CITY OF MOORPARK

ADDDENDUM No. 01

Project Name: **NEW MOORPARK CITY LIBRARY PROJECT**
IDENTIFICATION NO. P&R-2025-01

Issued By: City of Moorpark

Date: June 23, 2025

To all bidders submitting proposals for the above captioned project. This Addendum is hereby included in the Contract Documents to the same extent as though it were originally included therein. The following items modify, add to, delete from, or explain the drawings and/or specifications. The contents of this Addendum shall take precedence over the original specifications and plans.

OBTAINING ADDENDUM #01 DOCUMENTS. Bidders may obtain free copies of ADDENDUM #01 by emailing Ralamillo@balfourbeattyus.com. Please provide name, company and e-mail address when requesting a copy of the Addendum.

The Addendum #01 may also be obtained at the following **bidding sites:**

Bidnet Direct
www.bidnetdirect.com

Ventura County Contractors Association
www.vccainc.com

Dodge Data & Analytics
www.construction.com

Tri-Co Reprographics
www.tricoblue.com

BID CLARIFICATIONS(Attached)

Item #1.0:

1. The General Contractor shall select a fire alarm system installer from one of the following approved vendors: **Dial** or **Bay Alarm**. These firms currently service City infrastructure buildings, ensuring consistency and compatibility for future maintenance needs.

2. **Exhibit Q** (Compliance for the CARB requirement) Replaces **DESIGNATION OF SUBCONTRACTORS** (B-11) from the New Moorpark City Library Bid Documents and must be submitted at Bid Time.

PRE-RFI'S: (Attached)

Item #2.0:

Refer to Attached Spreadsheet: **Pre-RFI #01 - 21.**

SPECIFICATIONS ITEMS (Contact Balfour Beatty or obtain from Bidder Plan Rooms listed above)

Item #3.0:

1. 04 26 16 ADHERED MASONRY VENEER
    a. Added section

2. 27 10 00 – STRUCTURED CABLING SYSTEM
    a. Replaced CAT 6 references to CAT 6A wherever occurred
    b. Changed fiber connector to LC type.

3. 27 41 00 – AUDIOVISUAL SYSTEMS
    a. Replaced CAT 6 references to CAT 6A wherever occurred.

4. 28 10 00 – SECURITY MANAGEMENT SYSTEM
    a. Added requirement for ACAMS to be Paxton Net2 Plus
    b. Added requirement for integration with Fire Alarm.

DRAWINGS ITEMS(Contact Balfour Beatty or obtain from Bidder Plan Rooms listed above):

Item #4.0:

1. S6.71B TYPICAL LIGHT GAUGE FRAMING SCHEDULES and ELEVATIONS
    a. Removed nonapplicable detail references in detail 01 and 03 regarding slip joint. Removed references that are not applicable on detail 03.

2. S6.72 TYPICAL LIGHT GAUGE METAL FRAMING DETAILS
    a. Removed nonapplicable notes in detail 11 and 12.
    b. Provided kicker connection structure info on detail 12.
    c. Updated notes on detail 13A to remove note #1 and provided correct reference on note #2.
    d. Updated detail references on detail 18.

3. S6.73 TYPICAL LIGHT GUAGE METAL FRAMING DETAILS
    a. Updated detail 14 reference to in plane kicker detail.

4. M0.20 MECHANICAL SCHEDULES
    a. Silencer install detail reference added to schedule.
    b. Updated text in VAV schedule to show maximum vs connected. Updated schedule to show CO2 sensor based on requirement/occupancy.

c. New additional 40x24 wall grille added

5. M0.30 MECHANCIAL TITLE-24 FORMS
    a. Updated T24 to account for updated CO2 sensors needed per occupancy.

6. M0.31 MECHANICAL TITLE-24 FORMS
    a. Updated T24 to account for updated CO2 sensors needed per occupancy.

7. M2.01 MECHANICAL FLOOR PLAN
    a. Provided notes to show return air path route using keynotes.
    b. Updated VAV tags to remove overlap.
    c. Added transfer boot to Multipurpose space to account for doors closing off from plenum Return path.
    d. Updated return air path for 117 FOTL to get back to the unit.

8. M3.01 PIPING & CONTROLS FLOOR PLAN
    a. Updated VAV tags to remove overlap.

9. M6.10 MECHANICAL CONTROL SEQUENCES AND DIAGRAMS
    a. Added zone temp setpoint for split system.
    b. Added pump failure note to split system.
    c. Low static pressure switch added to heat pump controls detail. Added occupancy sensor info to VAV detail for contractor coordination.
    d. Added run condition schedule for VAV box.
    e. Added note on VAV controls detail for after hour use.

10. M7.11 MECHANICAL DETAILS AND DIAGRAMS
    a. Silencer installation detail added to detail sheet.

11. T0.01 – TECHNOLOGY LEAD SHEET
    a. Removed “Communications Systems” section.
    b. Replaced CAT 6 references to CAT 6A

12. T1.00 – TECHNOLOGY SITE PLAN
    a. Added communications pathway and notes at south end of property.

13. T2.01 – TECHNOLOGY FIRST FLOOR PLAN
    a. Added card reader to Rm. 117 and 113.
    b. Moved card reader at Rm. 109.

14. T2.31 – TECHNOLOGY REFLECTED CEILING PLAN
    a. Modified Keynotes 5.304, 5.307, 6.129, 3.134.
    b. Removed wireless access points from Rms.102 and 104.

15. T4.01 – TECHNOLOGY ENLARGED MDF ROOM LAYOUT
    a. Modified Keynote – 6.112

b. Added Keynotes 7.001 – 7.011
c. Added Detail #3 and #4.

16. T6.11 – TECHNOLOGY MOUNTING DETAILS
    a. Modified detail #2
    b. Deleted detail #8

17. T6.12 – TECHNOLOGY FACEPLATE DETAILS
    a. Modified Keynote – #6

18. T6.13 – TECHNOLOGY SECURITY DETAILS
    a. Modified Detail #1

19. T6.15 – TECHNOLOGY DETAILS
    a. Modified Detail #2 and #4

20. AV0.01 – AV LEAD SHEET
    a. Replaced CAT 6 references to CAT 6A wherever occurred.

21. FA0.10 FIRE ALARM LEAD SHEET
    a. Updated FA Sequence of Operations

22. FA2.01 FIRE ALARM FLOOR PLAN
    a. Added a FA Relay Module in Room 112 to integrate with Access Control System
    b. Added Keynote FA-1015

23. FA5.00 FIRE ALARM RISER DIAGRAMS AND CALCULATIONS
    a. Added FA Relay Module
    b. Added Keynote FA-1112

ATTACHMENTS

Bid Clarification:
Checklist for Bidders at the Time of BID Submission

Exhibits:
Exhibit Q - Exhibit Q - California Air Resources Board (CARB)

Pre-Bid RFI's:
Attached Spreadsheet

CHECKLIST FOR BIDDERS

The following information is required of all Bidders at the time of Bid submission:

_____ Completed and Signed Bid Cover Form

_____ Completed and Signed Bid Sheets

_____ Completed and Signed Questionnaire

_____ Completed References Form

_____ Resume of General Construction Superintendent/On-Site Construction Manager

_____ Completed Subcontractor Designation Form–Replace per ADD 01,Exhibit Q

_____ Completed and Signed Industrial Safety Record Form

_____ Completed, Signed and Notarized Bid Bond or Other Security Form

_____ Signed Noncollusion Declaration Form

_____ Evidence satisfactory to the City indicating the capacity of the person(s) signing the Bid to bind the Bidder

Failure of the Bidder to provide all required information in a complete and accurate manner may cause the Bid to be considered non-responsive.

I hereby certify and declare under penalty of perjury under the laws of the State of California that all of the information submitted in connection with this Bid and all of the representations made herein are true and correct.

Name of Bidder _____

Signature _____

Name and Title _____

Dated _____

Exhibit Q

10) CALIFORNIA AIR RESOURCES BOARD (CARB)
IN-USE OFF-ROAD DIESEL-FUELED FLEETS REGULATION COMPLIANCE

This project is subject to the amendments in Sections 2449, 2449.1, and 2449.2, Title 13, California Code of Regulations For any construction activity starting January 1, 2024 involving the use of off-road diesel fueled vehicles subject to the regulation, the prime contractor must provide evidence of their current and valid California Air Resources Board Certificate of Reported Compliance (Certificate) for their fleets, any rental fleet equipment and all subcontractors that are listed in the contract.

All CARB Certificates must be obtained prior to the bid opening and must be submitted with the bid package or within three working days after the bid opening. No bid will be accepted without verification of the contractor's and subcontractor's CARB compliance numbers, nor any contract entered into without proof of the contractor's and subcontractors' Certificates being valid and current at the time of bid opening, unless the contractor confirms that no equipment subject to the regulation will be used to execute the contract work.

For additional information regarding this regulation updates, please visit:
https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements

Bidder hereby certifies that it is aware of the requirements set forth in Sections 2449, 2449.1, and 2449.2, Title 13, California Code of Regulations.

Bidder: _____, hereby certifies:
Bidder's Name

SELECT AND SIGN ONE OF THE TWO OPTIONS BELOW:

☐ **OPTION A:** There will **NOT** be any use of Off-Road Diesel Vehicles (subject to Sections 2449, 2449.1, and 2449.2, Title 13, CCR) on this project:

_____
Bidder's Signature

OR

☐ **OPTION B:** There will be use of Off-Road Diesel Vehicles on this project:

_____
Bidder's Signature

CALIFORNIA AIR RESOURCES BOARD (CARB)
BID FORM 10

PROVIDE THE FOLLOWING INFORMATION FOR OPTION B:

Bidder's CARB Certificate of Reported Compliance Number: _____

Note: All Subcontractor(s) Certificate of Reported Compliance Number(s) shall be listed on Bid Form No. 5, Designation of Subcontractors.

Bidder further acknowledges the following:

1. To be eligible for award of the contract, Bidder shall provide copies of its CARB certificates within the time limits as specified above on this form.
2. To be eligible for award of the contract, Bidder shall provide copies of CARB certificates for all subcontractors that are listed in the bid package as well as rental fleets within the time limits as specified above on this form.
3. Failure to submit this form or comply with any of the above requirements may result in the bid to be found non-responsive, and the bid bond forfeited.
4. Bidder shall ensure that their fleet as well as all rental fleets and subcontractor fleets maintain their active and current CARB certification for the duration of the project.

Name and Title: _____

Signature: _____

Dated: _____

DESIGNATION OF SUBCONTRACTORS
[Public Contract Code Section 4104]

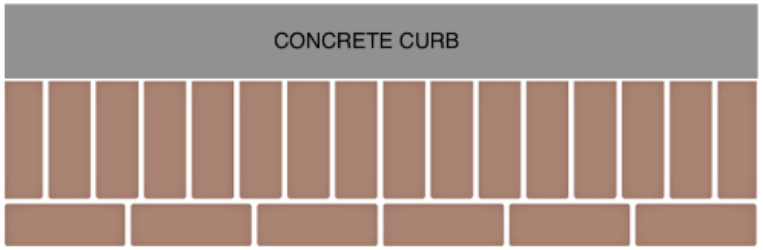
List all Subcontractors who will perform Work or labor or render service to the Contractor in or about the construction of the Work or improvement, or a Subcontractor licensed by the State of California who, under subcontract to the Contractor, specially fabricates and installs a portion of the Work or improvement according to detailed drawings contained in the Plans and Specifications, in an amount in excess of one-half percent (0.5%) of the Contractor's total Bid or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half percent (0.5%) of the Contractor's total Bid or $10,000, whichever is greater. If all Subcontractors do not fit on this page, attach another page listing all information for all other Subcontractors.

Name under which Subcontractor is Licensed and Registered	CSLB License Number(s) and Class(es)	DIR Contractor Registration Number	CARB Fleet Certificate Compliance Number	Address and Phone Number	Type of Work (e.g., Electrical)	Percentage of Total Bid (e.g., 10%)[1]

[1] The percentage of the total Bid shall represent the "portion of the work" for the purposes of Public Contract Code Section 4104(b).

Moorpark City Library - Pre-Bid RFIs

Balfour Beatty

Pre-Bid RFI #	Question	Addendum No.	Addendum Issue Date	Response
1	The City Fire Alarm System Preferred Vendors for the Fire Alarm System.	01	06/23/25	The General Contractor shall select a fire alarm system installer from one of the following approved vendors: Dial or Bay Alarm. These firms currently service City infrastructure buildings, ensuring consistency and compatibility for future maintenance needs.
2	Issuance of Exhibit Q - Exhibit Q - California Air Resources Board (CARB)	01	06/23/25	Exhibit Q (California Air Resources Board – CARB Requirements) will replace Form B-11 (Designation of Subcontractors) and must be submitted at the time of bid, as specified in the Checklist for Bidders.
3	Please provide the electronic CPT data to analyze the liquefaction hazard and degree of improvement required by ground improvement.	01	06/23/25	Attached - CPR DATA File Link: https://bbcus.egnyte.com/fl/hgFTcwgRkkDM/CPT-DATA_
4	Spec Section 316610.1.6.B.4 states “Add additional row(s) of VSCs as shown on drawings where stone columns cannot extend out because of utilities or structures.” The intent of this requirement is not clear. Does the Engineer wish to maintain a minimum number of rows of treatment beyond the structural footprint (e.g. 2 rows?) on tighter spacing if necessary due to lateral space constraints? Please clarify.	01	06/23/25	Confirmed. The intent is to maintain the same rows of treatment on tighter spacing if necessary.
5	Spec Section 316610.3.4.E states “The Specialty VSC Contractor to employ the specialty testing subcontractor to perform the CPT in accordance with ASTM D3441.” However, Spec Section 316610.1.6.I states “Engineer (Paid by Owner) to employ the specialty subcontractor to perform the CPT in accordance with ASTM D3441.” Please clarify.	01	06/23/25	The VSC Contractor is to retain the CPT subcontractor during the pilot test program outlined in Spec Section 316610.3.4.E. Engineer will retain CPT subcontractor for verification testing after completion of production VSC installation.
6	Spec Section 316610.1.6.G.2 states “terminate each CPT no less than 30 feet below the ground.” However, treatment depth is 40’ minimum. Please clarify.	01	06/23/25	The target depth for verification CPT testing after completion of production VSC installation is 50 feet but in case of shallower refusal, at least 4 soundings down to 30 feet or deeper will be completed.
7	Spec Section 316610.1.6.C refers to an “average post-treatment liquefaction induced settlement”. Please clarify what this is an average of. Is there no maximum tolerance?	01	06/23/25	This refers to the average of liquefaction-induced settlement values from at least 4 verification CPTs down to at least 30 feet. Differential settlement should be less than 1/2 inch over 40 feet.
8	Spec Section 316610. 1.6.D refers states “The average static settlement should be less than ½ inch.” Is there a maximum tolerance? Please clarify. Please also clarify whether this should be considered “Post-construction” settlement as considered in Item E. This requirement is very stringent for a stone column system if it must include the immediate elastic settlement the column will experience in response to the structural dead weight applied during construction.	01	06/23/25	Confirmed. Spec Section 316610.1.6.D refers to average post-construction settlement. Differential post-construction settlement should be less than 1/4 inch over 40 feet.
9	Is there an Asbestos and Lead Inspection Report for the Moorpark City Library project?	01	06/23/25	No. City to complete testing and abatement prior to Contractor's demolition of Existing library.
10	•Please confirm DMP will be required for the intrusion detection system, as is installed at City Hall. •Please advise manufacturer and model numbers required for access control system. I am not aware of what is existing at City Hall, but understand the city would like the same system	01	06/23/25	Intrusion Detection System device locations are pathway rough in only. City of Moorpark security integrator to install security alarm system. Access Control System shall be Paxton Net2 Plus. -Door Controller - Paxton Net2 Plus 1-door access control unit PN# 682-493-US -Reader - Paxton Net2 Proximity Readers PN# 38400-130-US -Software – Paxton Net2 Pro PN# 930-010-US on contractor provided ACAMS Server.
11	On Plan Page C-5 (Grading Plan) there is no existing elevations overlaid on the plans where the work is to be done, can you please have them inserted so that a proper take-off can be achieved. Please Clarify.	01	06/23/25	To provide grading plan clarity the existing condition has been frozen from plan sheet C5. Please reference the Existing Conditions Plan sheet C3 which documents the existing condition. This plan may be overlaid on the grading plan for takeoff purposes.
12	I was wondering if you had any insight on what Building/Energy Management System is currently used throughout the city of Moorpark.			City of Moorpark confirmed there is not a City standard, therefore refer to Spec Section 23 09 23 for acceptable options.
13	For the "Brick Paver Step Out" (Detail 15/L5.01) is the layout to be as shown below:	01	06/23/25	Yes, that is the layout.
				
14	For detail 15/L5.01, are the paver joints to be sand filled (Call out # 5) our mortar fill (Note A)?	01	06/23/25	Provide mortared joints.
15	For the Truncated Dome Tiles, Detail 9/L5.01 calls for these to be mortar set but specification 32 14 13 - 2.3D calls for these to be sand set. Which one should be followed?	01	06/23/25	Mortar set.
16	Is there any additional information on the "Donation Brick Pavers" as called out on sheet L1.02 and Detail 11/L5.01 - Note F?	01	06/23/25	Donation bricks per City. No additional information available at this time.
17	Request: It appears that the scale is incorrect on the Irrigation pages when compared to the Planting pages and A0.20 Site plan. Please confirm the Irrigation plan scale should be 1"=10'-0" Contractor’s suggested response or solution: Instead of 1/16" = 1'-0" it appears that the scale should be 1" = 10'-0"	01	06/23/25	Irrigation plan scale is 1”=10’.
18	Can you please confirm the liquidated damages for the above referenced project as there is conflicting information in the documents? The contract documents state “the sum of one thousand dollars ($250.00) per each calendar day”. Please advise.	01	06/23/25	The correct liquidated damages for this project are $250.00 (Two-Hundred Fifty Dollars) per calendar day.
19	Page 3 of Notice to Bidders indicates for contractor to sel-peform 25% of the work. Can this requirements be eliminated or reduce?	01	06/23/25	This requirement has already been reduced to 25% no additional reduction will be considered..

Pre-Bid RFI #	Question	Addendum No.	Addendum Issue Date	Response
20	The bid documents indicate for the GC to comply with HUD Section 3 requirements. Is this a goal or is there a certain porcentage that the GC have to meet?	01	06/23/25	Please review Exhibit N, Section VII for Section3 Contract Compliance Requirements, Attachment A for Section 3 has the labor hour Benchmarks. The referenced Section also provides info on what happens when Section 3 Benchmarks are not met.
21	Please confirm this project is NOT subject to PLA, PSA or trained skilled labor requirements.	01	06/23/25	There are no PLA, PSA or Skilled and Trained Workforce requirements for this project. It is subject to the Prevailing Wage Laws of the state of California. Labor Code 1720-1861

SECTION 042616 - ADHERED MASONRY VENEER

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thin Brick.

B. Mortar and Grout.

C. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 040100 - Maintenance of Masonry.

B. Section 079200 - Joint Sealants: Sealing control and expansion joints.

C. Section 092236 - Lath: Metal furring and lathing for plaster.

1.3 REFERENCE STANDARDS

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for thin brick units, mortar, grout, and adhesive.

C. Samples: Submit two samples of thin brick units to illustrate color, texture, and extremes of color range.

D. Manufacturer's Certificate: Certify that thin brick units, adhesives, mortar, and grout meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

1.6 MOCK-UP

A. Construct a mock-up panel sized 6 feet long by 4 feet high; include mortar, grout, adhesives, accessories, and substrate in mock-up.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

B. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.8 FIELD CONDITIONS

A. Do not install adhesives in an unventilated environment.

B. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

C. Maintain materials and surrounding air temperature to minimum 40 F prior to, during, and 48 hours after completion of masonry work.

D. Maintain materials and surrounding air temperature to maximum 90 F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 ACCESSORIES

A. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

B. Sealant: Rainguard Micro-sealer with Vanguard ISO Free aliphatic urethane anti-graffiti coating

2.2 THIN BRICK PANEL SYSTEM

A. Thin Brick Panel System with Mesh Backing: Thin brick factory-mounted and -aligned on mesh sheets.
   1. Brick: Belcrest 760
   2. Adhesive: Manufacturer's recommended type.
   3. Grout: Manufacturer's recommended type.
      a. Color: VP Joint Black 250
   4. Joints: 1/4" Concave
   5. Caulk Joints: Sealant type and location recommended by manufacturer.
   6. Manufacturers:
      a. The Belden Brick Company; www.beldenbrick.com#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive thin brick veneer.

3.2 INSTALLATION

A. Exterior Applications: Comply with TCNA (HB) Method W201, W202, or W244E.

B. Thin Brick Panel System: Install according to manufacturer's written instructions.

3.3 CONTROL AND EXPANSION JOINTS

A. Form joints as detailed on drawings.

3.4 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

3.5 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

3.6 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION 042616

SECTION 27 10 00 – STRUCTURED CABLING SYSTEM

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. This section shall define the Moorpark City Library (hereinafter referred to as Owner), Access Control and Alarm Monitoring system (ACAMS) system design standards and installation criteria.

1.2 RELATED WORK NOT IN THIS SECTION

A. General and specific provisions of these standards apply to the work detailed in this Section, as well as:
   1. Electrical (Division 26)
   2. Digital Video Management System (Section 28 30 00)

1.3 DESCRIPTION

A. Furnish, install, and test a complete and functional communications infrastructure system to provide voice, and datacommunications.

B. J-hooks, boxes, and supporting hardware needed for pathway systems.

C. Furnish and install station cabling, faceplates, and jacks for connectivity of voice/data systems and other IP devices.

D. Furnish and install all racks, equipment grounding to bus bars, and other hardware needed to fully configure the MDF/IT Server Rm./Radio Rm., and Telecommunications Cross connects / IDFs in this Section and shown on the Drawings.

E. Completely label and test all telecommunication cables, provide test documentation, and as-built drawings..

F. Furnish and install new 24s OS2 Single mode fiber from the new Library MDF to the City of Moorpark Community Center Video Room via underground conduit infrastructure shown on drawings.

1.4 SUBMITTAL

A. Prior to ordering any material, provide six (6) copies of complete brochure information on all products for installation on this project. All brochures and specification sheets shall be bound within a three-ring loose leaf binder and organized in the same manner as the products portion of the specifications. If more than one product is listed on the same page of the brochure or specification sheet submitted, the intended product or part

number shall be clearly indicated or highlighted by the Contractor.

B. Contractor shall submit along with the materials submittal all Proposed Test Procedures and a sample of the printout or test result form as well as a list of all Test Equipment to be used for cable testing. Within two (2) weeks of completion of testing all cabling systems, Contractor shall submit two (2) copies of the test results as directed in the Testing portion of the Specifications.

C. Contractor to submit pre-construction commissioning checklist for manufacturer's startup and testing.

D. Contractor to provide proposed test procedure for review / approval not later than by 2-weeks prior to testing.

1.5 QUALITY ASSURANCE

A. Standards: The contractor will furnish without extra charge any additional material and labor which may be required for compliance with these laws, rules, and regulations, even though the work is not mentioned in these particular specifications.
   1. The cable system shall meet the standards set forth in the American National Standards Institute / Electric Industries Association / Telecommunications Industry Association recommended standards EIA/TIA-568-B, -569, -607, and EIA/TIA-TSB 67, 72; EIA/TIA Technical Specification Bulletin 40 for Category 6A wire specifications.
   2. All cable installed under this specification shall be Underwriters' Laboratories (UL) listed and certified to pass the appropriate UL test for cable designated for installation in plenum and riserspaces.

B. The telecommunication cable system shall conform to all applicable local codes and applicable sections of the National Electric Code, NFPA-70-2010.

C. Fire stopping shall be in accordance with ASTM E 814, ASTM E 136, and UL 1479 as well as Section 300-21 of the National Electric Code.

D. Other applicable standards. ANSI C2-2010 National Electric Safety Code. UL 497 Electrical Groundingand Bonding Equipment.
   1. IEEE 802.3 Carrier Sense Multiple Access With Collision Detection.
   2. FCC Rules and Regulations, Part68.
   3. Basic, Uniform, and Standard Building Codes (BOCA, ICBO, SSBC).
   4. REA Cable Designations - PE Series Specifications
   5. NFPA 101 - Life Safety Code

E. Conditions: Materials and equipment provided must be new products of manufacturers regularly engaged in the production of such products.

F. UL Listing: Products must be UL listed where a UL test procedure is applicable.

G. Telephone system materials and equipment shall be FCC Type-accepted and certified as such by supplier.

H. Qualifications: The category 6A and fiber cable system required for this project is a Leviton/Berk-Tek structured wiring system. The contractor must be a Leviton Certified Cable System Contractor with a minimum "Leviton Installation Partner (LIP)" status, from the Southern CA. region as specified by Leviton Corporation. The "LIP" certification must be in place 45 days prior to bid. The company must have a minimum of three (3) years of experience in low voltage installations for voice, and data cabling systems. All personnel performing work on this project must have gone through the Leviton LIP training program as required by Leviton prior to performance of work.

I. Warranty: Contractor shall provide a Lifetime Manufacturer's warranty covering workmanship and compliance with manufacturer's specifications for category 6A, & Indoor Fiber cable systems. All repair, including labor and material, shall be made at no cost to City of Moorpark during the warranty period. All warranties shall be provided in writing to City of Moorpark prior to acceptance of the cabling system.

J. Contractor shall have the manufacturer's representative provide periodic inspections of the cable system during the installation phase. Inspections will occur:
   1. After termination of jacks and before wall plates are installed.
   2. After termination of Patch Panels.
   3. After termination of fiber cable.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials in manufacturer's standard protective packaging.

B. Do not remove protective packaging until ready for installation.

C. Follow manufacturer's instructions for storage & handling.

1.7 CONTRACT DRAWINGS AND SPECIFICATIONS

A. The intent of the drawings and specifications is to establish the type of system and functions, but not to set forth each item essential to the functioning of the system. The drawings are generally diagrammatic and show approximate location and extent of work. In case of doubt of work intended, it is the responsibility of the Contractor to request instructions from the Engineer or Owner prior to bid. The Contractor shall be responsible for installing a complete functioning system.

B. Contractor shall review all drawings and specifications before starting the work. Where discrepancies occur, Contractor shall immediately notify Engineer for clarification.

1.8 RECORD DRAWINGS

A. All drawings shall be submitted in hard copy with all field changes and contractor

labeling indicated in red line updates. Upon completion of the project, Contractor shall deliver to Owner documentation of the project to include:

1. As-built telecommunications floor plans of the facility with cable, outlet placement and full labels clearly depicted.
2. As-built elevations of all termination fields describing cable and outlet location labeling scheme, and any changes to the wall elevations and conduit placements in the IT rooms will be recorded on as-built drawings
3. As-built logical riser diagram describing connectivity and cable sizes, for copper, fiber and grounding cabling systems. Diagram shall include as-built labeling of all OSP and rise cables.

B. Cable test results shall be submitted in hard copy and magnetic format along with viewing software from the tester manufacturer. Hard copy to be bound within loose leaf binder and organized by serving MDF or IDF, room number of outlet location, and station identifier.

