARD SHOP DRAWINGS TO THE SERVING UTILITY FOR APPROVAL PRIOR TO FABRICATION. SWITCHBOARD SHALL COMPLY WITH IID REQUIREMENTS.
  - ALL CONDUCTORS FEEDING PANELBOARDS SHALL BE COPPER TYPE THIN WITH EMT OR PVC CONDUIT. BRANCH CIRCUIT AND FEEDER CABLES IN ALL SIZES SHALL HAVE THIN, THIN OR THIN INSULATION WITH EMT CONDUIT. AC CABLE IS NOT ALLOWED TO BE INSTALLED. A EQUIPMENT GROUND CONDUCTOR SHALL BE IN ALL FLEXIBLE CONDUITS. XHHW TO BE USED AT ALL EXTERIOR LOCATION PANEL FEEDERS.
  - ALL EQUIPMENT SHOWN IS NEW UNLESS NOTED OTHERWISE.
  - EACH TRANSFORMER SHALL USE THE NEAREST ELECTRODE AS THE SECONDARY GROUNDING SYSTEM. (I.E. BUILDING STEEL, COLD WATER PIPE.)
  - ALL TERMINATION LOSS OF PANELS AND SWITCHBOARDS TO BE RATED TO ACCEPT 75 DEGREE CONDUCTORS.
  - ALL MAIN SERVICE CIRCUIT BREAKERS SHALL BE 100% RATED.
  - FOR ALL PANELBOARDS SUPPLYING FIRE ALARM EQUIPMENT, PROVIDE LOCKABLE COVER, IDENTIFIED CIRCUIT BREAKER (RED), AND A BREAKER LOCK-OFF DEVICE.
  - PULL SECTION TAPS ARE TO BE FACTORY INSTALLED, FIELD INSTALLED PER FACTORY SPECIFICATIONS OR TO BE CERTIFIED BY A NRTL CERTIFIED THIRD PARTY TESTING LABORATORY.

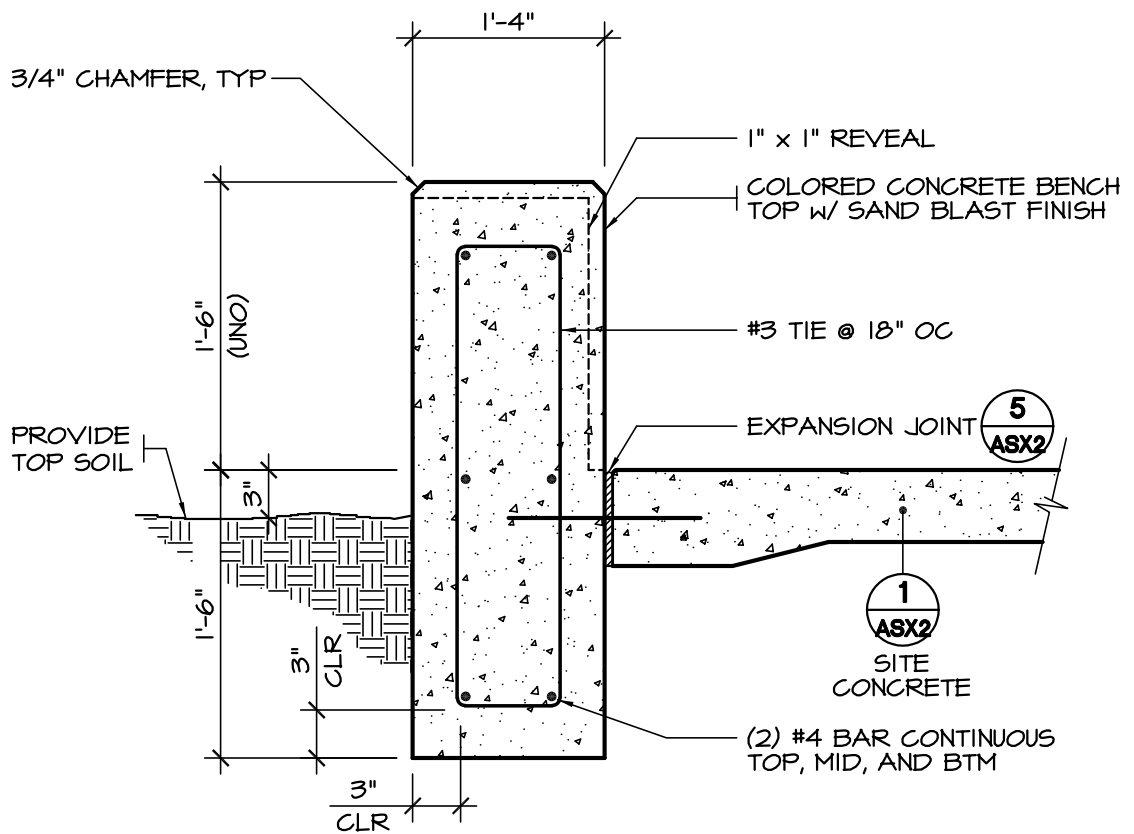


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Project Title  
**IMPERIAL VALLEY COLLEGE  
RESTROOM/CONCESSION BUILDING**

Sheet Title  
**SINGLE LINE DIAGRAM + PANEL SCHE.**

	Document Date 04-01-22	Project Number 22-091V
	Date Last Revised 12-19-22	<b>E301</b>
		<b>AD-3_E301</b>



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Project Title  
**IMPERIAL VALLEY COLLEGE  
 RESTROOM/CONCESSION BUILDING**

Sheet Title  
**CONCRETE BENCH SECTION**

Scale  
 1" = 1'-0"

Date  
 12-20-22

Drawing Number  
**AD-3\_SK1.0**