PART 2 - PRODUCTS

2.1 HORIZONTAL STATION CABLES

A. Category 6A Twisted Pair Voice and Data Cable
   1. Conductors-24 AWG solid bare annealed copper.
   2. Insulation-Riser
   3. Pairing-Varying pair lays
   4. Color Code-Standard Blue, Orange, Green, & Brown Pairings
   5. Jacket-Riser Sequential footage markers
   6. Compliances:
      a. ISO/IEC 11801
      b. ANSI/TIA/EIA 568-B.2 (July2002)
      c. UL Listed Type MPP/CMP,MPR/CMR
   7. Category 6A cables shall have a white cable jacket for all outlets.
   8. Acceptable Manufacturers: Category 6A, Superior Essex NextGain :
      a. Data Cable (white)
      b. Security (Yellow)
      c. Other Bldg. Systems (Green)

2.2 FIBER OPTIC CABLES

A. OSP Fiber Optic Backbone Cabling
   1. The approved fiber optic cable shall have the following features:
      a. Cable shall be indoor/outdoor rated jacket.
      b. Cable shall be constructed using a Tight Buffer design
      c. Cable will maintain the following:

1) Compliance: TIA/EIA-568-C.3 and ICEA S-87-Functional Requirements: GR-20-CORE and GR-409-
2) Min Bend Radius:
3) Long Term - No Load = 10x Cable diameter
4) Short Term – Load = 15x Cable diameter
5) Operating Temp. = -0°C to +70°C
6) Storage Temp. = -40°C to +70°C

2. The site fiber shall be a Singlemode OS2, 8/125, 48 strand loose tube, all dielectric, OSP cable.
3. All OSP fiber shall be loose tube, all dielectric, outdoor cable.
4. The fiber cable must comply with the following minimum transmission parameters:

Max Attenuation		**Bandwidth**	
Multimode OM4 (50/125 10G/150)			
850 nm	1300 nm	850 nm	1300 nm
3.5 dB/km	1.5 dB/km	220 MHZ km	600 MHZ km

Max Attenuation		**Bandwidth**	
Singlemode (Reduced Water Peak)			
1310 nm	1550 nm	1310 nm	1550 nm
.4 dB/km	.3 dB/km	220 MHZ km	600 MHZ km

5. All multimode and Singlemode fiber shall be terminated with LC fiber connectors and placed in separate patch panels.
   a. Cable shall be constructed of 50/125µ OM4 Multimode Laser Optimized rated glass and 9/125µ OM2 single mode glass.
   b. The site fiber shall be a Singlemode 8/125, 48 strand loose tube, all dielectric, OSP cable.
   c. All OSP fiber shall be loose tube, all dielectric, outdoor cable.
6. All multimode and Singlemode fiber shall be terminated with LC fiber connectors and placed in separate patch panels.
7. Acceptable Fiber Termination patch panels are
   a. Leviton: #5R730 w/LC Mounting Plates #
   b. Leviton: #5P330-0AB.Use Zirconia Ceramic Sleeves.
8. Acceptable Manufacturers of fiber cable are Superior Essex:
   a. Multimode OSP #120126D0P
   b. Singlemode OSP #120123D8

2.3 PATCH CABLES & TERMINATION HARDWARE

A. Data Patch Cables
   1. Factory assembled and tested 8 position / 8 conductor (8P/8C) UL-rated Category 6A 4-pair copper patch cords shall be provided by the Contractor. Quantity of patch

cables shall be determined from data jack tabulations shown on the drawings. Sufficient quantities of patch cables shall be provided to allow the Owner:

a. To activate the number of data terminals at each station location shown on the drawings, and
b. To provide patching between each patch panel port to be activated at move- in and the network equipment.

B. Work station patch cables shall be provided in one length such that the cables can be routed from data outlet to workstation device with sufficient slack for moderate workstation device movement.

C. IDF patch cables shall be provided in various lengths, such that the cables can be routed within the cable management hardware without crossing any other patch panel unnecessarily and to allow easy connection at each end, with minimal additional cable requiring storage within the cable management hardware.
   1. Patch/Interconnect cables shall be as follows:
      a. Blue – workstation patch cords – 10'
      b. Blue – TC patch cords – 5' & 7'
   2. Patch cords shall be rated category 6a as manufactured by Leviton Extreme 6 products.
      a. IDF Patch Cord, 5 ft.: – Provide quantity to match 50% of the Data cables installed (example: 100 cables installed, 50 patch cables provided).
      b. IDF Patch Cord, 7 ft.:– Provide quantity to match 50% of the Data cables installed (example: 100 cables installed, 50 patch cables provided).
      c. Station Patch Cord, 10 ft.:– Provide quantity to match 100% of the Data cables installed (example: 100 cables installed, 100 patch cables provided).

D. Grounding Conductors
   1. Bare stranded copper ground conductors shall be provided and installed by the Contractor as shown on the project drawings to provide a grounding system consistent with the 2002 National Electric Code as well as EIA/TIA 607.
   2. Ground conductors shall be minimum 0 AWG between TC Closets, and the Building Service Ground point and minimum 6 AWG between hardware components located within the MDF & IDF closets.
   3. All cable runway shall be bonded together, and bonded to the ground bus bar.
   4. Each equipment rack shall be bonded independently to the ground bus bar.
   5. Each connection to cable runway, and equipment racks shall be to bare metal. Paint shall be scraped away, exposing bare metal.
   6. Ground Lugs shall utilize 2 screw holes to hold lug in place.

E. Copper Patch Panels
   1. Work Station: Equipment rack-mounted 48-port, patch panels shall be provided and installed as indicated on the accompanying project plans. Patch panels shall be rated Category 6A compliant (per EIA/TIA TSB-40) and shall utilize 8P/8C style non-keyed jacks with T568B pinout assignments and 110 style termination.
      a. Acceptable Manufacturers: Leviton Extreme 6+ #69586-U48

2. Telephone Panels: Equipment rack-mounted 48-port patch panels shall be provided and installed as indicated on the accompanying project plans. Patch panels shall be rated Category 6A compliant (per EIA/TIA 568) and shall utilize 8P/8C style non-keyed jacks with T568B pinout assignments and 110 style termination.
   a. Acceptable Manufacturers: Leviton #5G596-C48

F. 110-Style Termination/Wiring and Connecting Blocks
1. 110 Style termination/wiring blocks for cross connecting between voice station and riser cables shall be provided and installed as shown on the project plans.
   a. 110 blocks shall be wall-mountable and manufactured with standoff legs to allow cables to pass behind. All required connecting blocks (4-pair and 5-pair), and labeling strips shall be included.
2. Connecting Blocks shall be Category 6A for all voice station cable installed.
3. Acceptable Manufacturers: Cross-connects and wall terminations blocks will be:
   a. Leviton
   b. Station: 110 blocks, 100 pair-#41AB6-1F4
   c. Station: C-4 Connecting blocks-#69104-IDC
   d. Riser: 110 blocks, 300 pair-#41AW2-100.

2.4 FIBER OPTIC TERMINATION HARDWARE

A. Fiber Termination Shelves, Singlemode and Multimode
1. Fiber shelves shall provide for current and future fiber. Outside singlemode fiber shall be fusion spliced to pre-terminated fiber pigtails. Riser tight buffered fiber shall be direct connected with LC connectors.
2. Manufacturer: Leviton Corporation
3. Singlemode Fiber Hardware, (Includes Termination Shelf, Adapter Plates, Splice Trays, LC Pigtails, Cable Clamp and Mounting Ears)
   a. 2U fiber panel (OSP fiber cable)
   b. Part #2OPTX-02AJD01NY19N
4. Multimode Fiber Hardware, (Includes Termination Shelf, Adapter Plates, Cable clamp and Mounting Ears)
   a. 1U fiber panel (Riser fiber cable)
   b. Part #1OPTX-02BBNNCY19N

B. Fiber Connectors, Multimode SC, Field Installed
1. Manufacturer: Leviton
2. SC Fast Cure Connector #49990-MSC (Beige)

2.5 TELECOMMUNICATIONS WORKSTATION OUTLETS

A. Universal Data outlets will be of modular design. Each outlet shall be configured with Modular 8-Pin jacks wired to the T568B pin assignment sequence.

B. All outlet jacks will be rated for category 6A systems. All jacks will be White.

C. Acceptable Manufacturers: Leviton Extreme 6A jack #6110G-RW6

D. All AP outlet jacks will be rated for category 6A systems. AP jacks will be Green.

E. Acceptable Manufacturers: Leviton Extreme 6A jack #6110G-RG6.

F. All Security outlet jacks will be rated for category 6A systems. AP jacks will be Yellow.

G. Acceptable Manufacturers: Leviton Extreme 6A jack #6110G-RY6.

H. All single gang wall plates will have ID windows, match the color of the electrical cover plates and have a minimum of 4 ports. Leviton #42080-XXX

I. All wall phone outlets shall be recessed stainless steel single gang plates.
   1. Leviton #4108W-1SP

2.6 CABLE SUPPORT HARDWARE AND MISCELLANEOUS MOUNTING EQUIPMENT

A. Miscellaneous Equipment shall be provided and installed by the Contractor as described below and on the drawings. Mounting hardware and accessories typically required to provide a complete and working installation but not listed in these specifications shall be provided and installed by the Contractor.

B. Backboard Cable Management shall be provided and placed by Contractor on all telecommunications backboards to provide effective routing of all telecommunications cabling. Contractor shall utilize D-rings, wire distribution spools, and cable clamps as required for a neat and organized installation.

C. J-hook Assemblies: Contractor is responsible for maintaining the maximum fill guidelines and spacing requirements as shown on the accompanying project plans. Contractor shall provide and install additional J-hook assemblies as required to meet these requirements.
   1. J-hook horizontal cable supporting hardware shall be UL listed. The J-hook(s) shall provide a broad base for proper cable support, thereby reducing stress and bending of cabling.
      a. Contractor shall attach appropriate J-hook fasteners for wall, stud, beam, or flange mounting to the supporting structure. Fasteners shall be spaced a maximum of 5’ apart, and no more than 4’ from the final outlet destination or turn point as shown on the accompanying project drawings.
      b. Acceptable Product: Caddy CableCat Clips, B-Line and required supporting hardware, or approved equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Contractor shall give notice to all agencies requiring advance notification and comply

with all regulations specified by all governing agencies having jurisdiction over the performance of the work.

B. Contractor shall coordinate with and abide by the construction schedule and sequencing as dictated by the General Contractor on the project. Storage and staging areas within the job site shall be as dictated by the General Contractor.

C. The owner shall provide and pay all permits.

D. The contractor shall provide all labor, materials, equipment, tools, utilities and services necessary for the proper execution and completion of the telecommunications cabling system.

3.2 INSTALLATION METHODS

A. Contractor is required to adhere to the following parameters whether or not Contractor and/or others have placed existing equipment. Contractor will notify the owner of any of the following requirements that cannot be met prior to bid or ordering of materials.

B. General: Install an infrastructure cabling system as detailed by the contract drawings, details, and specifications.

C. The maximum length of horizontal cabling from nearest closet to an outlet shall not exceed 295 feet as per EIA/TIA 568. Contractor will notify The owner prior to commencement of any installation not meeting the 295-foot maximum distance limitation.

D. Contractor will place all station cables in the ceiling area on Contractor supplied and installed wire hangers or in floor spaces and raceways. Contractor also will assess whether or not the ceiling space is a plenum air return, which shall dictate the use of the listed plenum type, or PVC type cable required in the materials specification section. The cables will be routed to the TC located on the first floor, utilizing cable tray. Station cables must be strapped every 5 feet with tie straps in J-Hooks provided by the Contractor; strapping to any other wires (e.g., lighting, ceiling grid, etc.) is not permitted. Cable splicing at any point of a station cable is unacceptable. When cables are routed in non-ceiling spaces, such as below raised flooring, the Contractor will still assess whether or not the space is a plenum air return and pull the appropriate cable type.

E. In hard wall (wallboard) or V wall type construction where accessible, Contractor will install a wall board adapter or equivalent, which will support mounting of the faceplate necessary for the jacks. This will eliminate the need for an electrical box (in-wall junction box) to accommodate the communications outlet.

F. Cables will be run vertically in dedicated EMT conduit inside the wall and into the ceiling space. Once in the ceiling space, the cable will be routed to the closest cable tray. Cables shall be routed to their closest TC utilizing the shortest path possible, while still following EIA/TIA standard guidelines. Station cables outside of cable tray must be strapped to tie wires with J-Hooks every 5 feet provided by Contractor; strapping to any

other wires (e.g., lighting, ceiling grid, etc.) is not permitted.

G. In areas where modular furniture is installed or in areas where office furniture is in an open office space, telecommunications cabling access will either be through the floor or from the ceiling.

H. Where the cable access is from a duct under the floor, the Contractor will provide and install mounting hardware inside the floor box that will support the outlets.

I. The Contractor will provide and install a plastic spiral wrap device or metal flexible conduit to the cable channel in the furniture or to a surface mount box located at each work station. The Contractor shall coordinate with the owner, the exact location of each cable termination andjack location.

J. UTP cabling must conform to a 6-foot separation requirement from main power panels, switch gearand/or starter motors.

K. All power feeds crossing the path of the UTP cables at right angles must be a minimum of 6 inches in distance from the UTP cables.

L. Cables shall be run cable tray in corridors wherever possible in order to avoid furniture and work areas so that access to the cables is unencumbered.

M. The cables shall be placed at a minimum of 6 inches above the ceiling.

N. The cables are to be run so as to maximize accessibility. Contractor will notify the owner in the event this requirement cannot be met.

O. Debris, boxes, leftover cables, and trash must be removed from construction sites upon completion of work. No debris or work material may be left in areas that have student access unless the affected area is marked with cones, tape, or temporary fencing.

P. Contractor shall pull conductors together where more than one is being installed in a raceway. Cable bundles in raceways, in suspension systems, or on wallboards must be tie wrapped every 5 feet. There must be an independent system supporting the cable system. Cable bundles tied to the lighting-ceiling grid will not be permitted. Station wire cannot be attached to electrical conduit, gas or sprinkler piping, or other code-restricted items.

Q. No cabling is allowed to rest on any ceiling tile or suspension system. Cable shall be kept 30 inches away from any heat source; i.e., steam valves, etc.

R. Cables shall be pulled free of sharp bends or kinks, twists, or impact damage to the sheath.

S. Cables shall not be pulled across sharp edges. Cables shall not be forced or jammed between metal parts, assemblies,etc.

T. Cables shall not be pulled across access doors and pull box covers. Access to all

equipment and systems must be maintained.

U. Cables shall be protected from paint and any other chemicals during installation. Any paint or chemicals that adhere to the installed cable shall be cleaned from the cable per manufacturers requirements.. The cable manufacturer and the design consultant shall be notified.

V. Insulation shall be removed to expose shielding and conductors to the exact length required by manufacturer for proper termination of plugs and pins. Plugs and pins, upon termination, shall not be damaged in any way.

W. All communications racks must be properly anchored to walls and floors and grounded to building ground grid (not to water pipes, etc.).

X. Cable splicing will not be permitted in any horizontal cable run.

Y. Contractor shall install system using tools and equipment specifically designed for the installation tasks. Use installation practices that ensure the highest quality installation. Perform all cutting, splicing, pulling and termination of cables using equipment specifically designed for each purpose.

Z. Install tie wraps using a tension controlling cutting device. Tension shall not exceed that which is specified by the manufacturer of the cable. Tie wraps and other securing hardware shall be rated as required for the installation environment.

AA. Where multiple conduits are being used, fill one conduit to its maximum fill ratio before going onto the next conduit. Wherever possible, leave as many spare conduits available as possible.

BB. All cables requiring lubrication for installation in conduits shall be continuously lubricated during the pulling-in process. Maximum pulling tensions specified by the cable manufacturer shall not be exceeded. Monitor cable-pulling tension with a mechanical tension-indicator.

CC. CC.All new conduit will not exceed a 40% fill rate. All spare conduits or conduits filled with less than the maximum allowed fill ratio shall have a pull string installed and left for future installation of cable. Clearly label as "pulling line" indicating To/From.

DD. DD.Support cables running overhead that are not installed in raceways by bridle rings or J-Hooks spaced every 5 feet.

EE. Install the telecommunication cabling system as detailed in the contract drawings in the exact location and layout shown in the details.

FF. Openings around electrical raceway penetrations shall maintain the fire resistance rating required. See NEC 300-21.

1. GG. Label all cables at both ends. The label shall be permanent. Labels shall be typed (not handwritten) and individual number strips are unacceptable. An acceptable labeling product is a self-laminating cable marker, such as Brady #DAT-9-292-series.

All cable labeling shall include numeric designation, source, destination, and cable type.

2. HH. All outlet plates shall be installed neatly and square with floor and walls.
3. II. Category 6A installations shall conform strictly with EIA/TIA 568B and TSB-40B to insure a quality system that meets the transmission rate criteria.

3.3 FIBER OPTIC CABLE SYSTEM

A. The fiber optic raceway system must be continuous between pull boxes and junction boxes. The raceway system must enter and be secured to enclosures.

B. All fiber supplied to the PROJECT must be tested with an OTDR, Microtest Certifiber, or equal prior to installation, while still on the shipping reel, using an optical time domain reflectometer (OTDR) or a 850/1300/1510 nm power meter and stabilized light source. The test results must be compared to the manufacturer's test results. A discrepancy of more than 1 dB on any fiber in either window indicates possible shipping damage and the fiber must be returned to the supplier.

C. All fiber must be tested after installation according to the procedures and acceptability criteria described in EIA/TIA 455A (Aug 1991) and all applicable addenda after installation and termination using an OTDR in one direction and an 850/1300 nm power meter and stabilized light source in both directions and in both optical windows. The results of these tests (printed OTDR results and tabular loss results) must be provided by the installer as documentation of the quality of installation and as a baseline for future troubleshooting. The results must be compared to the pre- installation test results for significant changes.

D. All optical test equipment must have current, traceable calibration certification.

E. All spare optical ports and connectors should have a dust cap in place to protect the cable from the environment.

F. Manufacturer's specification for pulling stress and minimum bend radius must not be exceeded on any fiber cable.

G. Installation contractor must develop and review conduit installation plan with the owner before beginning installation.

H. Installation contractor must verify all device locations with the owner before installation.

I. Installation contractor must review cable numbering and labeling scheme with the owner prior to installation.

J. Installation contractor must review drawing notes and drawing back-annotations (red line) on site plans with the owner prior to installation.

K. Fiber Optics Cable Labeling: Fiber termination locations must be labeled to

corresponding fiber strands pairs at the Main Cross-connect (MC), Intermediate Cross-connect (IC), and the Telecommunications closet (TC). Use embossed labels. The Contractor is expected to provide tags, straps, and adhesive labels. These tags, straps, and adhesive labels must be of high quality that will endure over time. Hand written labels are notacceptable.

L. All outside fiber cable will be installed through 1.25" innerduct from point of origin and destination.

M. Securely fasten the fiber optics raceway to the cable tray, or walls when routed inside buildings, using clamps and clips designed for this purpose.

N. Provide a nylon or polyethylene pulling line in all fiber optics raceways. Clearly label as "pulling line", indicating source and destination.

O. Openings around fiber optics raceway penetrations shall maintain the fire resistance rating required. See NEC 300-21.

P. All fiber optics cables are to be run as efficiently as possible, minimizing the amount of cable required.

Q. All fiber optics cables shall be continuously lubricated during the pulling-in process. The maximum pulling tensions specified by the cable manufacturers shall not be exceeded. Monitor cable pulling tension with a mechanical tension meter.

R. The fiber optics cables passing through pullboxes and manholes shall be neatly arranged and secured to cable jacks on the interior walls. Cables will not be accepted when diving through the manhole or pullbox.

S. As fiber optics cables emerge from intermediate-point pull boxes, coil the cable in a figure eight pattern with loops not less than two feet in diameter.

T. Label all fiber optic cables at both ends. The label shall be permanent. Labels shall be typed (not handwritten) and individual number strips are unacceptable. All cable labeling shall include numeric designation, source, destination, and cable type.

U. Fiber optics raceways shall be clearly marked at each pull box indicating type and number of cables within.

V. If connectors have been factory installed on fiber optic cables, protect the connector during the pulling-in by wrapping with a thin layer of foam and insert in a stiff plastic sleeve for protection.

3.4 OUTSIDE PLANT INSTALLATION

A. The following specifications will be adhered to when splicing copper cable runs. These specifications and standards apply for all splicing situations, including:
   1. Manhole Splices and Splice Cases

2. NEMA Enclosure Splices and Splice Cases
3. MC/IC Splices and Splice Cases
4. MC/IC Electrical Protection Splices

B. The Contractor will splice all the cable pairs within each cable sheath using AT&T 710-SC1-25 Splice Modules, including cable pairs that will not be connected at this time. All splices shall be secured in a splice case using a preformed splice case. All splices and the installation of the splice case shall be in accordance with the manufacturer's specifications and GTE Practice, Section 632, ensuring a watertight seal. The Contractor will bond the cable's metallic sheath/shield to the metallic splice case with the bonding bar assembly provided with the splice case. No filling compound is to be used in the splice enclosures; therefore the Contractor must take special care while assembling the case.

C. All copper cables passing through a manhole or pullbox will be dressed neatly to the inside walls with “L” brackets designed for securing cable in manholes and pullbox’s. Cable that is not secured and routed properly will be removed and redone at no expense to the owner.

3.5 GROUNDING

A. Grounding shall be accomplished by common single-point termination of all ground conductors.

B. All metallic components of the infrastructure system shall be solidly grounded by the shortest possible route.

C. Manhole Splices and Splice Cases - the Contractor will connect the splice case to the manhole ground as per GTE practice 605-100-201 using a #6 AWG solid copper wire.

D. NEMA Enclosure splices and Splice Cases - the splice case must be grounded to the provided ground lug in the existing NEMA box with a minimum #6 AWG wire.

E. MC/IC Splices and Splice Cases - the splice case must be grounded to the provided ground bar in the Voice/Data Equipment Room with a minimum #6 AWG wire.

F. MC/IC Electrical Protection Splices - the Contractor must bond the cable's metallic sheath/shield to the metallic splice case with the bonding bar assembly provided with the splice case.

G. Labeling: The splice case and all cables must be labeled using a stamped metal plate or indelible plastic plate, that The owner has approved, which details exact pair counts and destinations. Each 25-pair binder group, of each cable entering the splice case, must be labeled with a Panduit PAN-TY PLF1M-0 Flag with appropriate cable pair counts.

H. Conduit Sealing: The Contractor will supply and install all necessary components to effectively seal all conduits. The Contractor will use Semco part #PR-851 conduit sealing kit. The PR-851 compound is a two part polyurethane foam, which, when mixed for

fifteen seconds, expands approximately fifteen times in volume. It forms a dense, tough foam with a density of three to four pounds per cubic foot. The expanding nature of the compound allows it to fill cracks and voids in conduit walls, and imperfections in the cable sheath. This effectively seals the conduit against the passages of gases and water. For additional information, refer to GTE Practice 628- 020-203.

3.6 FIRE STOPPING

A. Clean surfaces to be in contact with fire stopping materials of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting or the required fire resistance.

B. Install fire stopping materials as indicated, in accordance with manufacturers instructions.

C. Seal all holes or voids made by penetrations to ensure an effective smoke barrier.

D. Unless protected from possible loading or traffic, install fire stopping materials in floors having void openings of 4 square inches or more to support the same floor load requirements.

E. A small amount of hydrogen gas is released as foam cures. Use forced air ventilation when installing if areas of installation have less than 2 cubic feet of free air for each pound of liquid mixture beingfoamed.

F. Examine fire stopped areas to ensure proper installation prior to concealing or enclosing fire stoppedareas.

G. Areas of work shall remain accessible until inspection (and approval) by the applicable code authorities.

3.7 CABLE LABELING

A. Refer to Attachment “A” for all labeling standards.

B. All cables shall be labeled, using the owners cable identification standard.

C. Intrabuilding Cable: All Intrabuilding cables will be labeled. Provide legible and indelible marking on all cables as indicated in the Drawings. Contractor shall ensure labeling of the cables during installation.

D. Raceways shall be clearly marked at each pull box indicating type and number of cables within.

3.8 SYSTEM TESTING

A. The Contractor shall be responsible for separately testing and documenting the cables and termination throughout the entire cabling system. Ensure that the cable and

equipment being installed in the system is without flaw and that no potential damage to the cable or equipment occurred in shipment, handling, or installation. The owner representative shall observe the testing of the installed cabling and terminations at any time during the testing process

B. Testing of all installed unshielded twisted pair telecommunications cabling shall be performed by the Contractor. Interim testing of the cabling system during and after installation is encouraged to ensure that the testing and acceptance criteria are met.

C. Acceptance of the Telecommunications Cabling System shall be based on the quality of Contractor performance by analysis/inspection of the testing program documentation and the conformance of the system operation with the criteria described herein. Contractor shall make available all drawings and documentation prior to acceptance testing.

D. Contractor shall provide all necessary testing equipment for performing the required acceptance test. Contractor shall verify the authenticity and display appropriate calibration data to include the expiration date of the correct calibration.

E. Testing methods are provided herein as reference for the Contractor. Test equipment, methods, and criteria shall comply with the guidelines set forth in EIA/TIA TSB - 67 - Transmission Performance Specifications for Field Testing of Unshielded Twisted Pair Cabling Systems where applicable.

F. Copper Cable Testing:
   1. Contractor shall perform final testing on the copper cable system to demonstrate the acceptability of the project as installed. Contractor shall perform and furnish documentation of the followingtests:
      a. Continuity of all conductors.
      b. Shorted conductors or pairs.
      c. Crossed pairs.
      d. Grounded conductors.
      e. Open conductors.
      f. Reversed pairs.
      g. Split pairs.
      h. NEXT performance.
      i. Length.
      j. Attenuation.
      k. AC voltage presence.
      l. Pin-assignment confirmation
   2. Results of the testing shall be furnished in printed format. All test documents shall be dated and signed by the personnel performing the testing. Hand-written test results are not acceptable. Test gear used for general testing shall be Tektronix TPS 100 Twisted Pair Cable Analyzer or approved similar device.
   3. All Category 6A wiring shall be tested to indicate a minimum of 350 Mbps transmission capability. Test results shall document each installed cable pair for

a. measured attenuation and Near End Cross Talk (NEXT). Category 6A testing shall utilize a Fluke 4000 Category 6A Scanner or approved similar device for performance validation. Category 6A End to End Link Performance shall be in accordance with the specification set forth in ANSI/TIA/EIA-568-A as well as meeting the documents' requirements for cabling length and topology, component performance and reliability, and installation practices.

4. Contractor shall be responsible for recording all test results. Copies of these test results shall be submitted to the owner for review prior to final acceptance of the copper cabling system.
5. The contractor shall perform all tests and adjustments, and shall furnish all test equipment necessary and perform all work required to determine or modify performance of the system in accordance with these specifications. The contractor will submit to the owner a complete test plan for Station Wiring/Information outlet (Voice, Data and Network), and Riser Cable to be used for this contract. At a minimum, the plan should show test configurations, calibration procedures, impedances, and measurement equipment. This plan must be approved by the owner prior to the start of testing. The test plan is a one-time requirement and will remain in effect for the duration of this contract unless specifications change requiring a re-submittal. The scope of this work includes, but is not limited to, the following:
   a. Testing of Category 6A cable shall meet EIA/TIA 568A Requirements.
   b. The vendor must utilize a check-off list for reference by the owner during tests.
   c. The result of the measurements outlined shall be recorded and submitted to the owner as final proof of system performance. Electronic results will be supplied in Fluke or equivalent format. If the owner requires specific software to view the results, the contractor will supply a copy of software to the owner.
6. All systems must pass Category 6A specifications and be accepted by the owner before the work will be considered complete.
7. Inter- and Intra-building tie cables: all tie cables will be tested for pass-fail connectivity ground continuity.

G. Fiber Cable Testing
1. Test all fiber with an OTDR, Microtest Certifiber or equal, prior to installation while fiber is still on the shipping reel, using an optical time domain reflectometer (OTDR) or a 850/1300/1510 nm power meter and stabilized light source. Compare test results to the manufacturer's tests. A discrepancy of more than 1 dB on any fiber in either window indicates possible shipping damage and the fiber must be returned to the supplier. Contractor shall keep test results on file for future reference.
2. Test all fiber after installation according to procedures and criteria described in EIA/TIA 455A and all applicable addenda after installation and termination using an OTDR in one direction and an 850/1300/1510nm power meter and stabilized light source in both directions and in both optical windows.
3. All optical test equipment must have current, traceable calibration certification.

H. Test Deliverables
1. Contractor shall submit a complete test plan for station and riser wiring. At a minimum, the plan should show test configurations, calibration procedures, and measurement equipment. The plan must be approved by the owner prior to the start

of testing.

2. Printed ODTR results and tabular loss results must be submitted by the Contractor as documentation of the quality of the installation and as a baseline for future troubleshooting. Compare results to pre-installation tests and document significant changes.
3. Cable test results shall be submitted in hard copy and magnetic format along with viewing software from the tester manufacturer. Hard copy to be bound within loose leaf binder and organized by serving MC or TC, room number of outlet location, and station identifier.
    a. Four (4) copies of the general Copper, Category 6A and Fiber ODTR results shall be submitted in a tabular, typewritten format at the completion of system testing. The test results must also be provided in a electronic file for future reference.

3.9 RECORD DRAWINGS

A. All drawings shall be submitted in hard copy with all field changes and contractor labeling indicated in red line updates. Upon completion of the project, Contractor shall deliver to Owner documentation of the project to include:
    1. As-built telecommunications floor plans of the facility with cable, outlet placement and full labels clearly depicted.
    2. As-built elevations of all termination fields describing cable and outlet location labeling scheme, and any changes to the wall elevations and conduit placements in the IT rooms will be recorded on as-built drawings
    3. As-built logical riser diagram describing connectivity and cable sizes, for copper, fiber and grounding cabling systems. Diagram shall include as-built labeling of all OSP and rise cables.

END OF SECTION

SECTION 27 41 00 - AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. This specification shall apply to all phases of Work hereinafter specified, shown on Drawings, or as required to provide a complete installation of Audiovisual Systems as shown in the plans and specifications for this Project. Work required under this specification, may not be limited to just the Audiovisual Systems (AVS) - refer to Architectural, Electrical, Structural, Landscape, Structural Cabling and Mechanical/Plumbing Drawings, as well as all other drawings applicable to this project, which designate the scope of work to be accomplished. It is the intent of the Drawings and Specifications for the Contractor to finalize design, provide and install a complete, fully operational, and tested system.

1. Work Included. Furnish labor, material, services and skilled supervision necessary for the construction, erection, installation, connections, testing, and adjustment of all AVS equipment specified herein, or shown or noted on Drawings, and its delivery to the Owner complete in all respects functional system ready for use.
    a. Equipment and materials as indicated on the audio-visual drawings.
    b. Extension rings where required to provide a flush mount surface for cover plate mounting on finished walls.
    c. Engraved nameplates on the equipment rack and any custom wall plates.
    d. Coordination of all millwork mounting of any AVS device with the Architect and millwork providers.
    e. Include work not usually shown or specified, but necessary for proper installation and operation of the system or piece of equipment.
    f. All conduits, device junction boxes, wall plates and floor boxes, not shown on the electrical drawings, but required to complete the audio-visual system installation.
    g. Installation of any specialty back boxes, including display backboxes, and speaker rough-in kits with j-boxes and flexible conduit connections.
    h. Installation of all backing or structural support for flat panel displays, projectors, projection screens, speakers, and other AVS equipment not shown elsewhere in these drawings and specification but required to complete the audio-visual system installation.
    i. Seismic and safety wires where required.
    j. Connection of AVS equipment to Fire Alarm shunt wiring as required to mute AV systems during fire alarm event.
    k. If not provided by others, Design, engineer and provide complete means of support, suspension, attachment and seismic restraint for all AVS equipment, including but not limited to, speakers, displays and projectors. (Hereinafter “support) of the Work of this Specification in accordance with local building codes and regulations. Contractor shall obtain the services of an engineer licensed to perform this work within the State of Jurisdiction it is to be performed.

2. The AVS Contractor Work shall include installation or connection of certain materials and equipment furnished by others. Verify installation details, installation and rough-in locations from the actual equipment or from the equipment shop drawings.
3. Audiovisual Systems are diagrammatic, and are intended to convey the scope of work, indicating intended general arrangement of equipment. Follow Drawings in laying out Work and verify spaces for installation of materials and equipment based on actual dimensions of equipment furnished.

B. All miscellaneous system components including, but not limited to, cables, speakers, signal converters, interface panels and components, termination equipment, patch panels, backboards, converters, digital matrix switchers, digital video extenders, controllers, digital signal processors, amplifiers, pre-amps, custom faceplates, mounting hardware, fasteners, racks, cabinets, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements. Verify functionality of all signal chains for proper operation.

1.2 QUALITY ASSURANCE

A. Design, manufacture, testing and method of installation of all apparatus and materials furnished under requirements of these specifications shall conform to latest publications or standard rules of the following:
1. AES - Audio Engineering Society
2. ANSI - American National Standards Institute
3. AVIXA - Audiovisual and Integrated Experience Association
4. BICSI - Building Industry Consulting Service International, Inc.
5. CEDIA - Custom Electronic Design and Installation Association
6. EIA - Electronic Industries Alliance
7. FCC - Federal Communications Commission
8. HDMI Licensing, LLC
9. IEEE - Institute of Electrical and Electronic Engineers
10. ISO - International Organization for Standardization
11. ITU -Telecommunication Standardization Sect
12. MPEG - Moving Picture Experts Group
13. NAB - National Association of Broadcasters
14. NEC - National Electrical Code
15. NEMA - National Electrical Manufacturers Association
16. NFPA - National Fire Protection Association
17. NSCA - National Systems Contractors Association
18. CALOSHA - Occupational Safety and Health Administration
19. SMPTE - Society of Motion Picture and Television Engineers
20. TIA - Telecommunications Industry Association
21. IBC - International Building Code

22. UL - Underwriters Laboratories Inc.
23. VESA - Video Electronics Standards Association
24. Local Authority Having Jurisdiction (AHJ) Published Standards and Codes

B. The contractor is required to obtain the latest revisions of these standards and provide the infrastructure which meets the most stringent implementation of these standards.

C. Perform Work in accordance with the National Electrical Code, applicable building ordinances, and other applicable codes, hereinafter referred to as the "Code." The Contractor shall comply with the Code including local amendments and interpretations without added cost to the Owner. Where Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply unless variance is approved.
   1. Comply with all requirements for permits, licenses, fees and codes. The Contractor, at Contractor's expense, shall obtain all permits, licenses, fees, special service costs, inspections and arrangements required for Work under this contract, unless otherwise specified.
   2. Comply with requirements of the applicable utility companies serving this Project. Make all arrangements with utility companies for proper coordination of Work.

1.3 GENERAL REQUIREMENTS

A. Warranty: Furnish a written guarantee for a period of (1) one-year from date of acceptance. Provide Phone Contact information for service personnel within twenty-four hours of call and for exchange of faulty equipment. This obligation is limited to exclude conditions of misuse.

B. The one-year warranty also includes any software installed on the system. After AVS certification and acceptance, source code changes and/or additional programming, whether requested by the Owner or performed by the Installing Contractor, shall be warranted by the Installing Contractor for a period of one (1) year, with the Installing Contractor responsible for the diagnosis and repair.

C. The Contractor shall provide an annual "Software Maintenance" contract for consideration. This shall cover all software provided as part of this system and/or written for this system and shall include both routine upgrades to applications and operating systems, as well as any modifications to software that may be required by any of the AVS equipment provided on the project. The Software Maintenance contract shall commence immediately after expiration of the warranty period and continue for three (3) years.

D. Wherever a discrepancy in quantity of equipment, cable, devices, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be fully responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to ensure complete and operable systems as required by the Owner and Engineer.

E. The Contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least 10 projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five years, and capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.

F. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.

G. All work shall be performed under the supervision of a company accredited by the AVS equipment manufacturer and such accreditation must be presented at the time of the bid.

H. The installing contractor shall be a factory authorized dealer / installer and warrantee station for the brand of equipment offered at the time of the bid and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment at time of bid. The installing contractor shall provide availability for spare set of all major parts for the system or have immediate access to replacement equipment.

I. All of the equipment in this specification shall be furnished and installed by Authorized Factory Installation technicians. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the installing contractor is the Authorized Installer and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they shall have a service representative assigned to this area for the life of the equipment.

J. All AV systems equipment supplied shall be listed by Underwriters Laboratories or Nationally Recognized Testing Laboratory. A copy of the listing card for the proposed system shall be included with the contractor's submittal. Any equipment submitted that is not NRTL-listed shall be subjected to on-site testing by AHJ-approved agency at the Contractor's sole cost. All expenses related to such testing, including any repairs or replacements caused by damage to the equipment shall be borne by the Contractor.

K. Personnel: Use adequate numbers of directly employed skilled technicians and installers who are thoroughly trained and experienced with the specified requirements and the methods needed for proper performance of the AV systems installation work specified herein. Use of temporary labor or sub-contracted labor shall not be allowed unless explicitly allowed elsewhere in this specification.

1. Designated Project Engineer: Provide a designated Project Engineer in responsible charge of the Design, CAD, In-House testing and on the on-site commissioning of the Project during all phases of the work of this specification. The Project Engineer shall hold a current InfoComm CTS-D along with all applicable AV equipment manufacturer certifications necessary to complete the work specified herein. The Project Engineer 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. All Certifications shall be held by the Project Engineer at the time of the bid and shall have at least five (5) years direct experience in similar work.

2. The Lead Technician shall have at least three (3) years direct experience in similar work. The AV technician assigned to this project shall be fully trained, qualified and carry valid and current industry certifications regarding the installation, operation and testing of audiovisual systems. At least one lead technician shall hold a current InfoComm CTS-I, with all applicable AV equipment manufacturer certifications necessary to complete the work specified herein shall be assigned as Lead Technician to the project. All Certifications shall be held by the Lead Technician at the time of bid.
3. Custom Control System Programmer: Provide Manufacturers Certifications as required for the equipment used on this project. Provide at least one (1) full time programmer on staff, capable of on-site custom programming of the custom remote-control system specified herein. Control System Programmer to hold the following certifications: InfoComm CTS-D, CTS-I or CTS along with Extron Control Professional (ECP) Certification, and Extron AV Associate certifications, or Crestron Master Programmer, at least Silver Level., or equivalent Certification from AMX, QSC Level 2. A programming Sub-Contractor may be used as long as the Programmer has the certifications as listed above. The AV Contractor shall take full responsibility to provide a properly programmed AV System.
4. Designated Project Manager: Provide Manufacturers Technician's Certifications as required for the equipment used on this project. Provide a designated Project Manager in responsible charge of the fabrication shop and on the Project Site during all phases of installation and testing of the work of this specification. The Project Manager shall hold current InfoComm CTS-D, CTS-I or CTS, and Extron AV Associate certifications or applicable and equivalent Certifications for Crestron or AMX, QSC Level 2 and 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.
5. Commissioning Personnel shall have a current AQAV Certified Quality Technician (CQT) certification in good standing and shall be capable of performing AV commissioning tests during staging and final commissioning of the system according to the AV 9000: Quality Management System for the Audio-Visual Technology Industry.

L. All the equipment in this specification shall be furnished and installed by the Authorized Factory Installer of the equipment with the most current software & firmware package available at the time of installation.

M. Software – Control System, DSP, and All Other Applicable Equipment
1. At the time of Owner Acceptance of the installation, all equipment shall include any and all updated software or hardware revisions including source code to allow the Owner to make alternations and modifications to AVS programming to include, but not limited to all custom programs for remote control system touch panels, control systems, Digital Signal Processors. The software developer shall retain intellectual property rights to the operation software. The Owner shall be granted a license in perpetuity for use. The following requirements shall apply:
   a. A written release shall be given by the Installing Contractor for all control programming done by the Installing Contractor's personnel or sub-contractors. The release shall acknowledge the Owner's ownership and right to modify programming directly, or to have the or to have the programming modified by

others on the Owner's behalf. The programming code provided must be the latest version. Provide a date in the code file name.

b. No program resident in a control system shall be overwritten until a back-up of the resident program is made or programming modified by others or the owners' behalf.

c. All source code changes must be fully documented.

d. At the completion of the project, (3) USB drives shall be supplied to the Owner with the written release that includes the program and source code for the system in an unencrypted format. All documentation, not residing in the code in Adobe PDF and Microsoft Office format. The programming code provided must be the latest version. Provide a date in the code file name.

N. Verifying Drawings and Job Conditions:

1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.

2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment(s) shall be made, and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

O. Operation, Control Programming and Touch Panels

1. It is imperative for the AV Contractor to interview the Owner's staff to gather and document the various operational modes including signal routing of the DSP-Control System, IP Video Systems, Device Control Requirements to ensure any controlled device is properly integrated into the Control system. Control via the QSC Touch Panels, Control Room Computer and other Existing System must be integrated as required.

1.4 WORK IN COOPERATION WITH OTHER TRADES

A. Examine the Drawings and Specifications and determine the work to be performed by the Architectural structural cabling, electrical, mechanical, structural, and other trades. Provide the type and amount of AVS materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all additional conduits, boxes and other devices for the required operation sequence of all AVS equipment.

B. Low voltage conduit, boxes and power provided by division 16 or 26000 contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver equipment until site conditions are adequate to receive work; protect items from weather while in transit.

B. On-Site Storage

1. The Contractor shall be responsible coordinate and maintain a secure storage space.

2. If this storage space is required to be on-site it shall be the Contractor's responsibility to coordinate the size and spatial requirements with the Owner.
3. The Contractor shall assume full responsibility for the storage space and all contents, unless otherwise indicated by the Owner.
4. The Contractor shall examine the site and the Programmatic Documents and review with the Owner the designated areas of access, delivery, and storage for the Contractor's use. The Contractor agrees that such areas are satisfactory and sufficient for their needs in the completion of their work and in conformance with the terms of this Contract.

C. Store materials indoors in ventilated areas with constant, but minimum, temperature of 60 degrees F and a maximum temperature of 90 degrees F and maximum relative humidity of 25% to 55%.

D. Protection from Damage
1. The Contractor shall provide all protection necessary to safeguard their work from damage by their operations and the operations of others. Unless the Contractor proves to the Owner’s satisfaction that the Work has been damaged by others, the Contractor shall promptly repair, adjust, and clean all defective installations and bear all associated costs.

1.6 RECORD DRAWINGS

A. Drawings of Record:
1. The Contractor shall provide and keep up to date, a complete record set of drawings. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without written direction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be used to denote all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.7 APPROVALS, EQUALS, SUBSTITUTIONS, ALTERNATIVES, NO KNOW EQUAL

A. Approvals: Where the words (or similar terms) “approved”, “approval”, “acceptable”, and “acceptance” are used, it shall be understood that acceptance by the Owner, Architect and Engineer are required.

B. Equal: Where the words (or similar terms) “equal”, “approved equal”, “equal to”, “or equal by”, “or equal” and “equivalent” are used, it shall be understood that these words are followed by the expression “in the opinion of the Owner, Architect, and Engineer.” For the purposes of specifying products, the above words shall indicate the same size, made of the same construction materials, manufactured with equivalent life expectancy, having the same aesthetic appearance/style (includes craftsmanship, physical attributes, color and finish), and the same performance.

C. Substitution: For the purposes of specifying products "substitution" shall refer to the submittal of a product not explicitly approved by the construction documents/specifications.

1. Substitutions of specified equipment shall be submitted and received by the Engineer ten (10) days prior to the bid date for review and written approval. Regulatory Agency approval for all substitutions shall be the sole responsibility of the Contractor. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letterform and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and samples, if requested, must be included in the submittal. ONLY PRE-BID APPROVED PRODUCTS, ISSUED VIA A FORMAL BID ADDENDUM TO ALL BIDDERS, WILL BE ALLOWED ON THE PROJECT. REGARDLESS OF THE APPROVAL ON ANY SUBSTITUTION, ALL BIDS SHALL BE BASED ON THE PRODUCTS EXACTLY AS SPECIFIED. PRICING FOR EACH APPROVED SUBSTITUTION SHALL BE INCLUDED IN THE BID SUBMITTAL AS A SEPARATE LINE ITEM.
2. If the Contractor proposes to substitute the specified speaker system(s), the Contractor shall be responsible to provide the Owner & Engineer with an AMFG Electronic and Acoustic System Evaluation and Response Analysis (EASERA) model depicting equal or better performance in both uniformity of direct field response and Speech Transmission Index (STI) as compared to the specified speaker system.
3. In the event that written authorization is given for a substitution after award of contract, the Contractor shall submit to the Engineer quotations from suppliers/distributors of both the specified and proposed equal material for price comparison, as well as a verification of delivery dates that conform to the project schedule.
4. In the event of cost reduction, the Owner shall be credited with 100 percent of the reduction, arranged by Change Order.
5. The Contractor warrants those substitutions proposed for specified items shall fully perform the functions required.

D. Alternates/Alternatives: For the purposes of specifying products, "alternatives/alternates" may be established to enable the Owner/Architect/Engineer to compare costs where alternative materials or methods might be used. An alternate price shall be submitted in addition to the base bid for consideration. If the alternate is deemed acceptable, written authorization will be issued.

E. No Known Equal: For the purposes of specifying products, "No Known Equal" shall mean that the Owner/Architect/Engineer is not aware of an equivalent product. The Contractor will need to submit a "Substitution" item, per the requirements listed above, if a different product is proposed to be utilized.

1.8 SHOP DRAWINGS/SUBMITTALS

A. Shop Drawings/Submittals shall be submitted within 20 working days of a notice to proceed, in digital sets accompanied by Letter of Transmittal, which shall give a list of

the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.

B. The Shop Drawings/Submittals submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Contractor has checked the Drawings. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.

C. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in the Contractor's letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment that may be caused by the substitution. Samples shall be submitted when requested.

D. Only products listed as "Equal" within the contract documents, along with formally approved "Substitutions" will be reviewed. Products not conforming to these items will not be reviewed and will be returned to the Contractor for re-submittal.

E. Review comments used in response to shop drawings/submittals are:
   1. "No Exception Taken" - Product approved as submitted.
   2. "Furnish as Corrected" - Re-submittal not required, although the Contractor shall provide the submitted product with corrections as noted.
   3. "Revise and Resubmit" - Re-submittal required with corrections as noted.
   4. "Rejected" - Re-submittal required based upon the originally specified product.

F. Original, Contractor provided shop drawings shall be submitted on the following but not limited to: Note: AutoCad backgrounds will be provided.
   1. Audio, Video, and Control System one-line diagrams with cable type and cable numbering provided.
   2. AV Equipment Rack Elevations
   3. AV Floor, Ceiling and Elevation Plans.
   4. Control Panel & Touch Panel screen layouts
   5. AV equipment attachment drawings with structural engineer's stamp if required.
   6. All other products called out on drawings that call for shop drawing submittal.

G. All equipment specified an/or required for a complete and operational AV and Control system shall be listed in the projects equipment list submittal.
   1. Provide the AV and Control equipment list divided into room/area sections with the AV device Manufacturer in alphabetical order.
   2. For Example:
      a. Classroom 125
         1) Extron TLP1025 Touch Panel
         2) FSR PL-500 Floor Box.

1.9 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRING DIAGRAMS

A. Prior to final acceptance of the job, the Contractor shall furnish to the Owner at least four (4) copies of operating and maintenance and servicing instructions, as well as four (4) complete AV System wiring diagrams for the following, but not limited to, items or equipment:
   1. Audio, Video, and Control Systems.
   2. Rack Elevations.
   3. Touch panel layout pages
   4. Current Programming source code.

B. All wiring diagrams shall specifically cover the system supplied. Typical drawings or consultant supplied drawings will not be accepted. Four (4) copies shall be presented to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and Equipment: All AVS materials and equipment, including custom-made equipment, shall be new and shall be listed by Underwriter's Laboratories (UL) and bear their label or be listed and certified by a Nationally Recognized Testing Lab (NTRL) that is also recognized by the local Authority-Having-Jurisdiction (AHJ).

B. Frequency Coordination. Prior to ordering equipment, the Installing Contractor shall coordinate the frequencies of all wireless devices to prevent unwanted interaction between devices and rooms. This includes, but is not limited to, wireless microphones, assisted listening system devices, wireless control panels, etc. Verification of Frequency coordination shall take place with the use of a spectrum analyzer and frequency allocation/analysis software.

2.2 SYSTEM FUNCTIONS AND CAPABILITIES:

A. The AVS (If applicable) shall be utilized for presenting, viewing and listening to multimedia presentations. The system shall utilize/integrate where indicated, computer, microphone, and other inputs for output to the Video Projector, LCD/LED Displays, and Sound Reinforcement Systems. The AV system shall be controlled by a Touch Panel interface with DSP system processors. The control system shall be able to control the required functions of the AV equipment, audio volume, audio switching, paging and control. See AV drawings for more detailed information regarding specific system functionality.

B. The AVS shall provide clear, natural sound uniformly distributed throughout the designated areas. The system shall utilize speakers as shown on the plans. The AV system shall also be able to display High-Definition Video to the Native Resolution of all displays without any distortion or artifacts.

C. The system shall have adequate dynamic range without audible clipping or distortion to accommodate all types of program material. Audio, Digital Signal Processing shall be employed in the designated rooms to insure smooth frequency response, high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and or transients.

D. The system frequency response shall:
   1. Be within +/- 1.5 dB from a curve which is flat from 80Hz to 10 kHz.
   2. There shall be a minimum 12dB per octave roll-off below 32 Hz.
   3. Uniformity of coverage of the system at seated ear height (42") shall be within +/- 1.5dB in the 4 kHz 1/3 octave band at any seat location using pink noise as a test signal.

E. System noise shall not exceed an equivalent input noise of -120dB based on a 20 KHz-noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.

F. The sound level capability of program material levels produced in all seats shall be at least 98 dB when measured with a scaled filter, set at “C Weighting”. There shall be at least 6dB of amplifier headroom.

G. The system shall provide clear audio to all areas covered by the system. All side, Left & Right and any stage lip, or under balcony speakers shall be wired discretely to the correct channel on the amplifier. See AVS drawings for exact location.

H. EDID and Color Space Management. EDID data exchange is a standardized means for a display to communicate its capabilities to a source device. It is the AVS contractor’s responsibility to address and resolve and manage all EDID and Color Space issues.

I. HDCP (High-bandwidth Digital Content) is an encryption protocol for copy protected video content as Blu-Ray Disc, HD movie downloads, Cable TV & Satellite TV. It is the Contractor’s responsibility for proper HDCP 2.2 and Digital Rights Management (DRM) in all systems listed in plans and this specification. This shall apply to all HDMI, DVI or Display Port signals. HDCP is not applicable to SDI signal lines, and no attempt to pass encrypted material through these signal paths shall be attempted.

J. CEC (Consumer Electronics Control) is device control functions between all connected HDMI devices. It is the AVS contractor’s responsibility for proper CEC Management in all systems listed in plans and this specification.

2.3 SOFTWARE PROGRAMMING

A. General: Except when otherwise agreed in writing the client shall retain legal and beneficial ownership of all Intellectual Property, including source code, created by the Contractor, their employees and sub-contractors.

B. The Contractor must allow sufficient time for the programming of all software configurable audio, video and control systems. Contractors must evaluate the systems

functional requirements and user interface and then allow time in their bid accordingly. The system description as well as the end user interview will provide the Contractor with the necessary information needed to proceed with the programming. Any questions as to the systems functional requirements must be sent in written RFI form to the Consultant. All programming schemes must be submitted to the Consultant for approval before programming starts. This includes the appearance of all user interfaces, touch panel layouts, preset and sub-preset information (acquired through client interviews), and speaker control schemes. The Contractor shall also submit a narrative for the control system concept to the Consultant for approval. The Contractor is to interview the Owner and their representatives to acquire the necessary information needed to allow for the proper programming of this system. The Contractor, after interviewing the Owner, shall then submit a written report stating his interpretation of the client's requirements for approval by consultant. Only after the Client and Consultant have approved the programming report may the Contractor proceed with the programming of this system.

C. All equipment that is connected to the Client's local area network and is configurable via the local area network must have its equipment software installed onto dedicated computers provided by the Client. The Contractor is to allot time to install and test equipment software onto a minimum of two of the Client's computers which are to be identified by the Client and/or Consultant. The computers shall be programmed to emulate user interfaces throughout the facility. The Contractor shall coordinate all software deployment over IP with the Client's Information technology department.

D. A user-friendly/easy to use graphical interface programmed by the Contractor shall allow for easy operation of the system. This interface shall allow novice users the control of the system components without having to access the digital schematic diagram. These main system components shall include master volume control, zone volume control, room combining, routing, switching, source-equipment level control and any other control necessary for the system to function properly from a user standpoint.

E. Control system minimum programming outlined below:
   1. The Contractor shall allot as many hours as required for on-site control system programming with the Client's representative.
   2. The Control System in this project may connect to the Client's Local Area Network (LAN). This connection will provide desktop computers control of the audio-visual system as well as make available remote troubleshooting via the internet and (If applicable) Extron Global Configurator Plus and/or Global Configurator Professional. The Contractor shall provide time to install control system interface software on at least three desktop computers. Coordinate work with Client's Information Services personnel.
   3. Provide password protection to each control surface in this facility.
   4. Touch panels shall be activated and deactivated by password. Upon start up a password dialog box shall be presented to the user to enter his/her password. Only after entering a password will the user have access to the system. The system shall be programmed to shut down automatically after being idle for a time to be specified by the user.

5. Touch panel layout design shall conform to the InfoComm International “Dashboard for Controls” and programming guidelines. Touch panel designs are to be custom to this project. Re-purposed touch panel designs are not acceptable.
6. Control Help File: Each touch panel shall include a help file that will explain each layer of the touch-panel control scheme.
7. Control system shall utilize help desk software to provide:
    a. Real-time monitoring (If Possible) of: Control system, Device monitoring, Projector lamp life, System online status, Room activity, Remote system diagnostics via Contractors help desk, Remote system control, Fault reporting via email alert, Logging of help request, User access control via password protection, Event logging, report and chart generation.
8. All serial-controlled devices must have bi-directional communication with the control system. All control functions locally available on each device must be accessible via the remote-control system. All locally gestured control functions must mirror on the control system user interface. In other words, if a volume control is adjusted on a DSP interface that adjustment must register on the control interface.
9. Control system shall be used to power up and down connected equipment if required.
10. All projectors shall be monitored and report lamp hours remaining and lamp failure if required.

F. Complexity of Programming:
    1. It is required that the Contractor be experienced in the specified Control System. and shall have experience in Professional programming and programming systems of this complexity. Contractors shall allow enough time in their bid to permit extensive programming of all software configurable audio, video and control systems to the requirements of the client and consultant. Contractor shall break out cost associated with programming of these systems for review by the Consultant. By submitting this bid, the Contractor agrees that they understand systems of this type and that all programming services are included to the satisfaction of the Owner and Consultant. The Contractor further agrees that they shall not make any claim for additional monies because of misinterpretation of programming requirements.
    2. It is imperative for the AV Contractor to interview the user’s staff to gather and document the various operational modes including signal routing of the DSP-Control System, IP Video Systems and Dante Device Control Requirements to ensure any controlled device is properly integrated into the Control system. Control via the QSC Touch Panels, Control Room Computer and other Existing System must be integrated as required.
    3. The Dante Network will be quite extensive and must be labeled and organized. Dante routing presets will be provided, as necessary.
    4. The IP Video and all AV network switches must be configured properly for trouble free operation. Pay particular attention to the IP Video network switch programming. Proper switch CONFIGURATION and VLANS MUST be provided as required.

G. Control System Programming. Minimum Touch Panel Functions. Coordinate all functional programming with the owner before final programming sign off.

2.4 AUDIO/VISUAL SYSTEM PRODUCTS

A. The system shall utilize AV products as shown on the Plans referenced here, unless otherwise specified. The products referenced here shall be considered to be the minimum quantity, performance, functionality and quality levels. If additional and/or upgraded components are needed to meet the performance requirements of this final design-build specification, the contractor shall include all costs for such added and/or upgraded components in the base bid.

2.5 GENERAL PRODUCTS FOR SYSTEMS

A. See Sheet AV6.10 for the major equipment list
   1. PROVIDE ALL REQUIRED COMPONENTS FOR A COMPLETE, OPERATIONAL AV AND CONTROL SYSTEM AS DESCRIBED IN THIS DOCUMENT AND ON THE AV DRAWINGS.

2.6 CABLE – ALL SPACES

A. Speaker Cable, 70-Volt distribution, Plenum Rated 2-Conductor, 14 AWG, unshielded pair: Extron, West Penn, Belden or equal.

B. Loudspeaker Cable Plenum Rated 2-Conductor, 12 AWG, unshielded pair: Extron, West Penn, Belden or equal.

C. Loudspeaker Cable Plenum Rated 2-Conductor, 14 AWG, unshielded pair: Extron, West Penn, Belden or equal.

D. Analog Microphone/Line Level Installation Cable, 22 AWG conductor, jacketed, shielded, twisted-pair, Plenum Rated: Extron, West Penn, Belden or equal.

E. Control System Device Control (RS232, Relay or Contact Closure): (Dual 22 AWG shielded twisted pairs with individual drain wires, each pair is color-coded Red/Black and Green/White to simplify identification.) Plenum Rated: Extron, West Penn, Belden or equivalent.

F. Data Network: Plenum-rated Category 6A, see Structured Cabling Specifications for additional requirements.

G. Serial Digital Interface Cable RG6/U, 75 Ohm Coaxial Cable Belden 4694R or equal. 12G-SDI up to 258'. Provide the correct BNC connector for the specified cable. Provide 12G-HD-SDI extension if cable runs are longer than 225'.

H. Provide plenum rated cable for all cable where required by code. Any cable changes or substitutions must be submitted and approved prior to installation. Non-compliant cable that has been installed without approval shall be replaced at the Contractor's expense.

I. Fiber, OM4. MM, 50 micron / 6 strand or strands as required.

J. Video over IP, CAT6A Belden, West Penn or equal.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION DESCRIPTION

A. The installation, configuration and wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's installation instructions and guidelines. Should any variations in these requirements occur, the Contractor shall notify the architect before making any changes. It shall be the responsibility of the factory-authorized installer of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.

B. Workmanship on the installed systems shall be of professional quality, best commercial practice and accomplished by persons experienced in the techniques and standards of the particular industries involved.

C. Furnish all Additional conduits, AV Back-boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.

D. The cables within the rack or cabinets shall be carefully cabled and laced with Velcro wraps. All cables shall be numbered for identification. Cables should have enough slack to allow removal of equipment for service without having to cut multiple Velcro ties or wire wraps. Power plugs need to be labeled at PDU.

E. Splices of conductors in underground pull boxes are not permitted.

F. All communications cabling used throughout this project shall comply with the requirements as outlined in the NEC Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear UL listed type CMP (Plenum Rated) and/or CM/G (General Purpose) and/or CMR (Riser Rated). All fiber optic cabling shall bear OFNP (Plenum Rated) and/or OFNR (Riser Rated) and/or OFN/G (General Purpose). Contractor is responsible for installing appropriately rated cable for the environment in which it is installed.

G. The Contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The Contractor shall remove all debris and rubbish occasioned by the work from the site. The Contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

H. The Conduit System. Each conduit shall contain wires or cables of the same signal level or the same type of circuitry only. Low Level Lines, medium level lines, video level lines, high level lines and data and control circuits should be run in their respective separate conduits.

I. Wiring and Cabling. During installation both ends of all single wires or cables shall be marked with consecutive approved number markers, and a careful running log kept of route and terminations. After attachment at terminations these markers shall be

accessible and readable for identification. A detailed wiring diagram shall be furnished with these numbers shown. At the operational level (i.e., Audio-Visual equipment receptacle boxes, etc.) all receptacles shall be clearly marked by function and number (when there are many of the same function). For example, where a given microphone line may appear at several locations, the same label shall show.

J. Power distribution cables shall not be installed adjacent to signal cables. Power distribution cabling shall be on the opposite sig of the equipment enclosure from signal cables and shall be uniformly located throughout the installation.

K. Wherever signal lines entering the equipment areas must be connected into the racks, the use of intermediate terminal strips shall be used. This shall also facilitate the testing of maximum increments of the systems in the Contractor's shop. UTP Cables shall terminate in a Patch Panel and / or Switch. All connections of lines at terminal strips, as well as at signal receptacles, shall be mechanically secured and then soldered. No unsoldered connections shall be permitted.

L. Where lines approach the racks and terminal strips they shall also be mechanically anchored at the rack, and provided with sufficient slack length to avoid strain, abrasion or wear. All cable entry shall be through the tops of racks or through entrance holes in the base of the rack. No cable shall enter racks through front, rear or side panel openings. For equipment mounted in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length. Cables shall not protrude from the back of racks. All system wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means.

M. System Grounding.
   1. The "spider" concept is designed to avoid ground loops and inductive coupling.
   2. The systems shall be hum free, stable and free of oscillation with the earth ground temporarily disconnected.
   3. The earth ground shall be made at only one point in the system as indicated and shall be in accordance with National Fire Protection Association 70-2014.
   4. The grounding method shall insure that the system is free of the following problems under any mode of operation:
      a. RF oscillation, pickup and interference.
      b. Distortion.
      c. Crosstalk.
      d. Signal Leakage.
      e. Very high frequency feedback.
      f. Audio Hum.
   5. The equipment racks shall be isolated from, and not electrically connected to, the building grounding system. This means that the conduit system shall not be electrically connected to the equipment racks and that the equipment racks shall be installed so that they are electrically isolated from the building structural steel. The racks shall be electrically connected at only one point to the isolated grounding system.

6. In order to ensure the least amount of cable un-twisting, it is required that all cables shall be stripped using a special tool.
7. The use of lubricants (i.e., Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the Contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.
8. Under no circumstance are "channel locks" or other pliers to be used.
9. Plenum rated cable may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The cables shall not be laid directly on the ceiling panels. The use of cable ties shall be done in accordance with the cable manufacturer's requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.
10. Labeling
11. Wiring Labels: At all connection points for all types of cable & wiring, a label strip shall be attached indicating the name/number of that cable or wire as follows:
    a. At internal locations (inside racks, cabinets, or boxes), a pressure sensitive label shall be used.
    b. At external locations, a printed label covered with clear shrink wrap or approved labeling system shall be used.
12. Equipment Labels: All active components shall have labels at the front and rear. Labels shall be applied plumb and neat and shall not cover any equipment lights, recessed controls, or control labels.
    a. Front labels shall indicate functional use of equipment.
    b. Rear labels shall indicate system schematic reference designation.

3.2 PERFORMANCE TESTS OF THE COMPLETE SYSTEM. (SEE SECTION 3.08 FOR FINAL INSPECTION)

A. Verify that all wiring is correctly and completely installed.

B. Verify that the entire system performance is in accordance with the design requirements.

C. All these tests, and any others that the Contractor may wish for his own satisfaction, shall have been performed and successfully achieved before observation is requested. The Owner’s representative may request repetition and demonstration during observation of certain of these tests or other critical tests if problems become apparent. If specifications are not met, further observations shall be at the Contractor's expense.

D. Sealing of openings between floors, into or through rated fire and smoke walls, existing or created by the contractor for placement of new or removal of old cable into or through shall be the responsibility of the contractor. Sealing material (Approved UL listed system) and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the

drawings shall be the responsibility of the contractor's work. Any openings created by or for the contractor and left unused shall also be sealed as part of this work.

E. Firestopping work shall be performed by a single contractor to maintain consistency and accountability on the project.
   1. The Contractor shall install penetration firestop seal materials in accordance with design requirements, and manufacturer's instructions.
   2. The Contractor's installer shall be certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.
   3. All installed through penetration firestops shall be identified via label, or stencil. Label shall state that the fill material around the penetrating item is a firestop, and that it shall not be disturbed unless by an authorized contractor. The label shall include the firestop brand name, and the classified system number for which it was installed.
   4. Sample Label:
      a. MANUFACTURER'S NAME
      b. ATTENTION
      c. Fire Rated Assembly
      d. For Any Changes to This System, Please Refer to UL System Listed Below
      e. PRODUCT
      f. HOUR RATING
      g. UL SYSTEM
      h. INSTALLATION DATE
      i. INSTALLED BY
      j. LICENSE NUMBER
      k. PHONE
      l. FAX

F. Equipment Rack and Equipment Testing and Adjusting Procedures: Conduct procedures in fabrication shop. 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 with color photographs of each equipment rack, front and back. Perform at least the following procedures:

G. Preliminary: Verify: Grounding of devices and equipment. Integrity of signal and Audiovisual system ground connections. Proper provision of power to devices and equipment. Integrity of all insulation, shield terminations and connections.

H. Integrity of soldered connections. Absence of solder splatter, solder bridges. Absence of debris of any kind, tools, etc. Routing and dressing of wire and cable.

1. All wiring, including polarity and continuity, including conformance with wire designations on running sheets, field and shop drawings.
2. Mechanical integrity of all support provisions.

I. All new equipment racks shall be bolted to the floor/millwork by the Contractor once the Owner determines the exact location for new rack. Contractor to verify the original Middle Atlantic racks are bolted to floor and seismic bracing are installed to code. The earthquake mounting brackets for each rack kit shall be screwed to studs, not drywall. All equipment shall be serviceable in the rack's final location – the need to unbolt racking equipment to access or service equipment is not acceptable.

J. Cleaning
1. Clean each section or area of where the work was conducted after completion to permit immediate use of the area.
2. Remove and discard all refuse, rubbish, and debris.
3. The Contractor shall ensure that all recyclable and environmentally hazardous waste materials are disposed properly.
4. Make good all existing structures, surfaces, and utilities affected by cutting, coring, mounting, drilling, or other new work.
5. Clean all furnished equipment of dust, dirt, fingerprints, smudge, and other material prior to calling for a Substantial Performance of Work Review or Completion of Work Review.

3.3 PROTECTION

A. During the installation phase and up to the date of achieving Substantial Performance of Work, protect finished or unfinished work against damage or loss. In the event of such damage or loss, immediately replace or repair such work or equipment at no cost to the Owner.

3.4 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

A. The installer shall, upon completion of the system, orient all antennas, speakers, align all projectors, screens and displays, adjust all controls, etc., to provide a system operating at maximum capability. Submit block diagram and shop drawing of equipment.

3.5 GENERAL TESTING REQUIREMENTS

A. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the all audio, digital video and control parameters are as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.
1. Equipment and components in need of adjustment, repair or replacement and discovered during such testing, shall be immediately adjusted, repaired or replaced

with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the owner.

3.6 SPECIFIC AUDIO TESTING REQUIREMENTS

A. Furnish all laptops, software, equipment and personnel to conduct these tests in accordance with the performance specification requirements. ANSI and EIA Standards.
   1. Audio testing and adjustment:
   2. Adjust all audio levels. Measure and record absolute impedance at 400 Hz and 1 kHz for each speaker line. Correct polarity of all speaker lines.
   3. Each “leg” of every individual speaker line shall be measured using a voltmeter to ensure that there are no shorts to ground.
   4. When the system is brought to full power, there shall be no hums, buzzes, rattles, or indication of any abnormal speaker noise.
   5. Audio check for continuity, polarity, cold solder connections, shorts and opens.

B. Provide full flat panel monitor display calibration and adjustments for optimal picture quality for a single HDMI input. Provide proper aspect ratio configuration for both 16:9 and 16:10 sources. Use a test generator (I.E. Extron VTG or equal): for all setup verification and verify proper image configuration with all inputs. (Contract the Owner’s Technical Representative prior to final adjustment to coordinate).
   1. Controls: Adjust all controls to achieve the specified performance. Provide shaft-locks or covers for all level controls, as appropriate to prevent unauthorized gain changes. Contractor shall confirm that all control system operations are properly programmed and repeatable.
   2. Contractor shall review and assess the appropriate Lens Throw length between all video projectors and the projection screens to ensure optimum picture sizing and focus. Make all adjustments necessary, including projector keystone correction and lens shift to achieve the image size and shape required.
   3. Provide full video projector calibration and adjustments for optimal picture quality for all used inputs. Provide proper aspect ratio configuration for 4:3, 16:9 and 16:10 sources. Set all projector configuration presets required for control system recall coordination and provide with final system documentation.
   4. Testing Report: Provide a letter/report documenting the results of these preliminary tests, including amplifier gain/level settings, DSP EQ filter settings, and AV equalization curves for review by the AV Design Consultant and Owner.
   5. The Contractor is fully responsible align, program, and test the sound speaker system to include the left, right, and center arrays as well as subwoofer speakers where these occur, to the respective speaker manufacturer specifications as required to achieve required uniformity of coverage as specified herein.
   6. Contractor shall and utilize provide the following Calibrated Test Instruments as a minimum during commissioning and acceptance testing:
   7. Sensitive AC voltmeter, -80dBu sensitivity or more, 20Hz -30KHz response, able to measure signal to noise ratio, THD, electrical levels within the system. Note that some systems require measurements up to 100 volts and may require an external pad.

8. Sound Pressure Level Meter, ANSI Type I with A and C weighting filters, fast or time averaged.
9. Audio Signal Generator, 20Hz-30kHz, sine wave, pink noise, and continuous sine wave sweep.
10. Amplified Loudspeaker 100 mm producing 60 dBa at one meter, and 70 dBa at one-meter, pink noise, sine wave, and speech files.
11. 200Mhz Oscilloscope, with TV sync (analog video only). Analog Signal Generator NTSC/PAL, plus computer patterns at all required resolutions and refresh rates required for the systems under test. For systems with composite video, include Pluge pattern. (Analog video only)
12. Digital Signal Video Generator for computer patterns for all resolutions and refresh rates required for the systems under test, HDMI/DVI/HD-SDI with and without HDCP.
13. The ability to measure STI-PA (source analyzer).
14. Colorimeter/luminance meter, 10% accuracy.
15. Infrared thermometer.

C. Test media with known levels (audio, video, etc.): Cd's, VS, DVD's etc.
   1. AD/DC multimeter.
   2. Light meter, lux/foot-candles.
      a. Outlet tester (to test power outlet wiring).
      b. The ability to measure electrical power (watt meter, clamp meter, etc.).
      c. Cable sets, cable assemblies, adapters as required to sample and measure in-or-out of circuit as req'd.
      d. Computer with Smaart v8 or Systune. Outboard Dual Channel Preamplifier and Calibrated microphones. Earthworks M23 or equal.
      e. All equalization shall be accomplished using FFT Transfer Function. No real time analysis methodology shall be allowed.
      f. Verification of Frequency coordination shall take place with the use of a spectrum analyzer and frequency allocation/analysis software.
      g. Testing Report: Provide a letter/report documenting the results of these preliminary tests, including amplifier gain/level settings, crossover filter settings, and AVS equalization curves for review by the AV Design Consultant.

3.7 SPECIFIC AUDIOVISUAL SYSTEM NETWORK CABLING TESTING REQUIREMENTS

A. Category 6x Cable Testing.
   1. The Contractor shall provide competent, factory-trained engineers and/or technicians, authorized by the manufacturer of the cabling system, to technically supervise and participate during all tests for the systems.
   2. The Contractor shall test and certify the cabling system to minimum standards as set forth in the ANSI/TIA/EIA-568-C specifications for Category 6A cable as appropriate.
   3. General Requirements – Category 6A.
      a. Every cabling link in the installation shall be tested for:

1) Wire Map
2) Length
3) Insertion Loss
4) NEXT Loss
5) PS NEXT Loss
6) ELFEXT Loss
7) PS ELFEXT Loss
8) Return Loss
9) Propagation Delay
10) Delay Skew in accordance with the field test specifications defined in ANSI/TIA/EIA-568-C. This document will be referred to as the "TIA Cat 6A Standard."

b. In addition to testing the "In-link" performance parameters detailed in 3.a above, Alien Crosstalk testing or "Between-link' testing shall be carried out in accordance with Annex E of the TIA Cat 6A Standard. Alien crosstalk testing includes the PS ANEXT and PS AACR-F (Power sum alien attenuation-to-crosstalk ratio from the far end) performance parameters. The standards refer to the link-under-test for Alien Crosstalk as the disturbed link.

c. PS ANEXT and PS AACR-F shall meet or exceed the limits defined in Section 7.8 of the TIA Cat 6A Standard.

4. The installed twisted-pair horizontal links shall be tested from the Switch located in the equipment rack to all end points throughout the AV System for compliance with the "Permanent Link" performance specification as defined in the TIA Cat 6A Standard.
5. One hundred percent of the installed cabling links must pass the requirements of the standards mentioned in 3.a above and as further detailed in Section B. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with Section C below.
6. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by BiCSi or the ACP (Association of Cabling Professionals).
7. The test equipment (tester) shall comply with the accuracy requirements for level IIIe field testers as defined in the TIA Cat 6A Standard. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table I.1 of Annex I of the TIA Cat 6A Standard. (Table I.1 in this TIA document also specifies the accuracy requirements for the Channel configuration.)
8. The test plug shall fall within the values specified in test plug NEXT loss requirements of the TIA Cat 6A Standard.
9. The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.

10. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.
11. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in ANSI/TIA/EIA-568-C). Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.
12. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. To which extent '*' results shall determine approval or disapproval of the element under test shall be defined in the relevant detail specification, or agreed on as a part of a contractual specification.
13. Owner or owner's representative shall be invited to witness field testing. The representative shall be notified of the start date of the testing phase five business days before testing commences.

B. Category 6A – Performance Test Parameters: The test parameters for Cat 6A are defined in the TIA Cat 6A standard. The test of each link shall contain all of the following parameters as detailed below. In order to pass the test, all measurements (at each frequency in the range from 1 MHz through 500 MHz) must meet or exceed the limit value determined in the above-mentioned standard.
    1. Wire Map: Shall report Pass if the wiring of each wire-pair from end to end is determined to be correct. The Wire Map results shall include the continuity of the shield connection if present.
    2. Length: The field tester shall be capable of measuring length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP (1). The physical length of the link shall be calculated using the pair with the shortest electrical delay. This length figure shall be reported and shall be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 meters – 295 feet) plus 10% to allow for the variation and uncertainty of NVP.
    3. Insertion Loss (Attenuation): Insertion Loss is a measure of signal loss in the permanent link or channel. The term "Attenuation" has been used to designate "Insertion Loss." Insertion Loss shall be tested from 1 MHz through 500 MHz in maximum step size of 1 MHz. It is preferred to measure insertion loss at the same frequency intervals as NEXT Loss in order to provide a more accurate calculation of the Attenuation-to-Crosstalk ratio (ACR) parameter. Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results for the worst wire pair must show the highest attenuation value measured

(worst case), the frequency at which this worst case value occurs, and the test limit value at this frequency.

4. NEXT Loss: Pair-to-pair near-end crosstalk loss (abbreviated as NEXT Loss) shall be tested for each wire pair combination from each end of the link (a total of 12 pair combinations). This parameter is to be measured from 1 through 500 MHz. NEXT Loss measures the crosstalk disturbance on a wire pair at the end from which the disturbance signal is transmitted (near-end) on the disturbing pair. The maximum step size for NEXT Loss measurements shall not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case NEXT margin and the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

Table 1 -- Maximum frequency step size as defined in

Frequency Range (MHz)	Maximum Step size (MHz)
1 – 31.25	0.15
31.26 – 100	0.25
100 – 250	0.50
250 – 500	1.00

5. PSNEXT Loss: Power Sum NEXT Loss shall be evaluated and reported for each wire pair from both ends of the link under-test (a total of eight results). PSNEXT Loss captures the combined near-end crosstalk effect (statistical) on a wire pair when all other pairs actively transmit signals. Like NEXT this test parameter must be evaluated from 1 through 500 MHz and the step size may not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSNEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
6. ELFEXT Loss, pair-to-pair: Pair-to-pair FEXT Loss shall be measured for each wire-pair combination from both ends of the link under-test. FEXT Loss measures the crosstalk disturbance on a wire pair at the opposite end (far-end) from which the transmitter emits the disturbing signal on the disturbing pair. FEXT is measured to compute ELFEXT Loss that must be evaluated and reported in the test results. ELFEXT measures the relative strength of the far-end crosstalk disturbance relative to the attenuated signal that arrives at the end of the link. This test yields 24 wire pair combinations. ELFEXT is to be measured from 1 through 500 MHz and the maximum step size for FEXT Loss measurements shall not exceed the maximum step size defined in the standard as in Table 1. Minimum test results documentation (summary results):

Identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

7. PSELFEXT Loss: Power Sum ELFEXT is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs on the fourth one. This test yields eight wire-pair combinations. Each wire-pair is evaluated from 1 through 500 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst pair combinations must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
8. Return Loss: Return Loss (RL) measures the total energy reflected on each wire pair. Return Loss is to be measured from both ends of the link-under-test for each wire pair. This parameter is also to be measured from 1 through 500 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
9. Propagation Delay: Propagation delay is the time required for the signal to travel from one of the link to the other. This measurement is to be performed for each of the four wire pairs. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay. The report shall include the propagation delay value measured as well as the test limit value.
10. Delay Skew [as defined in the TIA Cat 6A Standard; Section 7.5] This parameter shows the difference in propagation delay between the four wire pairs. The pair with the shortest propagation delay is the reference pair with a delay skew value of zero. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay (the longest propagation delay). The report shall include the delay skew value measured as well as the test limit value.
11. PS ANEXT: Pair-to-pair Alien NEXT (ANEXT) contributions is measured by applying the stimulus signal at the near end to one wire pair of a disturbing link and measuring the coupled signal at the near end of a wire pair in a disturbed link. This process is repeated for every wire pair in a disturbing link. The PS ANEXT for each wire pair in a disturbed link is obtained by the power sum addition of all the pair-to-pair ANEXT results to that wire pair from all wire pairs in disturbing links. All the links that are bundles with the disturbed link need to be included as disturbing links. In addition, links that are terminated in adjacent positions in a patch panel or interconnect panel must also be included as disturbing links in this test.
12. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PS ANEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

13. PS AACR-F: The pair-to-pair Alien Far End crosstalk (AFEXT) contributions is measured by applying the signal at the near end to one wire pair of a disturbing channel or permanent link and measuring the coupled signal at the far end of a wire pair in a disturbed channel or permanent link. This process is repeated for every wire pair in a disturbing link and for all links in close proximity. A normalization, which is dependent on the relative length of disturbing and disturbed link, is applied to each pair-to-pair alien FEXT measurement. Then the PS Alien Attenuation-to-Crosstalk Ratio from the Far end (PS AACR-F) for each wire pair in a disturbed channel or permanent link is obtained by the power sum addition of all the normalized pair-to-pair far end alien crosstalk results to that wire pair from all wire pairs in disturbing links in close proximity.
14. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PS AACR-F. if the link or channel connects two patch panels (data center), these wire pairs must be identified for the tests performed from both ends. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

C. Category 6/6A Test Result Documentation
   1. The test results/measurements shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e., “as saved in the tester” at the end of each test and that these results cannot be modified at a later time.
   2. The database for the completed job shall be stored and delivered on CD-ROM including the software tools required to view, inspect, and print any selection of test reports.
   3. A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information
      a. The identification of the link in accordance with the naming convention defined in the overall system documentation
      b. The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number
      c. The date and time the test results were saved in the memory of the tester.
   4. General Information to be provided in the electronic data base with the test results information for each link:
      a. The identification of the customer site as specified by the end-user
      b. The identification of the link in accordance with the naming convention defined in the overall system documentation
      c. The overall Pass/Fail evaluation of the link-under-test
      d. The name of the standard selected to execute the stored test results
      e. The cable type and the value of NVP used for length calculations
      f. The date and time the test results were saved in the memory of the tester
      g. The brand name, model and serial number of the tester
      h. The identification of the tester interface

i. The revision of the tester software and the revision of the test standards database in the tester
j. The test results information must contain information on each of the required test parameters that are listed in Section B and as further detailed below under paragraph C6.

5. In-link (In-Channel) detailed test results. The detailed test results data to be provided in the electronic database for must contain the following information:
   a. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.
   b. Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m and the test limit value
   c. Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value
   d. Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value
   e. Insertion Loss (Attenuation): Minimum test results documentation as explained in Section B for the worst pair
   f. Return Loss: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link
   g. NEXT, ELFEXT: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link
   h. PSNEXT and PSELFEXT: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link
6. Between-Link (Between-Channel) Test Results Data. A test report shall be provided for each disturbed link included in the Alien Crosstalk sample test. This test report must contain
7. PS ANEXT results at each frequency (See Table 1) for each wire pair in a victim link as well as the PS ANEXT results for the average of these four wire pairs. The worst case margin and the worst values shall be provided for each wire pair and the average of the four wire pairs. PSANEXT shall be measured and tested from the end of the link or channel where all cables are terminated at a distribution panel. In case the cabling runs from panel to panel (data center), the PS ANEXT test results for each disturbed link shall be collected and saved from both ends (both panels) of the disturbed link.
8. PS AACR-F results at each frequency tested (See Table 1) for each wire pair in a disturbed link as well as the PS AACR-F results for the average of the four wire pairs. The worst case margin and the worst values shall be provided for each wire pair and the average of the four wire pairs. PS AACRF only needs to be measured and tested from one end of the link or channel. Connect the main DTX-1800 unit (measurement of PS AACR-F disturbance) to the disturbed link or channel at the end where all cabling links are terminated at a distribution panel. Select End 1 in the AxTalk Analyzer Software.

D. Optical Fiber Cable Testing: All fiber testing shall be performed on all fibers in the completed end to end system. There shall be no splices unless clearly defined in Section 3 of this specification. Testing shall consist of a bi-directional end to end OTDR trace performed per ANSI/TIA/EIA 455-61 & ANSI/TIA/EIA 526 and a bi-directional end to end power meter test performed per ANSI/TIA/EIA 455-53A. The system loss measurements shall be provided at 850 and 1300 nanometers for multimode fibers and 1310 and 1550 for single mode fibers.

1. Pre-installation cable testing: The Contractor shall test all lightguide cable prior to the installation of the cable. The Contractor shall assume all liability for the replacement of the cable should it be found defective during the warranty period.
2. Loss Budget: Fiber links shall have a maximum loss of: (allowable cable loss per km)(km of fiber in link) + (.4dB)(number of connectors) = maximum allowable loss.
3. Any link not meeting the requirements of the standard shall be brought into compliance by the contractor, at no charge to Owner.

E. HD-SDI coax cable testing

1. 12G HD-SDI – Adhear to SMPTE OV2082-0.2018 Standards.
2. 11.88 Ghz Support.

F. The Contractor shall provide test documentation to the Owner's Project manager in a three ring binder(s) and CD format within three weeks after the completion of a specific project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by test type. Test data within each section shall be presented in the sequence listed in the administration records. The test equipment by name, manufacturer, model number, and last calibration date shall also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test.

G. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.

3.8 FINAL INSPECTION AND ACCEPTANCE (SEE SECTION 3.02 FOR ADDITIONAL REQUIREMENTS)

A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.

B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

C. Upon testing by Owner's Representative (Consultant) any deficiencies shall be noted. If the deficiencies are not correctable at the time of testing, any retesting costs by the

Consultant, including any travel and lodging expenses shall be borne solely by the Contractor.

3.9 ACCEPTANCE TESTS – PUNCH LIST JOB WALKS

A. Qualification for Acceptance: After completing preliminary testing, the Contractor shall furnish the Construction Manager with the letter/report documenting the results of the preliminary tests and two (2) copies of "as-built" wiring diagrams of the entire system including the connection numbers, and their locations. The receipt of this documentation shall constitute the Contractor's acknowledgment that the installation is complete and conforms to this specification and is ready to be reviewed and tested by the AV Design Consultant.

B. Acceptance Test: The Consultant, Owner's Representative and/or Construction Manager will be present during the acceptance testing and require the assistance and cooperation of the AV Installation Contractor. Provide personnel who participated in the actual installation and preliminary testing and adjustment of the audiovisual systems.

C. Equipment cabinet keys and any tamper-proof fastener tools must be available to the AV Design Consultant. Delays associated with failure to access the equipment shall be back charged to the Contractor at the AV Design Consultant's current hourly rates.

D. Each major component shall be demonstrated to function, as specified.

E. The AV Contractor shall provide a laptop computer with all manufacturers supplied configuration software necessary for communicating with Control Systems, DSP Audio Matrix Mixers, and the Audiovisual System Switchers. A review of system settings may be required for either of the programmable units at the AV Design Consultant’s request, and settings may be adjusted if necessary.

F. Such tests may be performed on any piece of equipment or system. If any test shows the equipment or system is defective or does not comply with the specifications, the Contractor shall perform any remedies at his expense and pay the subsequent expenses of any retesting required.

G. Delays: If system acceptance is delayed because the system is found to not meet the specification requirements, the Contractor shall reimburse the Owner for all consultant expenses related to re-testing. This shall include costs associated with travel to the site and any associated business travel expenses.

3.10 SYSTEM DOCUMENTATION, TRAINING, AND FIELD SUPPORT

A. Operation and Maintenance Manuals: For each system, provide three (3) copies of system manuals per system, two (2) for the Owner and one (1) for the AV Design Consultant. Manuals shall be in adequately sized three-ring binders, clearly labeled on spine. Manuals shall contain the following:

B. Service Reference Cover Sheet: Provide a cover sheet with Contractor name, address, Email, WEB Address, telephone and Fax numbers.

C. System Operation Instructions: Step-by-step operating instructions for the basic day-to-day use of the system including power activation, connection of source devices, adjustment of volume levels, selection of sources, etc. Include illustrations and references to individual equipment manuals, as necessary.

D. Equipment Manuals: Include copies of individual equipment operation manuals separated by tabbed dividers. Arrange the manuals in nominal signal path order (i.e., sources first, amplifiers/loudspeakers last), followed by control system manuals, followed by miscellaneous manuals.

E. Equipment List: List all system equipment including, connectors and specialty hardware, by manufacturer and model and serial number.
   1. As-built Drawings: Provide one set, reduced 11”x17” foldout "as built" functional diagrams in clear plastic binder sleeves. Fold and insert drawings so that drawing title is clearly visible at the front of the sleeve. In addition, provide 2 full-size drawing sets.
   2. Provide current software programmable device configuration files to the Owner for all control system interfaces and computer-based files, and the DSP Audio Matrix Mixer. Store files on site in the system documentation binders in disk sleeves. Provide the files on USB.
   3. Complete spreadsheet lists of IP network devices, protocols used, and IP and MAC Address lists and required ranges for coordination with the Owner's IT department.
   4. Provide all network switch configuration files. Identify which configuration file is loaded into each switch.
   5. Provide Ip Network diagram with all interconnections and VLANS programmed into the network.

F. Lists shall include information regarding location on the Owner's network or dedicated audiovisual physical subnet, VPN requirements, and other pertinent information for integration of IP networked audiovisual equipment into the Owner's Enterprise network

G. Training: Provide hours as needed of system training to operator(s) designated by the Owner. Training time is to be non-contiguous, in multiple separate sessions. Training sessions are to be digitally recorded upon Owner request.

H. All training shall take place after the systems are operational, but before the acceptance tests.

I. Operational Training:
   1. In the event the Installing Contractor does not have qualified instructors on staff for certain sophisticated equipment, the Installing Contractor, at no additional cost to Owner, shall provide a manufacturer’s representative for such instruction to the Owner.

J. Training Materials Supplied:

1. System operational manual (not equipment operation manuals) that explains how to fully operate the system; from start-up to shut down, and all operational steps in-between, in a step-by-step description, with pictures and other visuals to help convey information.
2. The Installing Contractor shall video record training session(s) for Owners reference (to help limit minor follow up phone calls in the future).

K. Maintenance Training:
1. A session with Owner's designated technical personnel for routine and preventive maintenance shall be given.
   a. This training is for scheduled preventative maintenance for such items as filter and lens cleaning, minor equipment checks and "user" adjustments.
      1) This training is not meant to teach Owner's representatives how to use commercial test equipment and/or do sophisticated equipment/system alignment.

L. Training Materials Supplied:
1. Utilizing the equipment manuals and flow diagrams of the required in contract closeout submittals supply a listing with suggested preventative maintenance schedule of the system equipment.
2. Training Format

M. Presenter: The presenter of the training sessions to have been directly involved with the project and have intimate knowledge of the installed systems and its operation. The presenter to be experience operating similar systems of similar complexity.

N. Attendees: The End User to determine who shall attend Audio & Video Training. Group to be limited to 10 persons. Training to occur at building site and be coordinate with Owner's Schedule and Calendar.

O. Classroom presentation: PowerPoint Presentation covering items indicated in syllabus. Duration of classroom training not to exceed 4 hours.

P. Field Instruction: Hands On presentation covering items indicated in syllabus. Minimum duration of field instruction:
1. Video System Operation – 6 hours
2. Audio System Operation – 6 hours
3. One month follow up – 4 hours.

Q. Audio Systems Training Syllabus

R. Section 1 - Introduction to Audio Systems
1. Decibels – Explain the concept of Decibels and its application in dBu and dBSPL. Provide references of each.
2. Frequency – Explain the concept of Frequencies and a relationship to octaves and musical notes.

3. Voltage – Provide description of microphone, line and speaker levels.
4. Gain Structure – Provide description and example of proper gain structure along with an explanation of clipping and headroom.

S. Section 2 – Introduction to Project Systems (Provide the following for each system in project)
   1. Inputs – Present floor plans indicating location of technical panels with brief description of input connectors.
   2. Controls – Present floor plans indicating location of wall controls and mix locations.
   3. Review the setup and adjustment of the output devices.
   4. Review the maintenance of the video equipment.

T. Section 3 – Microphone Selection and Application
   1. Provide explanation of proper microphone selection to include:
      a. Type of microphone: Boundary, Condenser, Dynamic, etc.
      b. Type of coverage: Omni, Cardioid, Semi Cardioid, etc.

U. Provide explanation of proper microphone application to include:
   1. General Handling and placement for handheld applications
   2. General Handling and placement for stand applications
   3. 3 to 1 rule with respect to interference
   4. 3 dB rule with respect to headroom

V. Section 4 – Field Instruction
   1. Mixing Console Operation
   2. Explanation of signal path
   3. Review of Aux sends
   4. Review of Groups
   5. Explanation of Mute Groups
   6. Explanation of Matrix
   7. Review of Main Section
   8. Review of Metering
   9. Tie Line Description

W. Video System Training Syllabus

X. Section 1 – Introduction to Video Systems
   1. Provide description of digital and analog video signal types.
   2. Discuss the properties of a quality video image.

Y. Section 2 – Introduction to project systems
   1. Inputs – Present floor plans indicating location of technical panels with description of input connectors.

2. Controls – Present floor plans indicating location of wall controls and mix locations.
3. Components – Present Schematic diagram (based on shop drawings) indicating description of signal flow and components of the system.

Z. Section 3 – Field Instruction
1. Demonstrate the process of inputting media.
2. Review the process or routing the signals through distribution.
3. Review the setup and adjustment of the output devices.
4. Review the maintenance of the video equipment.

AA. Support Materials
1. Training Manuals - Provide three ring binders for each attendee with the following:
a. Cover sheet indicating Audio Training.
b. Contact information for Audio Contractor and Audio Consultant
c. Table of Contents
d. Printed copy of PowerPoint presentation.
e. Copy of Materials List
f. Copy of Loose Equipment Materials List and Product Cut Sheets
g. Owners and Instruction Manuals. Make Owners and Instruction manuals available and complete for reference during training.
h. Record Documents Make Record Document available and complete for reference during training.
i. Submit training support material binder to AV Consultant for approval prior to training sessions.

BB. Follow-up training within sixty (60) days shall also be provided.

CC. Single Point of Contact: Contractor shall provide an English proficient, single point of contact, i.e., Project Manager, to speak for the Contractor and to provide the following functions:

DD. Initiate and coordinate tasks with Owner’s Project Manager, and others as specified by Owner’s Project Manager.

EE. Provide day-to-day direction and on-site supervision of Contractor personnel.

FF. Ensure conformance with all Contract provisions.

GG. Participate in weekly site project meetings as needed.

HH. This individual shall remain as Project Manager for the duration of the project. The Contractor may change Project Managers only with the Owner’s Project Manager’s written approval.

II. Planning meetings and schedule: Within thirty (30) calendar days after the date of award of the Contract, an initial planning meeting shall be held with the successful bidder to

clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events that shall transpire during the implementation of the project. Within one (1) week of this initial meeting, the Contractor shall provide a written report and project schedule to clearly document the events and responsibilities associated with the project.

JJ. Site Cleaning: Throughout the progress of the plant construction, the Contractor shall keep the working area free from debris of all types and remove from the premises all rubbish resulting from any work done by Contractor. Daily and at the completion of its work, the Contractor shall, to the extent possible, leave the premises in a clean and finished condition.

KK. Safety Requirements: Contractor shall utilize appropriate personnel and display warning signs, signals, flags and/or barricades at the work site to ensure adherence to safety regulations and as prudence requires.

LL. Specification/Drawing Status: All specifications and drawings related to this project shall be “frozen” after shop drawing approval. The Owner reserves the right to negotiate any future changes with the Contractor at any time.

MM. Upon approval of shop drawings, Contractor shall immediately place orders for all required materials, components, and supplies. In addition, Contractor shall secure and forward written confirmations (including orders and shipping dates) direct from each manufacturer/vendor to the Owner’s Project Manager.

NN. Contractor shall expedite shipment of all materials, components and supplies, as necessary to ensure the successful completion of the Project by the date required. All costs for expediting shall be included within Contractor’s pricing as provided below.

OO. The system cost herein shall include administration/maintenance training for at least ten Owner’s representatives with a minimum allotment of sixteen (16) hours. Additional hours of training shall be as required at no additional expense to the owner. All training shall include written and/or video materials that shall remain the property of Owner. If materials are written, they shall be provided in quantities sufficient for each person trained; if materials are video, one copy of each shall be required. The administration/maintenance training shall include, but not be limited to, the following:

PP. Review of as-built documentation, including a site demonstration.

QQ. All warranty information.

3.11 DAMAGES

A. The Contractor shall be held responsible for any and all damages to portions of the building caused by it, its employees or sub-contractors; including but not limited to:

B. Damage to any portion of the building caused by the movement of tools, materials or equipment.

C. Damage to any component of the construction of spaces.

D. Damage to the electrical, mechanical and/or life safety or other systems caused by inappropriate operation or connections made by the Contractor or other actions of Contractor.

E. Damage to the materials, tools and / or equipment of the Owner, its consultants, agents and tenants.

3.12 INSPECTIONS

A. On-going inspections shall be performed during construction by the Owner's Project Manager. All work shall be performed in a high-quality manner and the overall appearance shall be clean, neat and orderly. The following points will be examined and must be satisfactorily complied with:

B. Are all cables properly labeled, from end-to-end?

C. Have all terminated cables been properly tested in accordance with the specifications for the specific category as well as tested for opens, shorts, polarity reversals, transposition and presence of AC and/or DC voltage?

D. Have the pathway guidelines been followed? Are all cable penetrations installed properly and fire stopped according to code?

E. Has the Contractor avoided excessive cable bending?

F. Is Cable fill correct?

G. Are terminations compatible with applications equipment?

H. Are connectors properly turned right side up in the Jack Panels or faceplates without cables wrapped or twisted?

I. Is the jacket maintained right up to the termination?

J. Are identification markings uniform, permanent and readable?

3.13 COMPLETION OF WORK

A. At the completion of the System, the Contractor shall restore to its former condition, all aspects of the project site and daily, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided under this Contract. All clean up, restoration, and removal noted above shall be by the Contractor and at no cost to Owner. If the Contractor fails in its duties under this paragraph, Owner may upon notice to the Contractor perform the necessary clean up and deduct the costs thereof from any amounts due or to become due to the Contractor. It shall be the

Contractor's responsibility to remove trash from the areas it is working in and bring trash and debris to the Contractor provided dumpster.

B. Final Punch Walk: The Contractor and owner shall complete a final inspection to determinate if all conditions of the scope of work are completed to the owner's satisfaction. A "punch list" shall be formulated within (2) days of the punch walk and be presented to the Contractor for completion prior to final project sign-off by the owner. If an item is missed during the punch walk or not included on the "punch list" for any reason, it does not release the Contractor from completing the scope of work as defined in the specification or drawings.

C. Contractor shall submit complete Record Documentation as outlined in submittals section prior to project sign-off by owner.

3.14 SYSTEM AND/OR NETWORK TESTING

A. Upon completion of installation, Contractor shall execute all the required tests as summarized in this specification. When all such tests have been completed to Owner's satisfaction and Manufacturer's specifications, Contractor shall give the Owner written notice thereof.

B. Contractor must assume responsibility of assuring that the system and network interface installed operates properly, including any required coordination with other suppliers.

3.15 FINAL ACCEPTANCE

A. The Owner or Owner's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.

B. The Owner or Owner's representative will conduct a final job review once the Contractor has finished the job. This review will take place within one week after the Contractor notifies the owner.

C. Two copies of all certification data and drawings for all identifications shall be provided to the Owner before the owner's review.

D. The Owner or Owner's representative will review the installation and certification data prior to the system acceptance.

E. The Owner or Owner's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the Owner reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing shall be billed back to the Contractor.

F. If repairs, or adjustments are necessary, the Contractor shall make these repairs at his own expense. All repairs shall be completed within 5 days from the time they are discovered.

G. The Contractor shall hand to the owner a copy of any applicable installation specific software configurations in USB format.

END OF SECTION

SECTION 28 10 00 – ACCESS CONTROL AND ALARM MONITORING SYSTEM

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. This section shall define the Moorpark City Library (hereinafter referred to as Owner), Access Control and Alarm Monitoring system (ACAMS) system design standards and installation criteria.

1.2 RELATED WORK NOT IN THIS SECTION

A. General and specific provisions of these standards apply to the work detailed in this Section, as well as:
   1. Door Hardware (Division 08)
   2. Electrical (Division 26)
   3. Communications (Division 27 10 00)
   4. Security Wire and Cable (Section 28 05 13)
   5. Digital Video Management System (Section 28 30 00)

1.3 DESIGN STANDARDS

A. The design standards outlined in this section shall define the requirements for a new ACAMS.

B. Design Layout:
   1. General Requirements:
      a. Include one (1) rack mounted ACAMS server in the MDF.
      b. ACAMS server shall be connected to a rack mounted UPS in the MDF.
      c. ACAMS server shall be connected to a rack mounted KVM in the MDF.
      d. Security equipment enclosures shall be wall mounted in the MDF.
      e. Each card reader door included in this design standard shall utilize and integrate the following devices:
         1) One (1) wall mounted card reader.
         2) One (1) door alarm contact for each monitored leaf of door opening.
         3) One (1) or more electrified locks as detailed in Division 08.
         4) One (1) request-to-exit switch integrated with door hardware as detailed in Division 08.
   2. Site Requirements:
      a. Provide and coordinate connectivity as required to City of Moorpark monitoring.
      b. Include one (1) ACAMS Client workstations and monitor for ACAMS administration functions. Coordinate final location of workstation and the

monitor with the Architect and Owner.

c. Include one (1) wall mounted card reader assembly at each exterior entry/exit door of the building.
   1) See Technology Plans for card reader locations.
d. Include one (1) wall mounted card reader assembly for each door at the following interior spaces.
   1) See Technology Plans for card reader locations.

C. Equipment and Software Design Requirements:
1. ACAMS System shall be Paxton Net2 Plus for continuity of access control systems across all city locations.
2. Include one (1) ACAMS server to support installation of the ACAMS software.
3. Include one (1) Base ACAMS software license to support sixty-four (64) card readers.
4. Include one dedicated desktop workstations and two (2) monitors in the Building for system administration and enrollment.
5. Include a Client licenses as required for the Administration and Alarm monitoring workstations.
6. Include Intelligent Dual Reader Controllers and Dual Reader Interface Modules in each building as required to support integration of the security field devices.
7. Include 12/24 VDC power supplies in each building as required to provide integration of security controllers/modules and electrified locking hardware supplied by Division 08.
8. Include wall mounted security equipment enclosures in each building to house security controllers/modules and power supplies. Each security equipment enclosure shall be supplied with a tamper switch to provide enclosure monitoring.
9. Card readers included in this design shall be configured for OSDB communications between the card reader and controllers.
10. As directed by owner, card readers shall be configured for both Bluetooth mobile credential for use by police officers and card credential use by Administrative Staff. Mobile credential communication shall be enabled for all card reader provisioned exterior doors.
11. Unless otherwise noted, all other building card readers shall be configured solely for card credential use.
12. Include 125 KHz/13.56MHZ card credentials in quantities as coordinated with the Owner.
13. Include pushbuttons connected to the ACAMS for remote door unlock at locations as coordinated with the Owner.

D. These Design Standards are not meant to be all-inclusive. The Designer shall make adjustments accordingly. Include in the original design, all equipment, software, cabling, connectors, transformers, relays, etc., whether detailed here or not, such that said design fulfills the intent of these standards and renders these systems functional and fully operational.

1.4 DESCRIPTION OF OPERATIONS

A. The system is designed to receive a signal from a card reader, which is activated by an authorized card or mobile credential. Upon a valid authorization, an electronic opening device (i.e., electric lock) is activated to allow access. Should an attempt be made to enter this system with an unauthorized card or mobile credential, the electronic device shall not be activated, thus denying entry. This system is also designed to provide for an override by the security system operator at a remote workstation to activate the electronic door device, thus allowing access for certain circumstances which are normally not programmed into the system. Each access or denial shall be recorded.

B. All access controlled doors equipped with electric locks, shall be configured so that when a card or mobile credential is presented at a card reader, access shall be granted only if the access code is valid, the I.D. number is found, and it is authorized at that location for that particular period. If all conditions are met, a signal shall be sent to the appropriate control hardware and the associated building DPS shall be shunted and the electric locking device shall be unlocked. Upon opening and closing the door on a valid card or mobile credential read, the electronic locking hardware shall re-lock and the DPS shall resume an armed state.

C. The ACAMS server will be connected to an IP network supplied by Division 27. Coordinate final location of server with the Division 27 Consultant.

D. Workstations will be connected to the IP network network supplied by Division 27. Coordinate final location of workstations with the Owner.

E. Intelligent Dual Reader Controllers will be connected to an IP network supplied by Division 27. Coordinate final location of each Intelligent Dual Reader Controller with the Division 26 and Division 27 Designers.

F. The ACAMS shall be integrated with the Digital Video Surveillance System (DVSS) to allow automated call-up of designated cameras based on active alarm conditions on the ACAMS.

G. ACAMS system programming shall include, but is not limited to the following:
   1. All hardware devices included in the Design Standards.
   2. All access and user defined authorization levels as coordinated with the Owner.
   3. Input of alarm condition and response messages as coordinated with the Owner.
   4. Development of activation alerts and unique messaging by alarm condition and location.
   5. Import and configuration of mapping displays for each floor with associated icon links which activate on alarm or event conditions.
   6. Integration of ACAMS alarms with the DVSS to allow automated camera call-up as coordinated with the Owner.

H. Alarm Monitoring Integration:
   1. The SYSTEM shall allow for annunciation of intrusion detection alarms in the Main Alarm Monitoring Window. Intrusion Detection alarms reporting into the Main Alarm Monitoring Window shall report just like any other access control alarm and shall have the same annunciation and display properties as access control.

2. The ACMS shall integrate with the Fire Alarm System to Auto-Unlock Fire Department specified ACAMS managed egress doors in the event of an fire emergency.

1.5 ACAMS HARDWARE AND SOFTWARE

A. Coordinate programming of new ACAMS devices with the Owner.

B. Coordinate system naming conventions with the Owner.

1.6 DEVICE HARDWARE REQUIREMENTS

A. ACAMS Server and Software:
   1. Intent is for the Access Control System to be IP based. Existing System Software: Paxton, Net2.Include an ACAMS server and software as detailed in these Design Standards.
   2. Coordinate final mounting location of server with the Division 27 Consultant.

B. ACAMS Workstation and Software:
   1. Include ACAMS workstations and software as detailed in these Design Standards.
   2. Coordinate final workstation locations with the Owner.

C. ACAMS VIDEO MONITORS:
   1. Include ACAMS video monitors as detailed in these Design Standards.
   2. Coordinate final video monitor locations with the Owner.

D. Intelligent Dual Reader Controller:
   1. Include intelligent dual reader controllers as detailed in these Design Standards.
   2. Intelligent dual reader controllers shall be powered by from an external 12VDC power source.

E. Dual Reader Interface Modules:
   1. Include dual reader interface modules as detailed in these Design Standards.
   2. Dual reader interface modules shall be powered by from an external 12VDC power source.

F. Card Readers:
   1. Include card readers as detailed in these Design Standards.
   2. Card readers shall be powered by 12VDC directly from the intelligent dual reader controllers and dual reader interface modules.
   3. Card readers shall be configured and programmed to provide OSDP communication.

G. Access Credentials:
   1. Include card credentials in the type and quantity as detailed in these Design Standards.

2. Include mobile credentials in the type and quantity as detailed in these Design Standards.

H. Alarm Contacts/Tamper Switches:
1. Include magnetic alarm contacts at each monitored door as detailed in these Design Standards, to detect an unauthorized intrusion into the facility. If a door is illegally opened, the contact shall send a signal to the ACAMS indicating an alarmed condition.
2. These alarm contacts shall have the capability of being shunted via a request-to-exit (REX) device. When the system grants access at a controlled point, it shall shunt the alarm input for that controlled point until the specified shunt time has elapsed, or the door is opened and closed. These alarm contact shall also be capable of being shunted via the ACAMS client workstation.
3. Tamper switches shall be included on all security equipment enclosures.

I. Door Release Pushbutton:
1. Include door release push-buttons at locations detailed in drawings.

J. Electronic Lock Hardware:
1. Electronic Locks: Include termination of security system cabling to electronic locks provided under Division 08.
2. Request-to-Exit Switches (RX): Include termination of security system cabling to RX switches that are integral with the electric locking hardware provided under Division 08.
3. Power Transfer Hinge: Include termination of security system cabling to power transfer hinges that are provided under Division 08.

1.7 POWER SUPPLIES

A. Power Supplies: Include 12VDC and 24VDC power supplies for all security devices associated with this project including specified battery back-up as detailed in the Design Standards.

1.8 RELAY/POWER DISTRIBUTION BOARDS

A. Relay/Power Distribution Boards: Include 24VDC relay/power distribution boards as detailed in the Design Standards.

1.9 POWER DISTRIBUTION BOARDS

A. Power Distribution Boards: Include 12VDC power distribution boards as detailed in the Design Standards.

1.10 BACKBOARD REQUIREMENTS

A. Include plywood backboards as detailed in the Design Standards.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Unless otherwise noted, all materials and equipment shall be new, of the type, capacity, and quality specified and free from defects. Material shall bear the label of, and be listed by, the Underwriters' Laboratories unless of a type for which label or listing service is not provided.

B. Materials shall be of same brand or manufacturer throughout for each class of material or equipment.

C. The following equipment has been selected by the Owner and the Security Consultant to be included based upon performance and integration with other systems included in the Design Standards.

2.2 ACAMS SERVER HARDWARE AND SOFTWARE

A. The ACAMS server hardware shall be included as follows:
   1. Rackmount Server (Dell Precision R7920-2RU):
      a. Intel Zeon Bronze 3106 (8C/8T, 1.7GGHZ, 9.6GT/S, 11MB, 85W
      b. 16GB (2X8GB) 2666MHZ DDR4 RDIMM ECC.
      c. DVD +/-RW, SATA, Internal.
      d. 500GB 7.2k RPM 2.5 Serial ATA Hard Drive.
      e. C1 SATA/SSD 2.5", 1-8 HD.
      f. Windows 10 IOT Enterprise 2016 Embedded.
      g. Intel 1350 (4x1GBit) Quad Port Network Card.
      h. Sliding Ready Rails without Cable Management Arm and 3 Year warranty.
      i. Rack Mount Server shall be by Paxton, or approved equal.

B. The ACAMS server software shall be included as follows:
   1. Operating System Software: Microsoft Windows 10 IoT Embedded.
   2. Database Software: Microsoft Sequel Express.
   3. ACAMS system software: Paxton Net 2.

2.3 ACAMS WORKSTATION HARDWARE AND SOFTWARE

A. The ACAMS Administration workstation hardware and software shall be included as follows:
   1. Mid-Tower Workstation (Dell Precision T5820):
      a. INTEL ZEON W-2104 CPU (4C, 5.5MB, 4T, 3GHZ, 120W.
      b. 8GB (1X8G 2666MHZ DDR RDIMM ECC.

c. 8X DVD+/-RW.
d. 500GB 2.5INCH SERIAL ATA (7,200 RPM Hard Drive).
e. INVIDEA NVS 315 (1GB DMS56 TO DVI-I ADAPTER).
f. Windows 10 IOT Enterprise 2015 Embedded.
g. RJ45 Ethernet Port.
h. Internal Chassis Speakers.
i. (6) USB 2.0 Ports.
j. (4) USB 3.0 Ports.
k. (1) Serial port.
l. USB Keyboard/Mouse.
m. 3 Year Limited Warranty.

2. Software:
   a. Operating System: Microsoft Windows 10.

2.4 ACAMS VIDEO MONITORS

A. Video Monitor:
   1. 24" Widescreen LCD.
   2. 1920 x 1200 Resolution @ 60 Hz.
   3. 8ms response time.
   4. DVI-D, VGA and Display Port Inputs.
   5. 4 x USB 2.0 Type A x USB 2.0 Type B Ports.
   6. 1000:1 Contrast Ratio.
   7. Video Monitor shall be by Dell, Model U2412M or approved equal.

2.5 ACCESS CONTROL DEVICE HARDWARE REQUIREMENTS

A. TCP/IP Controller:
   1. On-board Ethernet 10/100Base-T port.
   2. Host communications 38.4 Kbps direct wire (RS-232/RS-485 multi-dropped).
   3. Reader communications supports (Clock, Data or wiegand, Data1/Data0), Clock Data and OSDP compatible RS-485 readers and keypads.
   4. Battery backed non-volatile storage of 50,000 events.
   5. 12 VDC input power.
   6. 6 Mb of available on-board memory.
   7. Two (2) dedicated digital inputs for tamper and power failure status.
   8. Status LED’s for heartbeat, upstream and downstream communication.
   9. Shall have eight (8) unsupervised/supervised inputs, standard EOL: 1k/1k ohm.
   10. Shall have four (4) Form-C 5A @ 30VDC.
   11. Shall have two (2) Wiegand reader interfaces.
   12. Intelligent Dual Reader Controller shall be by Paxton Access Net2 Plus, Single Door Controller (682-610-US). Reference drawings for locations and quantities of access doors and closets. Any equipment deviations or configuration modifications shall be

pre-approved prior to bid.

B. Card Readers:
   1. Shall be mounted as detailed in the Design Standards.
   2. Shall be read when presented in any orientation or at any angle to the surface of the reader.
   3. Support for 125kHz proximity cards:
      a. HID Proximity
      b. AWID Proximity
      c. CASI/GE Security Proxlite.
   4. Support for 13.56 mHz smart cards:
      a. MIFARE DESFIRE EV1/EV2.
      b. MIFARE Classic - ISO 14443.
      c. Vicinity Card Serial Number - ISO 15693.
      d. HID iClass** Card
   5. Includes optical tamper switch.
   6. Damage or vandalism to the reader shall not damage any other part of the access control system.
   7. Outdoor reader operating temperature ranges shall be -31°F to +149°F (-35°C to +65°C).
   8. Shall be provided in standard black textured finish.
   9. Shall operate on 12VDC with a peak current draw of 73mA.
   10. Card reader shall be by HID Plus Mini Mullion Reader, Model# 6005BGB00. Substitutions must be pre-approved by Owner representative.

C. Credentials:
   1. Card Credentials:
      a. Shall be 26-bit prox.
      b. Shall be a 125 KHz format.
      c. Shall be a two-part clamshell design.
      d. Shall have a laser etched card number.
      e. Coordinate quantity of credentials with the Owner.

D. Alarm Contacts:
   1. Type A – Recess Mounted:
      a. Shall be single-pole, double throw (SPDT) unit.
      b. Shall provide dual circuit operation to provide operation suitable for a line supervision circuit.
      c. Switches shall be capable of initiating an alarm signal when the protected door is opened 1” on the latch side.
      d. Shall be installed in the door header and the associated magnet shall be installed in the door.
      e. Match alarm contact color with frame.
      f. Alarm contact shall be by Interlogix, Model 1076CW or approved equal.

2. Type B – Tamper:
   a. Shall be single-pole, single throw (SPST) unit.
   b. Shall be capable of initiating an alarm signal when the protected door is opened 3/8".
   c. Shall be installed inside enclosures requiring a tamper switch.
   d. Tamper shall be by Interlogix, Model 3025T or approved equal.

E. Door Release Pushbutton
   1. Pushbutton shall have an impact resistant housing.
   2. Pushbutton shall have nickel plated brass terminals.
   3. Pushbutton shall have a momentary operation.
   4. Door Release Pushbutton shall be by United Security Products, Model HUB2SA or approved equal.

F. Electronic Lock Hardware:
   1. Electric Locks: Electric locks shall be provided by Division 08. Include disassembly and re-assembly as required to provide final termination of ACAMS cabling to the electric lock.
   2. Request-To-Exit (REX) Devices: REX devices shall be included with electric locking hardware as provided by Division 08. Include disassembly and re-assembly as required to provide final termination of ACAMS cabling to the REX devices.
   3. Power Transfer Hinge: Power transfer hinges shall be provided by Division 08. Include disassembly and re-assembly as required to provide final termination of ACAMS cabling to the transfer hinges.

2.6 EQUIPMENT ENCLOSURES

A. TYPE A – Large:
   1. Enclosure shall be fabricated from 19-gauge steel.
   2. Enclosure shall be black powder coated.
   3. Enclosure shall be 36.12"H x 30.12"W x 7.06"D.
   4. Enclosure shall include a tamper switch and cam lock.
   5. Enclosure shall include a removable metal TM3 backplane.
   6. Enclosure shall be by Altronix, Model Trove3M3 or approved equal.
      a. Include equipment mounting magnets by Altronix, Model MM24 (Qty as required).
      b. Include magnetic cable tie mounts by Altronix, Model WM5 (Qty as required).

B. TYPE B – Medium:
   1. Enclosure shall be fabricated from 16-gauge steel.
   2. Enclosure shall be black powder coated.
   3. Enclosure shall be 27.25"H x 21.75"W x 6.5"D.
   4. Enclosure shall include a tamper switch and cam lock.

5. Enclosure shall include a removable metal TM2 backplane.
6. Enclosure shall be by Altronix, Model Trove2M2 and approved equal.
    a. Include equipment mounting magnets by Altronix, Model MM24 (Qty as required).
    b. Include magnetic cable tie mounts by Altronix, Model WM5 (Qty as required).

2.7 POWER SUPPLIES

A. TYPE A – Power Supply (Reader Boards/Locks):
1. Delivers a 4 amp supply current.
2. Auto switch over to stand-by battery when AC fails w/ zero voltage drop.
3. Filtered and electronically regulated outputs.
4. Short circuit and thermal overload protection.
5. AC fail supervision (form “C” contacts).
6. Low battery supervision (form “C” contacts).
7. Battery presence supervision (form “C” contacts).
8. AC input and DC output LED indicators.
9. 115 VAC input.
10. 12/24 VDC selectable output.
11. Power supply shall be by Altronix, Model eFlow4NB or approved equal.

B. TYPE B – Power Supply (Reader Boards/Locks):
1. Delivers a 6 amp supply current.
2. Auto switch over to stand-by battery when AC fails w/ zero voltage drop.
3. Filtered and electronically regulated outputs.
4. Short circuit and thermal overload protection.
5. AC fail supervision (form “C” contacts).
6. Low battery supervision (form “C” contacts).
7. Battery presence supervision (form “C” contacts).
8. AC input and DC output LED indicators.
9. 115 VAC input.
10. 12/24 VDC selectable output.
11. Power supply shall be by Altronix, Model eFlow6NB or approved equal.

C. TYPE C – Power Supply (Reader Boards):
1. Delivers a 10 amp supply current.
2. Auto switch over to stand-by battery when AC fails w/ zero voltage drop.
3. Filtered and electronically regulated outputs.
4. Short circuit and thermal overload protection.
5. AC fail supervision (form “C” contacts).
6. Low battery supervision (form “C” contacts).
7. Battery presence supervision (form “C” contacts).
8. AC input and DC output LED indicators.

9. 115 VAC input.
10. 12 VDC output.
11. Power supply shall be by Altronix, Model eFlow102NB or approved equal.

D. TYPE D – Power Supply (Locks):
1. Delivers a 10 amp supply current.
2. Auto switch over to stand-by battery when AC fails w/ zero voltage drop.
3. Filtered and electronically regulated outputs.
4. Short circuit and thermal overload protection.
5. AC fail supervision (form “C” contacts).
6. Low battery supervision (form “C” contacts).
7. Battery presence supervision (form “C” contacts).
8. AC input and DC output LED indicators.
9. 115 VAC input.
10. 24 VDC output.
11. Power supply shall be by Altronix, Model eFlow104NB or approved equal.

2.8 RELAY/POWER DISTRIBUTION BOARDS

A. 12/24-volt AC or DC operation.

B. Eight (8) independently controlled Class 2 Rated PTC protected power- limited auto-resettable 2.5A outputs.

C. Eight (8) access control trigger points.
1. Eight (8) normal open (NO) inputs.
2. Eight (8) open collector sink inputs.
3. Any combination of the above.

D. Relay/Power Distribution Board shall be by Altronix, Model ACM8CB or approved equal.

2.9 POWER DISTRIBUTION BOARDS

A. 12/24-volt DC operation up to 10A.

B. Eight (8) individually PTC protected outputs @ 2A per output max.

C. Power Distribution Board shall be by Altronix, Model PD8ULCB or approved equal.

2.10 BACKBOARD REQUIREMENTS

A. Include 3/4" fire retardant plywood backboards at locations as required for mounting Security Equipment Enclosures.

B. Backboards shall be finished with two (2) coats of white paint.

2.11 WIREWAYS

A. Type A – Wireway:
   1. Wireway shall be metal in construction with a standard powder coat finish.
   2. Wireway shall be 6” x 6” x 72”
   3. Wireway shall be by Hoffman, Model F66T172GVP or approved equal. Include closure plates without knockouts by Hoffman, Model F66GCPNKGV or approved equal.

B. Type A – Wireway:
   1. Wireway shall be metal in construction with a standard powder coat finish.
   2. Wireway shall be 6” x 6” x 36”
   3. Wireway shall be by Hoffman, Model F66T136GVP or approved equal. Include closure plates without knockouts by Hoffman, Model F66GCPNKGV or approved equal.

2.12 ASSOCIATED EQUIPMENT

A. Batteries:
   1. Include batteries in the required quantities for each power supply.
   2. Batteries shall be provided in 12VDC with a minimum 7ah capacity.
   3. Batteries shall be by Yuasa or approved equal.

2.13 ELECTRICAL REQUIREMENTS (120VAC)

A. All 120VAC should be coordinated with Division 26 at locations requiring installation of security equipment enclosures, low voltage power supplies and power boosters.

2.14 NETWORK REQUIREMENTS

A. All networking requirements should be coordinated with Division 27 at locations requiring installation of servers, workstations and security equipment enclosures.

PART 3 - EXECUTION

3.1 SECURITY DOOR CONTROL AND MONITORING DEVICES

A. INSTALLATION:
   1. Indicate that all materials and equipment should be installed in accordance with manufacturer's recommendations, instructions, and industry standards.
   2. Indicate that devices shall be installed straight, level and plumb to walls, doors, finished ceiling and/or finished floors, as applicable.

B. ACAMS HARDWARE AND SOFTWARE

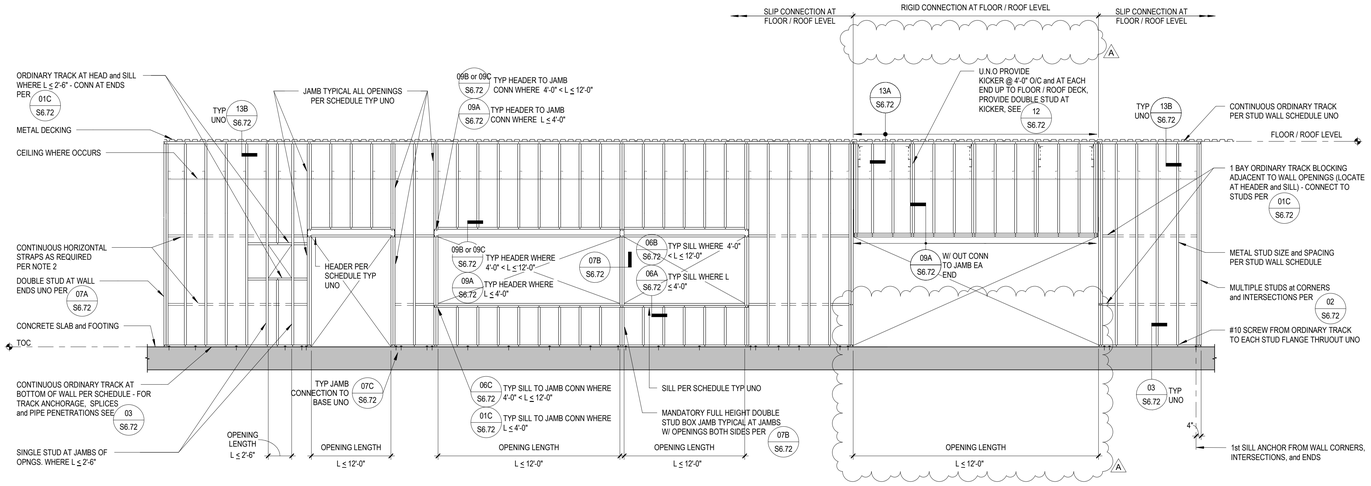
1. Include requirements for final programming and configuration of all security panels and field devices.
2. Indicate that all final configuration and programming of required ACAMS alarm alerts will be coordinated with the Owner.

C. SECURITY DOOR CONTROL AND MONITORING DEVICES:
1. Indicate that card readers shall be installed flush-mounted (unless otherwise noted), to new junction boxes.
2. Indicate that all wiring from each card reader door shall be run to its respective junction box, wireway, intelligent field processor, power supply or security equipment enclosure with no splices or termination points in between.
3. Indicate that end of line resistors (EOL) will be installed at required field devices to provide 4-state supervision monitoring of all installed devices.
4. Indicate that all devices and EOL resistors shall be tested such that desired conditions occur upon activation, which are within the manufacturer's performance specifications.
5. Indicate that field devices shall be configured in series as required to provide a single alarm point designation for each group of devices.
6. Indicate that individual tampers on power supply enclosure shall be wired in series and monitored as a single alarm point on the system.
7. Indicate that all relays, whether specified herein or not, shall be provided and considered incidental to the project.
8. Indicate that no splices shall be made except as required to terminate devices. All connections made at devices shall be soldered and encapsulated by clear heat shrink tubing. Wire nuts, bean connectors, barrel connectors, crimp connectors, etc. shall not be accepted.

D. ELECTRICAL REQUIREMENTS
1. Indicate that the Contractor shall check the adequacy of all power and wiring before making final connections and applying power to the equipment.
2. Indicate that the Contractor shall include termination of 120 VAC power to all power supplies, devices, and other security equipment as required. Items shall include conduit, wiring and connections from 120VAC junction boxes supplied under Division 26 to each security component requiring 120 VAC power.

E. TESTING
1. Indicate that all alarm contacts shall be tested such that alarm conditions occur upon door actuation, which are within the manufacturer’s performance specifications.
2. Indicate that the Contractor shall furnish all necessary instruments and equipment required for conducting tests. All wiring for shorts, open circuits or grounding shall be tested.
3. Indicate that when entire installation has been completed, all circuits will be tested to demonstrate that operation of system is in accordance with the design.

END OF SECTION



TYPICAL EXTERIOR STUD WALL ELEVATION (ONE STORY PLATFORM FRAMED CONDITION) (A)

EXTERIOR HEADER SCHEDULE (SEE 09/S6.72)	
MAX OPNG. LENGTH "L"	HEADER MATERIAL
4'-0"	FLAT MEMBER MATCHING STUD MATERIAL W/ ORDINARY TRACK ABOVE PER STUD WALL SCHEDULE
6'-0"	(2) 600S162-54 W/ ORDINARY TRACK PER STUD WALL SCHEDULE TOP and BOTTOM
8'-0"	(3) 600S162-54 W/ ORDINARY TRACK PER STUD WALL SCHEDULE TOP and BOTTOM
12'-0"	(3) 1000S162-54 W/ ORDINARY TRACK PER STUD WALL SCHEDULE TOP and BOTTOM

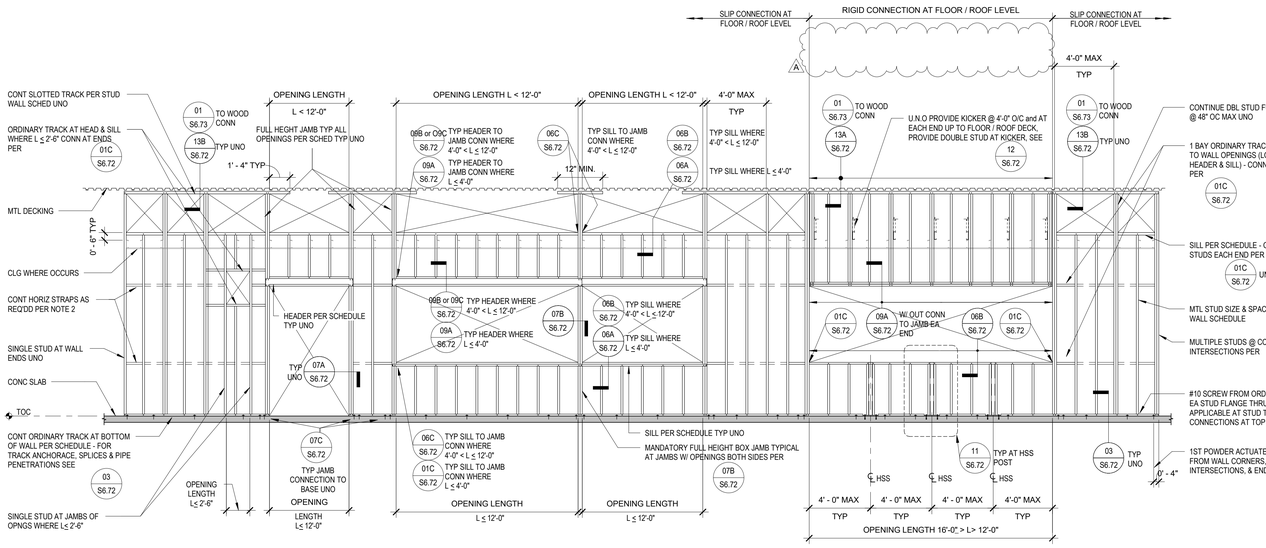
EXTERIOR SILL SCHEDULE (SEE 06/S6.72)	
MAX OPNG. LENGTH "L"	SILL MATERIAL
4'-0"	ORDINARY TRACK PER STUD WALL SCHEDULE
8'-0"	FLAT MEMBER MATCHING STUD MATERIAL W/ ORDINARY TRACK BELOW PER STUD WALL SCHEDULE
12'-0"	(2) FLAT MEMBERS MATCHING STUD MATERIAL W/ ORDINARY TRACK BELOW PER STUD WALL SCHEDULE

EXTERIOR JAMB SCHEDULE (SEE 07/S6.72)		
MAX OPNG. LENGTH "L"	JAMB MATERIAL	SECTION
4'-0"	DOUBLE STUDS MATCHING STUD MATERIAL	07A S6.72
8'-0"	DOUBLE STUDS MATCHING STUD MATERIAL	07A S6.72
12'-0"	DOUBLE STUDS MATCHING STUD MATERIAL -54 MIL (16 GA.) MIN THK	07A S6.72

EXTERIOR STUD WALL SCHEDULE				
STUD SIZE	METAL STUD (SSMA TRACK DESIGNATION) and SPACING	ORDINARY TRACK (SSMA DESIGNATION)	SLOTTED TRACK (PER 13/S6.72) GAUGE	REMARKS
6" STUD	600S162-68@16"O/C	600T150-68	14	WHERE NOTED ON DETAIL OR SECTION (MAX HT "H" = 17'-6")
8" STUD	800S162-54@16"O/C	800T150-54	14	TYPICAL EXTERIOR STUDS UNO (MAX HT "H" =17'-6")

STUD WALL NOTES:
1. SEE LIGHT GAUGE METAL FRAMING GENERAL NOTES ON S0.02.
2. PROVIDE HORIZONTAL STRAPS and BLOCKING AT ALL STUD WALLS EXCEPT WHERE WALL FINISH OCCURS ON BOTH SIDES OF WALL. SEE DETAIL 01/S6.72.
3. STUD SIZES INDICATED ON SCHEDULE IS MINIMUM DESIGN WIDTH. PROVIDE WIDER STUDS IF ARCHITECTURAL CONSTRAINTS REQUIRE WIDER WALL THICKNESSES. REQDUEST CLARIFICATION OF GAUGE, FLANGE, AND RETURN SIZES WHERE WIDER STUDS ARE REQUIRED.
4. ALL EXTERIOR STUDS SHALL BE 8" STUDS UNLESS NOTED OTHERWISE.
5. COORDINATE WITH ARCHITECTURAL DRAWING FOR EXACT VERTICAL SLIP JOINT LOCATIONS (A300 SERIES).
6. STUDS THAT ARE SUPPORTING LIGHT (BETWEEN 50 lbs and 250 lbs) EQUIPMENT or CASEWORK SHALL BE 16 GA. MIN WHERE HEAVY (EXCEEDING 250 lbs) EQUIPMENT OR CASEWORK OCCUR PROVIDE DOUBLE STUDS OF 16 GA. MIN (INTERCONNECT PER 07A/S6.92).
7. AT LOCATIONS OF FACADE VERTICAL PANEL JOINTS PROVIDE DOUBLE STUDS MATCHING STUD MATERIAL (INTERCONNECT PER 07A/S6.72).
8. WHERE PIPE, CONDUIT, ETC. RUN VERTICALLY WITHIN EXTERIOR WALLS, POSITION PIPE and ADJACENT STUDS PER 09/S6.73.

TYPICAL EXTERIOR STUD WALL SCHEDULES and ELEVATIONS | 1/4" = 1'-0" | 03



TYPICAL INTERIOR STUD WALL ELEVATION

INTERIOR HEADER SCHEDULE (SEE 09/S6.72)	
MAX OPNG. LENGTH "L"	HEADER MATERIAL
4'-0"	FLAT MEMBER MATCHING STUD MATERIAL W/ ORDINARY TRACK ABOVE PER STUD WALL SCHEDULE
8'-0"	(2) 600S162-43 W/ ORDINARY TRACK TOP and BOTTOM PER STUD SCHEDULE
12'-0"	(2) 800S162-43 W/ ORDINARY TRACK TOP and BOTTOM PER STUD SCHEDULE
16'-0"	(3) 800S162-54 W/ 16 GA. ORDINARY TRACK TOP and BOTTOM PER STUD SCHEDULE

INTERIOR SILL SCHEDULE (SEE 06/S6.72)	
MAX OPNG LENGTH "L"	SILL MATERIAL
4'-0"	ORDINARY TRACK PER STUD WALL SCHEDULE
8'-0"	FLAT MEMBER MATCHING STUD MATERIAL W/ ORDINARY TRACK BELOW PER STUD WALL SCHEDULE
12'-0"	(2) FLAT MEMBERS MATCHING STUD MATERIAL W/ ORDINARY TRACK BELOW PER STUD WALL SCHEDULE
16'-0"	(3) FLAT MEMBERS MATCHING STUD MATERIAL W/ ORDINARY TRACK BELOW PER STUD WALL SCHEDULE

INTERIOR JAMB SCHEDULE (SEE 07/S6.72)		
MAX OPNG. LENGTH "L"	JAMB MATERIAL	SECTION
4'-0"	DOUBLE STUDS MATCHING STUD MATERIAL	07A S6.72
8'-0"	DOUBLE STUDS MATCHING STUD MATERIAL	07A S6.72
12'-0"	DOUBLE STUDS MATCHING STUD MATERIAL -54 MIL (16 GA.) MIN THK	07A S6.72
16'-0"	DOUBLE STUDS MATCHING STUD MATERIAL -54 MIL (16 GA.) MIN THK	07A S6.72

INTERIOR STUD WALL SCHEDULE				
STUD SIZE	MTL STUD (SSMA TRACK DESIGNATION) & SPACING	ORDINARY TRACK (SSMA DESIGNATION)	VERT SLOTTED TRACK (PER 13/S6.72) GAUGE	REMARKS
4" STUD	400S162-43@16" O/C	400T150-43	16	WHERE NOTED ON DETAIL OR SECTION (MAX SPAN = 17'-6")
6" STUD	600S162-43 @16" O/C	600T150-43	16	WHERE NOTED ON DETAIL OR SECTION (MAX SPAN = 24'-0")
6" STUD	600S162-54 @16" O/C	600T150-54	14	WHERE NOTED ON DETAIL OR SECTION (MAX SPAN = 29'-0")
8" STUD	800S162-54 @16" O/C	800T150-54	14	WHERE NOTED ON DETAIL OR SECTION (MAX SPAN = 29'-0")

RATED SHAFT WALL SCHEDULE			
METAL STUD and SPACING	TRACK GAGE	MAXIMUM HT.	
		1HR	2HR
4" x 18" GA. CH STUD	18	15'-8"	14'-8"
6" x 18" GA. CH STUD	18	20'-8"	19'-2"
(2) 18 GA. E STUD (INTERCONNECT PER 07A/S6.72 SIM.)	18	29'-0"	29'-0"

NOTES:
1. SEE ARCHITECTURAL FOR FURTHER CLARIFICATION OF FIRE RATED ASSEMBLY.
2. PROVIDE CT SHAFT WALL FRAMING CONFORMING TO ICC ESR 4934.

STUD WALL NOTES:
1. SEE LIGHT GAUGE METAL FRAMING GENERAL NOTES ON S0.02.
2. PROVIDE HORIZONTAL STRAPS and BLOCKING AT ALL STUD WALLS EXCEPT WHERE WALL FINISH OCCURS ON BOTH SIDES OF WALL. SEE DETAIL 01/S6.72.
3. STUD SIZES INDICATED ON SCHEDULE IS MINIMUM DESIGN WIDTH. PROVIDE WIDER STUDS IF ARCHITECTURAL CONSTRAINTS REQUIRE WIDER WALL THICKNESSES. REQDUEST CLARIFICATION OF GAUGE, FLANGE, AND RETURN SIZES WHERE WIDER STUDS ARE REQUIRED.
4. ALL INTERIOR STUDS SHALL BE 4" STUDS UNLESS NOTED OTHERWISE.
5. COORDINATE WITH ARCHITECTURAL DRAWING FOR EXACT VERTICAL SLIP JOINT LOCATIONS (A300 SERIES).
6. STUDS THAT ARE SUPPORTING LIGHT (BETWEEN 50 lbs and 250 lbs) EQUIPMENT or CASEWORK SHALL BE 16 GA. MIN WHERE HEAVY (EXCEEDING 250 lbs) EQUIPMENT OR CASEWORK OCCUR PROVIDE DOUBLE STUDS OF 16 GA. MIN (INTERCONNECT PER 07A/S6.92).
7. AT LOCATIONS OF FACADE VERTICAL PANEL JOINTS PROVIDE DOUBLE STUDS MATCHING STUD MATERIAL (INTERCONNECT PER 07A/S6.72).
8. WHERE PIPE, CONDUIT, ETC. RUN VERTICALLY WITHIN INTERIOR WALLS, POSITION PIPE and ADJACENT STUDS PER 09/S6.73.

TYP INTERIOR STUD WALL SCHEDULES & ELEVATION | 1/4" = 1'-0" | 01

LPA
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REGISTERED PROFESSIONAL ENGINEER DANIEL S. WANG No. S4167 STRUCTURAL STATE OF CALIFORNIA

MOORPARK CITY LIBRARY
83 W HIGH ST, MOORPARK, CA 93021
Developed for CITY OF MOORPARK

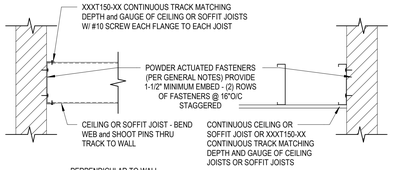
Revision	Date
A ADDENDUM #1	06/20/2025

Submittal	Date
SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
95% CONSTRUCTION DOCS	02/02/2024
AGENCY SUBMITTAL #1	03/01/2024
AGENCY SUBMITTAL #2	10/31/2024
AGENCY SUBMITTAL #3	03/27/2025
BID DOCUMENTS	05/23/2025

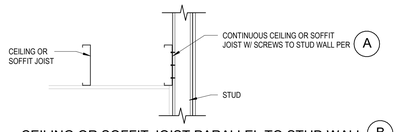
Job Number	30647
Date Published	08/15/2024
Checked By	NP/MC
Scale	1/4" = 1'-0"

TYPICAL LIGHT GAUGE FRAMING SCHEDULES and ELEVATIONS

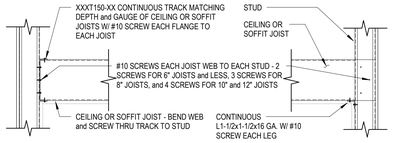
S6.71B



CEILING OR SOFFIT JOIST TO CONCRETE OR CONCRETE BLOCK WALL (C)



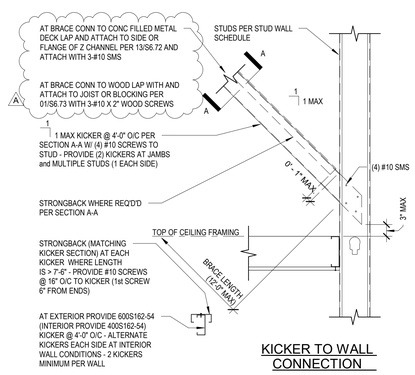
CEILING OR SOFFIT JOIST PARALLEL TO STUD WALL (B)



CEILING OR SOFFIT JOIST PERPENDICULAR TO STUD WALL (A)

NOTE:
1. PROVIDE CEILING OR SOFFIT JOIST LATERAL BLOCKING PER DETAIL 17/-.

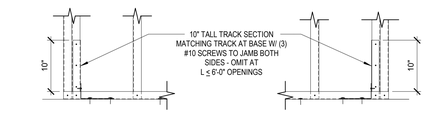
TYPICAL CEILING OR SOFFIT JOIST TO WALL CONNECTION DETAILS | 16



SECTION A-A

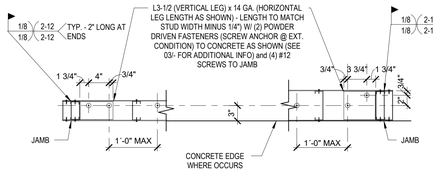
KICKER TO WALL CONNECTION

TYPICAL KICKER DETAIL | 12



ELEVATION AT 4" WALLS and SMALLER

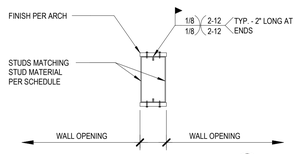
ELEVATION AT 6" WALLS and LARGER



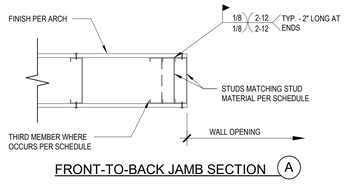
PLAN VIEW AT 4" WALLS and SMALLER

PLAN VIEW AT 6" WALLS and LARGER

JAMB CONNECTION AT BASE (C)

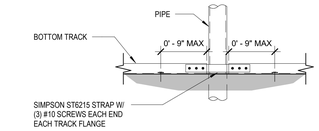


BOX JAMB SECTION (B)

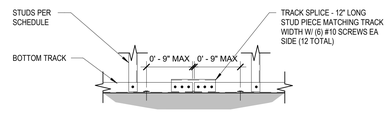


FRONT-TO-BACK JAMB SECTION (A)

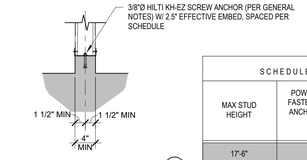
TYPICAL STUD WALL JAMB CONSTRUCTION AT OPENINGS | 07



BOTTOM TRACK PENETRATION DETAIL (D)

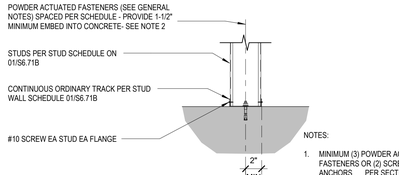


BOTTOM TRACK SPLICE DETAIL (C)



SCHEDULE	
MAX STUD HEIGHT	POWDER ACTUATED FASTENER OR SCREW ANCHOR SPACING AS DETAILED
17'-6"	24"
29'-0"	16"

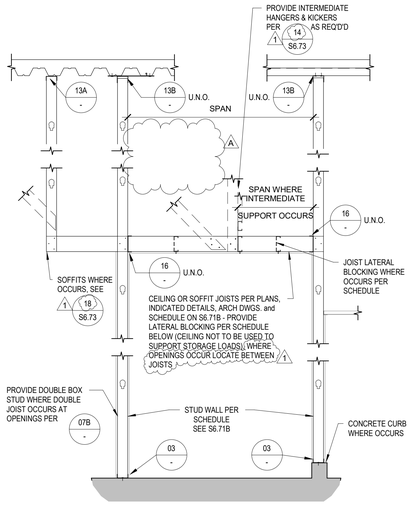
BASE AT CURB DETAIL (B)



NOTES:
1. MINIMUM (3) POWDER ACTUATED FASTENERS OR (2) SCREW ANCHORS PER SECTION OF TRACK.
2. PROVIDE SCREW ANCHORS PER 3B/- AT EXTERIOR WALLS, INTERIOR WALLS WITH CURBS, AND INTERIOR WALLS SUPPORTING ANY CABINETRY - OR - ANY EQUIPMENT HEAVIER THAN 40 LBS.

TYP BASE DETAIL (A)

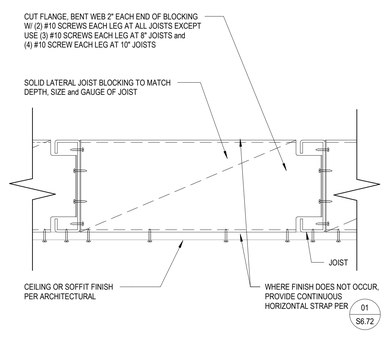
TYP STUD WALL BASE CONSTRUCTION TO CONCRETE | 03



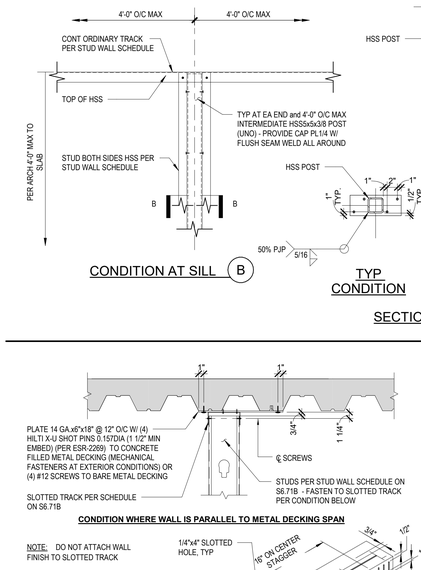
CEILING OR SOFFIT JOIST SCHED.			
INTERIOR / EXTERIOR	MAX SPAN (SEE NOTE 1)	CEILING OR SOFFIT JOIST	JOIST LATERAL BLOCKING PER 17/-
INTERIOR	10'-0"	400S162-43 @ 16" O/C	(1) ROW AT MID-SPAN
INTERIOR	16'-0"	600S162-54 @ 16" O/C	(2) ROWS AT 1/3 POINTS
EXTERIOR	10'-0"	600S162-54 @ 16" O/C	(1) ROW AT MID-SPAN

NOTE:
1. WHERE DOUBLE JOIST OCCURS AT OPENINGS, MAXIMUM SPAN OF DOUBLE JOIST TO BE 10'-0"O/C MAX
2. FOR CONNETION TO WOOD ROOF SEE DETAIL 1/S6.73.

TYPICAL CEILING OR SOFFIT FRAMING SECTION | 18

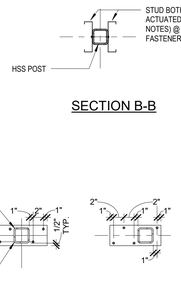


TYP JOIST LATERAL BLOCKING | 17



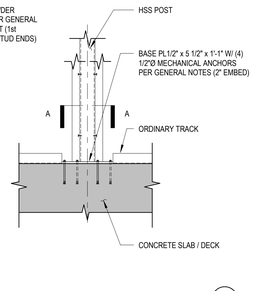
CONDITION AT SILL (B)

TYP CONDITION



SECTION B-B

ENDS and CORNERS

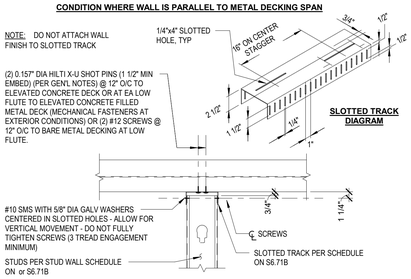


CONDITION AT CONCRETE SLAB (A)

SECTION A-A

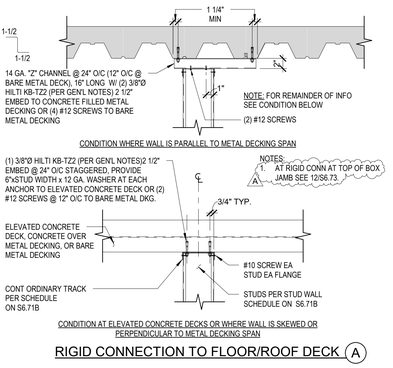
TYPICAL HSS POST AT INTERIOR WALLS | 11

CONDITION WHERE WALL IS PARALLEL TO METAL DECKING SPAN



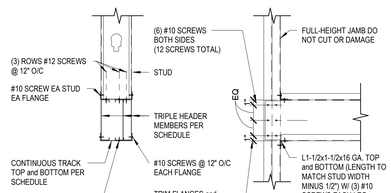
CONDITION AT ELEVATED CONCRETE DECKS OR CONDITION WHERE WALL IS SKEWED OR PERPENDICULAR TO METAL DECKING SPAN

SLIP CONNECTION TO FLOOR/ROOF DECK (B)



RIGID CONNECTION TO FLOOR/ROOF DECK (A)

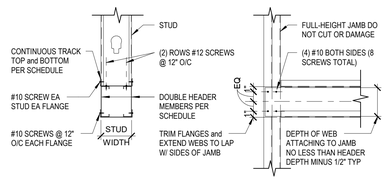
TYP RIGID and SLIP CONN AT TOP OF STUD WALL TO FLOOR/ROOF DECK | 13



HEADER SECTION

HEADER TO JAMB CONNECTION

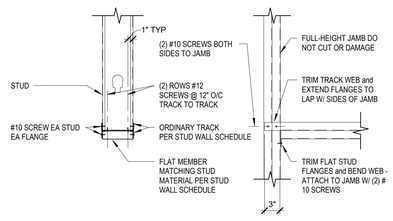
CONDITION AT TRIPLE STUD HEADER (C)



HEADER SECTION

HEADER TO JAMB CONNECTION

CONDITION AT DOUBLE STUD HEADER (B)

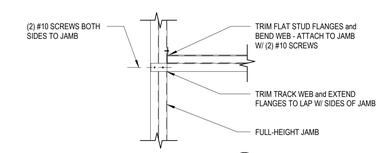


HEADER SECTION

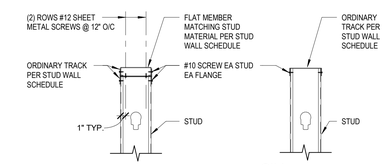
HEADER TO JAMB CONNECTION

CONDITION AT FLAT MEMBER HEADER (A)

TYPICAL STUD WALL HEADER CONSTRUCTION AT OPENINGS | 09



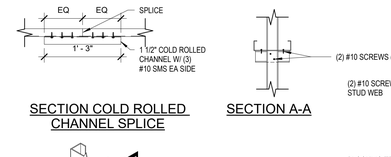
SILL CONNECTION (C)



SILL SECTION (B)

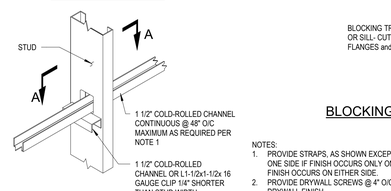
SILL SECTION (A)

TYPICAL STUD WALL SILL CONSTRUCTION AT OPENINGS | 06



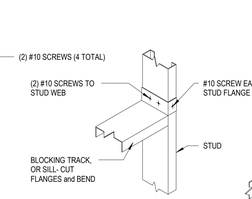
SECTION COLD ROLLED CHANNEL SPLICE

SECTION A-A

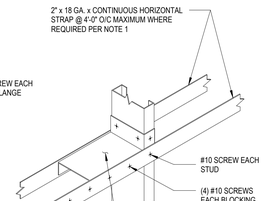


BRIDGING OPTION (B)

NOTES:
1. PROVIDE STRAPS, AS SHOWN EXCEPT WHERE WALL FINISH OCCURS ON BOTH SIDES. PLACE STRAPS ON ONE SIDE IF FINISH OCCURS ONLY ON OTHER SIDE. PLACE STRAPS ON BOTH SIDES OF STUDS WHERE NO FINISH OCCURS ON EITHER SIDE.
2. PROVIDE DRYWALL SCREWS @ 4" O/C TO TRACK BLOCKING WHEREVER BLOCKING OCCURS BEHIND DRYWALL FINISH.
3. DO NOT CUT OR DAMAGE VERTICAL STUDS DURING INSTALLATION OF CONNECTION ELEMENTS SUCH AS HEADERS, SILLS, BLOCKING, OR BRIDGING.
4. WHERE VERTICAL PIPE PENETRATION PIPE OCCURS, PROVIDE STRAP OPTION PER 1A and RELOCATE BLOCKING AS REQ'D'D.



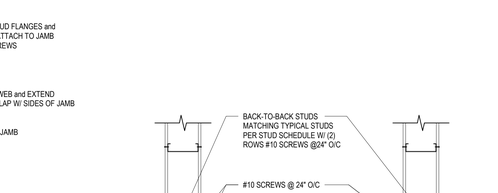
BLOCKING TO STUD CONNECTION (C)



STRAP OPTION (A)

TYPICAL METAL STUD STRAPPING OR BRIDGING DETAIL | 01

TYPICAL METAL STUD CONSTRUCTION at CORNERS and INTERSECTIONS | 02



PLAN VIEW AT TYPICAL CORNERS (B)

PLAN VIEW AT TYPICAL INTERSECTIONS (A)

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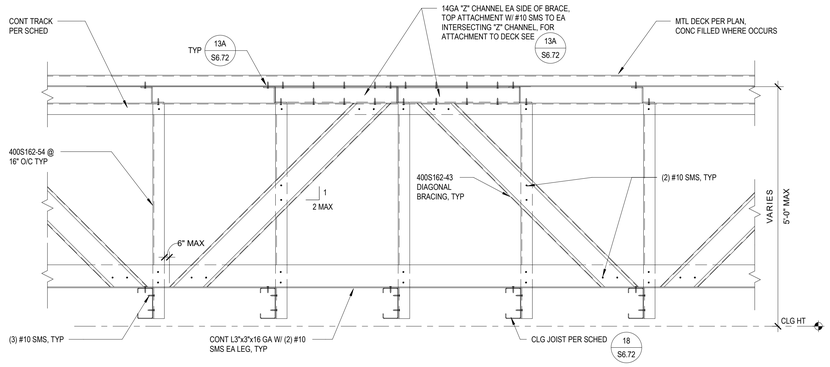
Revision	Date
A ADDENDUM #1	06/20/2025

Submittal	Date
SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
90% CONSTRUCTION DOCS	02/02/2024
AGENCY SUBMITTAL #1	04/05/2024
AGENCY SUBMITTAL #2	10/31/2024
AGENCY SUBMITTAL #3	03/27/2025
BID DOCUMENTS	05/23/2025

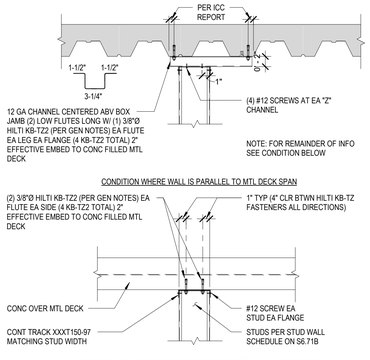
Job Number	30647
Date Published	08/15/2024
Checked By	NP/MC
Scale	As indicated

TYPICAL LIGHT GAUGE METAL FRAMING DETAILS

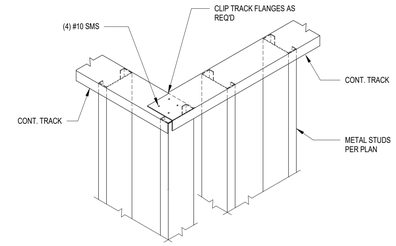
S6.72



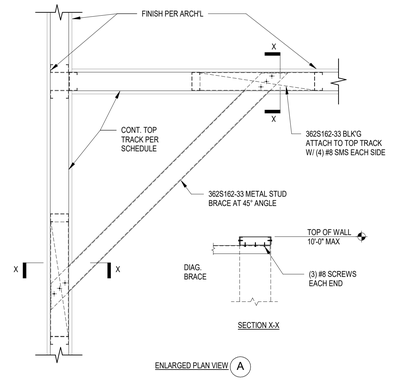
TYP SOFFIT BRACING | 16

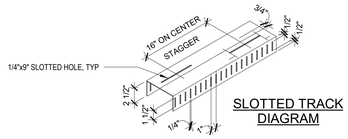


TYP RIGID CONN @ TOP OF BOX STUD JAMB TO FLR DECK | 12

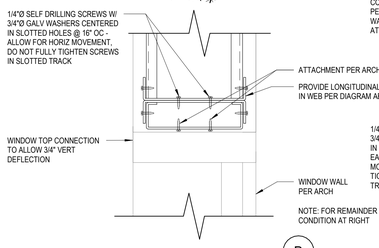


TYPICAL OVERLAP OF CORNER | 08

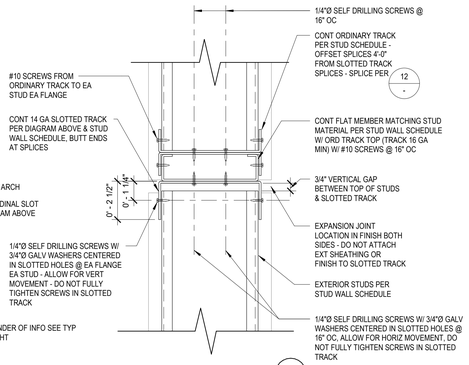




SLOTTED TRACK DIAGRAM

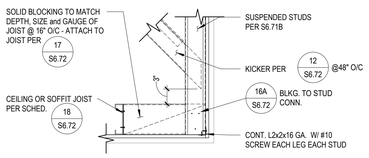


CONDITION AT WINDOW HEAD B

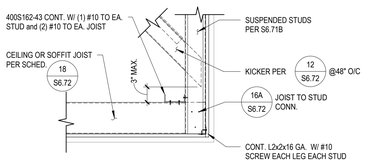


TYPICAL CONDITION A

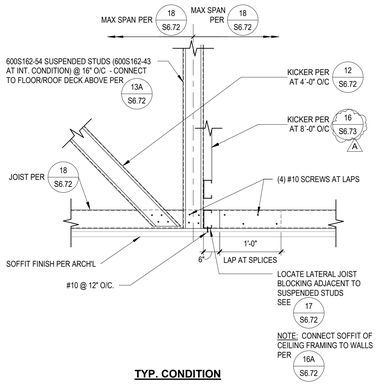
TYP SECTION AT EXT WALL HORIZ EXPANSION JOINT | 15



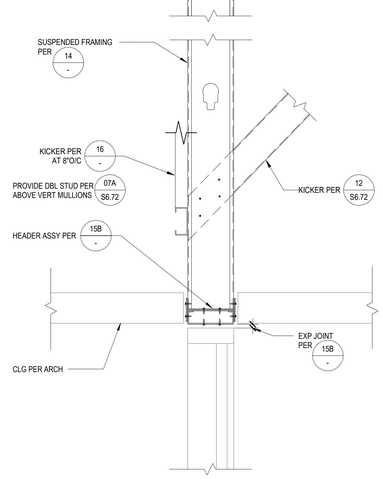
CEILING OR SOFFIT JOIST PARALLEL TO SUSPENDED STUD WALL B



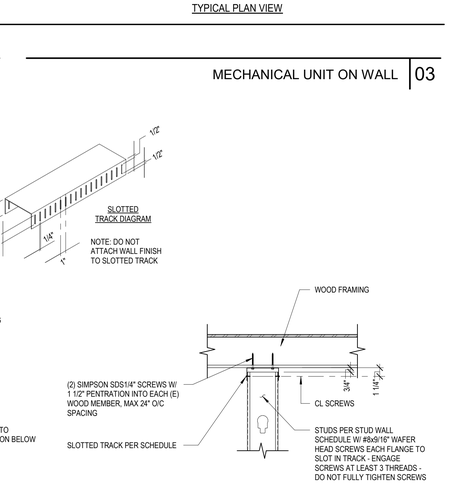
CEILING OR SOFFIT JOIST PERPENDICULAR TO SUSPENDED STUD WALL A



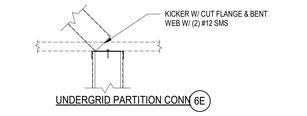
TYP. CONDITION



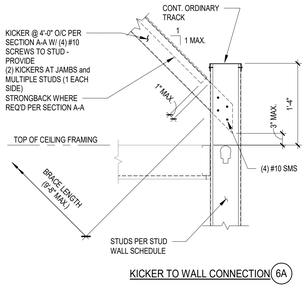
TYPICAL OVERLAP OF CORNER | 08



TYPICAL PLAN VIEW

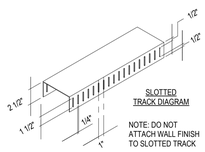


UNDERGRID PARTITION CONN 6E



KICKER TO WALL CONNECTION 6A

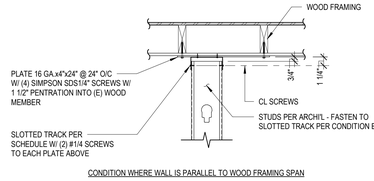
KICKER CONNECTION | 07



SLOTTED TRACK DIAGRAM

NOTE: DO NOT ATTACH WALL FINISH TO SLOTTED TRACK

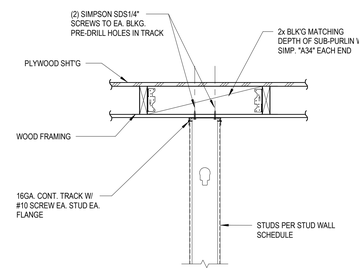
MECHANICAL UNIT ON WALL | 03



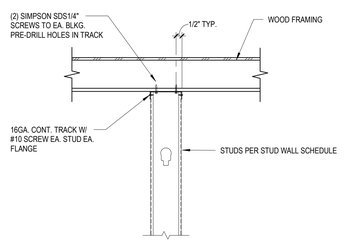
CONDITION WHERE WALL IS PARALLEL TO WOOD FRAMING SPAN

CONDITION WHERE WALL IS SKEWED OR PERPENDICULAR TO WOOD FRAMING SPAN

SLIP CONNECTION TO ROOF B



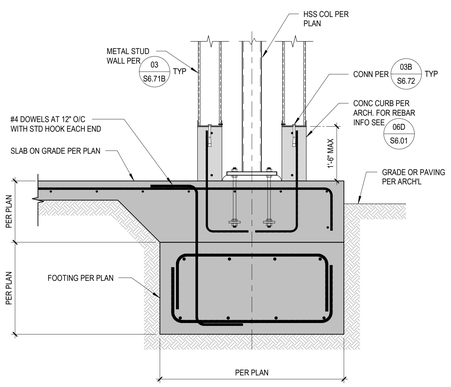
CONDITION WHERE WALL IS PARALLEL TO JOIST SPAN



CONDITION WHERE WALL IS PERPENDICULAR OR SKEWED TO JOIST SPAN

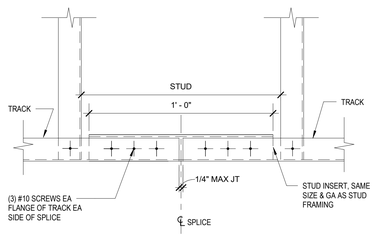
RIGID CONNECTION TO ROOF A

TYP. CEILING OR SOFFIT JOIST TO SUSPENDED WALL | 18



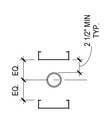
SECTION DETAIL AT METAL STUD WALL | 17

TYP. SOFFIT OR GYP. BD. CLG. SUSPENDED FROM FLR. OR ROOF FRMG. | 14

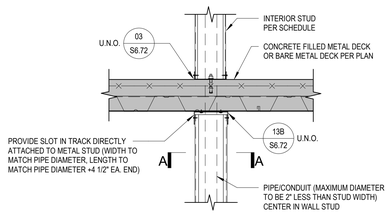


TYP TRACK SPLICE ELEVATION | 13

TYP SOFFIT ABOVE INT GLAZING | 10



PLAN VIEW A-A



VERTICAL PIPE PENETRATION | 09

TYPICAL SOFFIT CONSTRUCTION AT SAWN JOIST FRAMING | 01

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REGISTERED PROFESSIONAL ENGINEER DANIEL S. WANG No. S4457 STRUCTURAL STATE OF CALIFORNIA

MOORPARK CITY LIBRARY
83 W HIGH ST, MOORPARK, CA 93021
Developed for CITY OF MOORPARK

Revision	Date
A ADDENDUM #1	06/20/2025

Submittal	Date
SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
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AGENCY SUBMITTAL #1	08/15/2024
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Job Number	30647
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Scale	As indicated

TYPICAL LIGHT GAUGE METAL FRAMING DETAILS

S6.73

23 - SINGLE DUCT VARIABLE AIR VOLUME TERMINAL UNITS (VAV)

TAG	NECK SIZE (Ø)	CASING DIMENSIONS (L"xW"xH")	MFR / MODEL NO.	SERVICE	COOLING AIRFLOW MAXIMUM (CFM)	COOLING AIRFLOW MINIMUM (CFM)	HEATING AIRFLOW MAXIMUM (CFM)	HEATING AIRFLOW MINIMUM (CFM)	ELECTRIC REHEAT COIL MAX. COIL CAPACITY (KW)	EAT (°F)	LAT (°F)	COIL AMPS	MCA	MOP	CO2 CONTROL	CRITICAL ZONE (Y/N)	ELECTRICAL VOLT.	ELECTRICAL PHASE	OPERATING WEIGHT (LBS.)	REMARKS
VAV 1-1	10	76X14X12.5	PRICE / SDV	MULTIPURPOSE 124	1100	225	550	225	6.1	55	90	22.02	30	35	Y	Y	277 V	1	50	1, 2, 3, 4, 5, 6, 7
VAV 1-2	12	76X16X15	PRICE / SDV	MULTIPURPOSE 124	1200	250	600	250	6.6	55	90	23.83	32.5	35	Y	Y	277 V	1	60	1, 2, 3, 4, 5, 6, 7
VAV 1-3	6	76X12X8	PRICE / SDV	KITCHEN 123	150	25	125	75	1.4	55	90	5.05	6.9	15	N	Y	277 V	1	45	1, 2, 3, 4, 5, 6, 7
VAV 1-4	8	76X12X10	PRICE / SDV	CHILDREN'S COLLECTION 140 & LACT. 141	400	75	200	75	2.2	55	90	7.94	10.8	15	N	Y	277 V	1	45	1, 2, 3, 4, 5, 6, 7
VAV 1-5	12	76X16X15	PRICE / SDV	CHILDREN'S COLLECTION 140A	1500	300	750	300	8.3	55	90	29.96	40.8	45	N	Y	277 V	1	60	1, 2, 3, 4, 5, 6, 7
VAV 1-6	12	76X16X15	PRICE / SDV	HALL 134	1600	325	800	325	8.9	55	90	32.13	43.8	45	N	Y	277 V	1	60	1, 2, 3, 4, 5, 6, 7
VAV 1-7	10	76X14X12.5	PRICE / SDV	HALL 120 & RESTROOM	1000	200	500	200	5.5	55	90	19.86	27.1	30	N	Y	277 V	1	50	1, 2, 3, 4, 5, 6, 7
VAV 1-8	6	76X12X8	PRICE / SDV	LIBRARY MANAGER 110	150	25	75	75	0.8	55	90	2.89	3.9	15	N	Y	277 V	1	40	1, 2, 3, 4, 5, 6, 7
VAV 1-9	10	76X14X12.5	PRICE / SDV	MARKETPLACE 118	1000	200	500	200	5.5	55	90	19.86	27.1	30	N	Y	277 V	1	50	1, 2, 3, 4, 5, 6, 7
VAV 1-10	12	76X16X15	PRICE / SDV	MARKETPLACE 118	1500	300	750	300	8.3	55	90	29.96	40.8	45	N	Y	277 V	1	60	1, 2, 3, 4, 5, 6, 7
VAV 1-11	8	76X12X10	PRICE / SDV	FOTL WORK 117	400	75	200	75	2.2	55	90	7.94	10.8	15	N	Y	277 V	1	45	1, 2, 3, 4, 5, 6, 7
VAV 2-1	14	76X20X17.5	PRICE / SDV	ADULT COLLECTION 101A	2100	425	1050	425	11.6	55	90	41.88	57.1	60	N	Y	277 V	1	75	1, 2, 3, 4, 5, 6, 7
VAV 2-2	14	76X20X17.5	PRICE / SDV	ADULT COLLECTION 101A	2100	425	1050	425	11.6	55	90	41.88	57.1	60	N	Y	277 V	1	75	1, 2, 3, 4, 5, 6, 7
VAV 2-3	8	76X12X10	PRICE / SDV	STUDY A 102	230	50	115	75	1.3	55	90	4.69	6.4	15	Y	Y	277 V	1	45	1, 2, 3, 4, 5, 6, 7
VAV 2-4	8	76X12X10	PRICE / SDV	STUDY B 103 & C 104	230	50	115	75	1.3	55	90	4.69	6.4	15	Y	Y	277 V	1	45	1, 2, 3, 4, 5, 6, 7
VAV 2-5	6	76X12X8	PRICE / SDV	STUDY D 105	135	25	75	75	0.8	55	90	2.89	3.9	15	Y	Y	277 V	1	40	1, 2, 3, 4, 5, 6, 7
VAV 2-6	8	76X12X10	PRICE / SDV	TEEN COLLECTION & INNOVATION CENTER 106	500	100	250	100	2.8	55	90	10.11	13.8	15	N	Y	277 V	1	45	1, 2, 3, 4, 5, 6, 7
VAV 2-7	10	76X14X12.5	PRICE / SDV	TEEN COLLECTION & INNOVATION CENTER 106	800	150	400	150	4.4	55	90	15.88	21.6	25	N	Y	277 V	1	50	1, 2, 3, 4, 5, 6, 7
VAV 2-8	8	76X12X10	PRICE / SDV	MULTIPURPOSE 130	300	50	150	75	1.7	55	90	6.14	8.4	15	Y	Y	277 V	1	45	1, 2, 3, 4, 5, 6, 7
VAV 2-9	10	76X14X12.5	PRICE / SDV	STAFF LOUNGE 107	550	100	275	100	3.0	55	90	10.83	14.8	15	Y	Y	277 V	1	50	1, 2, 3, 4, 5, 6, 7
VAV 2-10	10	76X14X12.5	PRICE / SDV	STAFF WORKROOM 109	800	150	400	150	4.4	55	90	15.88	21.6	25	N	Y	277 V	1	50	1, 2, 3, 4, 5, 6, 7
VAV 2-11	12	76X16X15	PRICE / SDV	CHILDREN'S COLLECTION STACK 140A	1400	275	700	275	7.8	55	90	28.16	38.4	40	N	Y	277 V	1	60	1, 2, 3, 4, 5, 6, 7
VAV 2-12	12	76X16X15	PRICE / SDV	CHILDREN'S COLLECTION 140	1250	250	625	250	6.9	55	90	24.91	33.9	35	N	Y	277 V	1	60	1, 2, 3, 4, 5, 6, 7

REMARKS:

1. FACTORY PROVIDED DISCONNECT SWITCH
2. FACTORY PROVIDED 1" FIBER FREE DUCT LINER, 3 FOOT LENGTH (SINGLE OR MULTI OUTLET - SEE PLANS FOR LOCATIONS)
3. FACTORY PROVIDED 120V/24V TRANSFORMER. ELECTRICAL TO CONNECT
4. FIELD PROVIDED CONTROLLER, BACNET
5. ULTRA-LOW FLOW PRESSURE TRANSDUCER
6. FOR SEQUENCE AND CONTROL POINTS: SEE ASHRAE GUIDELINE 36-2018 5.1.16.3
7. SCRV - 0 TO 10 VDC CONTROL

23 - ROOFTOP PACKAGED MULTI ZONE VAV UNIT WITH RETURN FAN SCHEDULE

TAG	UNIT MFR	UNIT MODEL	SERVICE	LOCATION	NOMINAL CAPACITY (TONS)	AMBIENT (°F)	OUTSIDE AIR DESIGN (CFM)	OUTSIDE AIR MIN. CO2 (CFM)	EER / (IEER)	SUPPLY FAN PERFORMANCE AIRFLOW (CFM)	SUPPLY FAN PERFORMANCE EXT. STATIC PRESSURE (IN-WG)	SUPPLY FAN PERFORMANCE DRIVE TYPE	SUPPLY FAN PERFORMANCE MOTOR DATA HP	SUPPLY FAN PERFORMANCE MOTOR DATA BHP	SUPPLY FAN PERFORMANCE MOTOR DATA RPM	RETURN FAN PERFORMANCE AIRFLOW (CFM)	RETURN FAN PERFORMANCE EXT. STATIC PRESSURE (IN-WG)	RETURN FAN PERFORMANCE DRIVE TYPE	RETURN FAN PERFORMANCE MOTOR DATA HP	RETURN FAN PERFORMANCE MOTOR DATA BHP	RETURN FAN PERFORMANCE MOTOR DATA RPM	COOLING TOTAL (MBH)	COOLING SENSIBLE (MBH)	COOLING EAT DB (°F)	COOLING EAT WB (°F)	COOLING LAT DB (°F)	COOLING LAT WB (°F)	REFRIGERANT TYPE	REFRIGERANT CHARGE (LBS.)	FILTERS EFFICIENCY	FILTERS NO.	FILTERS SIZE (L"xW"xD")	FILTERS PD (IN-WG) CLEAN	FILTERS PD (IN-WG) DIRTY	ELECTRICAL VOLTAGE	ELECTRICAL PHASE	ELECTRICAL FLA	ELECTRICAL MCA	ELECTRICAL MOCP	UNIT SIZE (L"xW"xH")	VIBRATION ISOLATION (IN.)	UNIT WEIGHT (LBS.)	CURB WEIGHT (LBS.)	INSTALL DETAIL NO.	CONTROLS DETAIL NO.	REMARKS
HP-1	DAIKIN	DPSH30B	SOUTHERN PORTION OF LIBRARY	ROOF	28.0	95	2,700	1,350	10.0 / 17.0	10,100	2.0	VFD	15	10.61	1,821	9,500	0.75	ECM	2@4.4	4.12	3,087	342.9	255.4	80	67	55.7	55.7	R-32	48.0	MERV 8 / MERV 13	9 / 9	18x24x2 / 18x24x4	0.21	1.00	460 V	3	86 A	92 A	110 A	203"x77"x72"	2	4,135	2,000	04/M7.10	13/M6.10	1, 2, 3, 4, 5, 6, 7, 8
HP-2	DAIKIN	DPSH30B	NORTHERN PORTION OF LIBRARY	ROOF	28.0	95	3,000	1,500	10.0 / 17.0	10,395	2.0	VFD	15	10.53	1,825	9,100	0.75	ECM	2@4.4	3.72	2,974	345.2	259.2	80	67	56.0	56.0	R-32	48.0	MERV 8 / MERV 13	9 / 9	18x24x2 / 18x24x4	0.38	1.00	460 V	3	86 A	92 A	110 A	203"x77"x72"	2	4,135	2,000	04/M7.10	13/M6.10	1, 2, 3, 4, 5, 6, 7, 8

REMARKS:

1. FACTORY TEMPERATURE BASED ECONOMIZER
2. FACTORY COIL COATING FOR ANTI-CORROSION PROTECTION
3. FACTORY SUPPLY AND RETURN VFDS (SINGLE POINT OF POWER)
4. -
5. PROVIDE HORIZONTAL SUPPLY AND BOTTOM RETURN
6. MOUNT ON ACOUSTICALLY LINED VIBRATION ISOLATION CURB (VIBREX VIC-EQ-SS, OR SIMILAR)
7. FACTORY OUTDOOR AIR FLOW MONITORING STATION
8. FIELD PROVIDED BACNET CONTROL INTERFACE

23 - AIR TERMINAL SCHEDULE

EQUIPMENT TAG	MFR	MODEL	SERVICE	TYPE	MATERIAL	REMARKS
S-1: 8"ø	PRICE	SPD	1 - SUPPLY	24"x24" CEILING DIFFUSER	STEEL	1, 2, 3, 4, 5, 6, 7
S-1: 10"ø	PRICE	SPD	1 - SUPPLY	24"x24" CEILING DIFFUSER	STEEL	1, 2, 3, 4, 5, 6, 7
S-1: 12"ø	PRICE	SPD	1 - SUPPLY	24"x24" CEILING DIFFUSER	STEEL	1, 2, 3, 4, 5, 6, 7
S-2: 8"ø	PRICE	SPD	1 - SUPPLY	12"x12" CEILING DIFFUSER	STEEL	1, 2, 3, 4, 5, 6, 7
S-3: 8"ø	PRICE	520	1 - SUPPLY	12"x12" CEILING BAR GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
S-30: 10"ø	PRICE	RCD	1 - SUPPLY	10" ROUND CONE DIFFUSER	STEEL	1, 2, 3, 4, 5, 6, 7
S-41: 12"ø	PRICE	RSG	1 - SUPPLY	12" ROUND DOUBLE DEFLECTION 1" SPACING WALL GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
R-1: 20"x20"	PRICE	530	2 - RETURN	24x24 CEILING BAR GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
R-1: 22"x22"	PRICE	530	2 - RETURN	24x24 CEILING BAR GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
R-41: 24"x48"	PRICE	10	2 - RETURN	24"x48" PERFORATED RETURN GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
E-1: 22"x22"	PRICE	530	3 - EXHAUST	24"x24" SINGLE DEFLECTION GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
E-8: 16"x22"	PRICE	530	3 - EXHAUST	18"x24" CEILING BAR GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
E-10: 8"ø	PRICE	530	3 - EXHAUST	12"x12" CEILING BAR GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
T-1: 22"x22"	PRICE	530	4-TRANSFER	24"x24" SINGLE DEFLECTION GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
T-40: 10"x10"	PRICE	530	4-TRANSFER	12"x12" SINGLE DEFLECTION GRILLE	STEEL	1, 2, 3, 4, 5, 6, 7
T-40: 12"x6"	PRICE	530	4-TRANSFER	12"X6" TRANSFER GRILLE - SIDEWALL	STEEL	1, 2, 3, 4, 5, 6, 7
T-40: 14"x14"	PRICE	530	4-TRANSFER	SINGLE DEFLECTION GRILLE	STEEL	<vanes>
T-40: 40"x24"	PRICE	530	4-TRANSFER	40"X24" TRANSFER GRILLE - SIDEWALL	STEEL	1, 2, 3, 4, 5, 6, 7

REMARKS:

1. CEILING COMPATIBILITY: FURNISH WITH BORDER STYLES COMPATIBLE WITH ADJACENT CEILING SYSTEMS SPECIFICALLY MANUFACTURERED TO FIT INTO CEILING MODULE WITH ACCURATE AND ADEQUATE SUPPORT. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR TYPES OF CEILING SYSTEMS.
2. MATERIAL VARIANCE: PROVIDE ALUMINUM GRILLES, REGISTERS, AND DIFFUSERS WHERE INDICATED ABOVE AND IN THE FOLLOWING AREAS- RESTROOMS
3. PROVIDE RECTANGULAR TO ROUND ADAPTOR AS REQUIRED AND VICE-VERSA.
4. COLOR COMPATIBILITY: PAINT AIR TERMINAL TO MATCH CEILING, FLOORS AND WALLS. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR COLORING SCHEME.
5. CONTRACTOR TO VERIFY EXACT QUANTITIES.
6. PROVIDE VOLUME DAMPER (AND ACCESS PANEL IF REQUIRED) AT DUCT BRANCH.
7. PROVIDE FULL FACE GRILLE PER 2X2 CEILING TILE SIZING.

23 - SILENCER SCHEDULE

TAG	MFR	MODEL	FAN SYSTEM	SIZE (L"xW"xH")	DESIGN AIRFLOW (CFM)	DESIGN VELOCITY (FPM)	PRESSURE DROP (IN-WG)	PRESSURE DROP W/ SYSTEM EFFECTS (IN-WG)	INSERTION LOSS 63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	8000 HZ	OPERATING WEIGHT	DETAIL NO. INSTALL	REMARKS
ST-1R	PRICE	RH48/2E	HP-1	48"x56"x24"	9,000	964	0.09	0.16	5	8	16	30	33	25	19	14	250	17/M7.11	1, 2
ST-1S	PRICE	RM72/7D	HP-1	72"x52"x28"	10,000	989	0.13	0.17	7	13	23	37	32	23	15	12	300	17/M7.11	1, 2, 3
ST-2R	PRICE	RH48/2E	HP-2	48"x56"x24"	9,500	1018	0.11	0.18	5	8	16	30	33	25	19	14	250	17/M7.11	1, 2
ST-2S	PRICE	RL60/5D	HP-2	60"x42"x42"	10,500	857	0.06	0.17	6	10	13	20	15	11	9	7	200	17/M7.11	1, 2

REMARKS:

1. SLIP AND DRIVE DUCT CONNECTION
2. NATURAL FIBER ACOUSTICAL MEDIA
3. PROVIDE MASTIC FILLED SEAMS FOR OUTDOOR SILENCER

23 - EXHAUST FAN SCHEDULE

TAG	UNIT MFR	UNIT MODEL	SERVICE	LOCATION	TYPE	AIRFLOW (CFM)	FAN RPM	EXT. STATIC PRESSURE (IN-WG)	MOTOR DATA BHP (WATTS)	MOTOR DATA HP (WATTS)	ELECTRICAL VOLTAGE	ELECTRICAL PHASE	SOUND POWER (SONES / dBA)	UNIT SIZE (D"ØxH")	OPERATING WEIGHT (LBS.)	INSTALL DETAIL NO.	CONTROLS DETAIL NO.	REMARKS
EF-1	GREENHECK	CUE-160-VG	GENERAL EXHAUST	ROOF	UPBLAST	2,500	1200	0.75	0.60	3/4	115	1	14.0 / 66	29"Øx44"	120	09/M7.10	03/M6.10	1, 2, 3

REMARKS:

1. PROVIDE FACTORY 14" TALL PITCHED ROOF CURB
2. BACKDRAFT DAMPER
3. FACTORY MOTOR TRANSFORMER AND DISCONNECT

23 - SPLIT SYSTEM (MINI) INDOOR UNIT SCHEDULE

TAG	UNIT MFR	UNIT MODEL	LOCATION	TYPE	NOMINAL CAPACITY (TONS)	AIRFLOW (CFM)	COOLING CAPACITY (MBH)	COOLING EER / (SEER)	REFRIGERANT TYPE	REFRIGERANT CHARGE (LBS)	POWERED FROM OUTDOOR	ELECTRICAL VOLTAGE	ELECTRICAL PHASE	ELECTRICAL FLA	ELECTRICAL MOCP	UNIT SIZE (L"xW"xH")	OPERATING WEIGHT (LBS.)	INSTALL DETAIL NO.	CONTROLS DETAIL NO.	REMARKS
FC-1	DAIKIN	FTX36WVJU9	108 ELEC	WALL	YES	915	34.4	9.1 / (15.9)	R-410A	3.64	YES	208 V	1	0.37 A		47x10x14	40	17/M7.10	04/M6.10	1, 2, 3
FC-2	DAIKIN	FTX36WVJU9	112 TELECOM	WALL	YES	915	34.4	9.1 / (15.9)	R-410A	3.64	YES	208 V	1	0.37 A		47x10x14	40	17/M7.10	04/M6.10	1, 2, 3

REMARKS:

1. PROVIDE CONDENSATE PUMP, BLUE DIAMOND OR EQUIVALENT (120 V)
2. POWERED BY OUTDOOR UNIT
3. WIRE ALARM TERMINAL ON UNIT TO SHUT-OFF UPON CONDENSATE PUMP FAILURE

23 - SPLIT SYSTEM (MINI) OUTDOOR UNIT SCHEDULE

TAG	UNIT MFR	UNIT MODEL	SERVICE	LOCATION	NOMINAL CAPACITY (TONS)	AMBIENT (F)	COOLING CAPACITY (MBH)	COOLING EER2 / (SEER2)	REFRIGERANT TYPE	REFRIGERANT CHARGE (LBS)	ELECTRICAL VOLTAGE	ELECTRICAL PHASE	ELECTRICAL MCA	ELECTRICAL MOCP	UNIT SIZE (L"xW"xH")	OPERATING WEIGHT (LBS.)	INSTALL DETAIL NO.	CONTROLS DETAIL NO.	REMARKS
CU-1	DAIKIN	RX36WMVJU9	FC-1	ROOF	3.0	FC-1	33.2	9.1 / (15.9)	R-410A	3.64	208 V	1	19 A	20 A	34"x13"x29"	135	10/M7.10	04/M6.10	1, 2
CU-2	DAIKIN	RX36WMVJU9	FC-2	ROOF	3.0	FC-2	33.2	9.1 / (15.9)	R-410A	3.64	208 V	1	19 A	20 A	34"x13"x29"	135	10/M7.10	04/M6.10	1, 2

REMARKS:
1. VERIFY REFRIGERANT PIPE SIZES AND ROUTING WITH MANUFACTURER
2. FACTORY COIL COATING FOR ANTI-CORROSION PROTECTION

DUCT MATERIAL SCHEDULE

1" WG STATIC POS/NEG	MATERIAL
< 16"	26 GA.
17" - 20"	24 GA.
21" - 24"	22 GA.
25" - 26"	20 GA.
27" - 36"	18 GA.

1. INSTALL IN ACCORDANCE WITH SMACNA 006-2006 HVAC DCS.
2. DUCTS SHALL BE CONSTRUCTED OF GALVANIZED STEEL UNLESS OTHERWISE INDICATED.

PIPE INSULATION SCHEDULE

	INSULATION	JACKET	REMARKS
REFRIGERANT			
ALL SIZES	ELASTOMERIC 1.5" THICK	OUTDOOR - ALUMINUM INDOOR - NONE	1, 2

REMARKS:
1. SEE SPECIFICATION SECTION 238126 FOR ADDITIONAL INFORMATION
2. PIPE INSULATION SHALL COMPLY WITH SEC. 120.3(b)2, 2019 CALIFORNIA ENERGY CODE.

23 - PIPE MATERIAL SCHEDULE

	MATERIAL	CONNECTION	REMARKS
REFRIGERANT			
3/4" AND SMALLER	ACR COPPER	SOLDER	1
LARGER THAN 3/4"	ACR COPPER	BRAZED	1

REMARKS:
1. SEE SPECIFICATION SECTION 238126 FOR ADDITIONAL INFORMATION

DUCT INSULATION SCHEDULE

LOCATION	SERVICE OSA	SA	RA	TA
OUTDOOR	RIGID BOARD - 2" R=8.7, k-0.24, 3 lbs/cf ALUMINUM JACKET			
INDOOR - CONCEALED	FIBERGLASS DUCT WRAP - 1.5" R=4.2, k-0.29, 0.75 LBS/ CF FSK OR ASJ JACKET			NONE
INDOOR - EXPOSED	NONE			
DUCT LINER (WHERE INDICATED)	POLYESTER - 1" R=5, k-0.23, 1.6 LBS/ CF			

NOTES:
1) EXHAUST DUCT: NO INSULATION

2) REFER TO SPECIFICATION SECTION 230713 DUCT INSULATION FOR FURTHER INFORMATION

3) ALL FACTORY-FABRICATED DUCT SYSTEMS SHALL COMPLY WITH UL 181 FOR DUCTS AND CLOSURE SYSTEMS, INCLUDING COLLARS, CONNECTIONS, AND SPLICES, AND BE LABELED AS COMPLYING WITH UL 181. FACTOR-MADE RIGID FIBERGLASS AND FLEXIBLE DUCTS FOR FIELD-FABRICATED DUCT SYSTEMS SHALL COMPLY WITH UL 181.

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Job Number	30647
Date Published	02/13/2025
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Scale	1/4" = 1'-0"

MECHANICAL SCHEDULES

M0.20

Project Name:	Moorpark City Library	Date Prepared:	2025-02-11

A. General Information

1	Project Name	Moorpark City Library			
2	Run Title				
3	Project Location	669 Moorpark Ave			
4	City	Moorpark	5	Standards Version	Compliance 2022
6	Zip code	93021	7	Compliance Software (version)	CBECC 2022.3.2 (1369)
8	Climate Zone	9	9	Building Orientation (deg)	0
10	Building Type(s)	• Nonresidential	11	Weather File	VAN-NUYS_STYP20.epw
12	Project Scope	• New complete scope	13	Number of Dwelling Units	0
14	Total Conditioned Floor Area in Scope (ft^2)	16036.2	15	Total # of hotel/motel rooms	0
16	Total Unconditioned Floor Area (ft^2)	0	17	Fuel Type	None
18	Nonresidential Conditioned Floor Area	16036.2	19	Total # of Stories (Habitable Above Grade)	1
20	Residential Conditioned Floor Area	0			

B. PROJECT SUMMARY

Table B shows which building components are included in the performance calculation. If indicated as not included, the project must show compliance prescriptively if within the permit application.

Building Components Complying via Performance						Building Components Complying Prescriptively	
Envelope (See Table G)	Nonres	Performance	Solar Thermal Water Heating (See Table I3)	☐	Performance	The following building components are ONLY eligible for prescriptive compliance and should be documented on the NRCC form listed if within the scope of the permit application (i.e. compliance will not be shown on the NRCC-PRF-E).	
	MultiFam	Not Included		☒	Not Included		
Mechanical (See Table H)	Nonres	Performance	Covered Process: Commercial Kitchens (see Table J)	☐	Performance	Indoor Lighting (Unconditioned) 140.6 & 170.2(e)	NRCC-LTI-E is required
	MultiFam	Not Included		☒	Not Included	Outdoor Lighting 140.7 & 170.2(e)	NRCC-LTO-E is required
Domestic Hot Water (See Table I)	Nonres	Performance	Covered Process: Laboratory Exhaust (see Table J)	☐	Performance	Sign Lighting 140.8 & 170.2(e)	NRCC-LTS-E is required
	MultiFam	Not Included		☒	Not Included	**Building Components Complying with Mandatory Measures**	
Lighting (Indoor Conditioned, see Table K)	Nonres	Performance	Photovoltaics (see Table F)	☒	Performance	Electrical power systems, commissioning, solar ready, elevator and escalator requirements are mandatory and should be documented on the NRCC form listed if applicable (i.e. compliance will not be shown on the NRCC-PRF-E.)	
	MultiFam	Not Included		☐	Not Included	Electrical Power Distribution 110.11	NRCC-ELC-E is required
			Battery (see Table F)	☒	Performance	Commissioning 120.8	NRCC-CXR-E is required
				☐	Not Included	Solar and Battery 110.10	NRCC-SAB-E is required

C1. COMPLIANCE SUMMARY

COMPLIES[3]

	Time Dependent Valuaton (TDV)		Source Energy Use
	Efficiency[1] ($kBtu/ft^2$ - yr)	Total[2] ($kBtu/ft^2$ - yr)	Total[2] ($kBtu/ft^2$ - yr)
Standard Design	295.14	265.25	22.65
Proposed Design	239.01	191.94	16.48
Compliance Margins	**56.13**	**73.31**	**6.17**
	Pass	**Pass**	**Pass**

[1] Efficiency measures include improvements like a better building envelope and more efficient equipment
[2] Compliance Totals include efficiency, photovoltaics and batteries
[3] New Construction, Complete Addition Scope: Building complies when all efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded
Existing, Addition and Alteration Scope: Building complies when efficiency compliance margin is greater than or equal to zero and unmet load hour limits are not exceeded

C2. TDV ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS (Annual TDV Energy Use, $kBtu/ft^2$ - yr)

COMPLIES[2]

Energy Component	Standard Design (TDV)	Proposed Design (TDV)	Compliance Margin (TDV)[1]
Space Heating	6.11	50.94	-44.83
Space Cooling	91.73	94.9	-3.17
Indoor Fans	145.34	55.49	89.85
Heat Rejection	0	0	0
Pumps & Misc.	0	0	0
Domestic Hot Water	16.46	3.93	12.53
Indoor Lighting	35.5	33.75	1.75
Flexibility	---	---	---
EFFICIENCY COMPLIANCE TOTAL	**295.14**	**239.01**	**56.13 (19%)**
Photovoltaics	-29.64	-46.41	16.77
Batteries	-0.25	-0.66	0.41
TOTAL COMPLIANCE	**265.25**	**191.94**	**73.31 (27.6%)**

[1] Notes: This number in parenthesis following the Compliance Margin in column 4, represents the Percent Better than Standard.

C3. TDV ENERGY RESULTS FOR NON-REGULATED COMPONENTS[1]

Non-Regulated Energy Component	Standard Design (TDV)	Proposed Design (TDV)	Compliance Margin (TDV)[1]
Receptacle	81.42	81.42	---
Process	24.57	24.57	---
Other Ltg	---	---	---
Process Motors	---	---	---
TOTAL (TOTAL COMPLIANCE + NON-REGULATED COMPONENTS)	**371.24**	**297.93**	**73.31 (19.7%)**

[1] Notes: This table is not used for Energy Code Compliance.

C4. SOURCE ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS (Annual SOURCE Energy Use, $kBtu/ft^2$ /yr)

COMPLIES[2]

Energy Component	Standard Design (SOURCE)	Proposed Design (SOURCE)	Compliance Margin (SOURCE)[1]
Space Heating	0.89	7.23	-6.34
Space Cooling	4.19	4.74	-0.55
Indoor Fans	13.6	3.32	10.28
Heat Rejection	0	0	0
Pumps & Misc.	0	0	0
Domestic Hot Water	2.26	0.38	1.88
Indoor Lighting	2.92	2.81	0.11
Flexibility	---	---	---
EFFICIENCY COMPLIANCE TOTAL	**23.86**	**18.48**	**5.38 (22.5%)**
Photovoltaics	-1.1	-1.72	0.62
Batteries	-0.11	-0.28	0.17
TOTAL COMPLIANCE	**22.65**	**16.48**	**6.17 (27.2%)**

[1] Notes: This number in parenthesis following the Compliance Margin in column 4, represents the Percent Better than Standard.

C5. SOURCE ENERGY RESULTS FOR NON-REGULATED COMPONENTS[1]

Non-Regulated Energy Component	Standard Design (SOURCE)	Proposed Design (SOURCE)	Compliance Margin (SOURCE)[1]
Receptacle	5.59	5.59	---
Process	2.71	2.71	---
Other Ltg	---	---	---
Process Motors	---	---	---
TOTAL (TOTAL COMPLIANCE + NON-REGULATED COMPONENTS)	**30.95**	**24.78**	**6.17 (19.9%)**

[1] Notes: This table is not used for Energy Code Compliance.

C6. 'ABOVE CODE' QUALIFICATIONS

☐ This project is pursuing CalGreen Tier 1 ☐ This project is pursuing CalGreen Tier 2

C7. ENERGY USE SUMMARY

Energy Component	Standard Design Site (MWh)	Proposed Design Site (MWh)	Margin (MWh)	Standard Design Site (MBtu)	Proposed Design Site (MBtu)	Margin (MBtu)
Space Heating	3	26.8	-23.8	---	---	---
Space Cooling	41.2	40.6	0.6	---	---	---
Indoor Fans	81.7	25.4	56.3	---	---	---
Heat Rejection	---	---	---	---	---	---
Pumps & Misc.	---	---	---	---	---	---
Domestic Hot Water	5.3	2.5	2.8	25.6	---	---
Indoor Lighting	21.3	20.2	1.1	---	---	---
Flexibility	---	---	---	---	---	---
EFFICIENCY TOTAL	**152.5**	**115.5**	**37**	**25.6**	**0**	**25.6**
Photovoltaics	-21.9	-34.2	12.3	---	---	---
Batteries	0.1	0.1	0	---	---	---
ENERGY USE SUBTOTAL	**130.7**	**81.4**	**49.3**	**25.6**	**0**	**25.6**
Receptacle	50.9	50.9	0	---	---	---
Process	14	14	0	---	---	---
Other Ltg	---	---	---	---	---	---
Process Motors	---	---	---	---	---	---
ENERGY USE TOTAL	**195.6**	**146.3**	**49.3**	**25.6**	**0**	**25.6**

C8. ENERGY USE INTENSITY (EUI)

	Standard Design ($kBtu/ft^2$ / yr)	Proposed Design ($kBtu/ft^2$ / yr)	Margin ($kBtu/ft^2$ / yr)	Margin Percentage
GROSS EUI[1]	47.87	38.4	9.47	19.78
NET EUI[1]	43.21	31.13	12.08	27.96

[1] Notes: Gross EUI is Energy Use Total (not including PV)/Total Building Area. Net EUI is Energy Use Total (including PV)/Total Building Area.

D1. EXCEPTIONAL CONDITIONS

- The project includes windows which have been classified as clerestory windows. Please verify that clerestories are present, and that daylighting controls are present for these areas. Clerestory windows do not trigger mandatory daylighting control requirements, and may allow users to claim PAF credit for daylighting controls in areas illuminated by clerestories. .
- The user model includes space(s) that are designed to be served by mechanical cooling systems, but the cooling systems were not included in the simulation model. A cooling system has been modeled for both the proposed and standard cases.
- The user model includes space(s) without sufficient cooling equipment. Cooling equipment has been added to the model to meet cooling loads.

F1. REQUIRED PV SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12
DC System Size (kWdc)	Exception[1]	Module Type	Array Type	Power Electronics	CFI	Azimuth (deg)	Tilt Input	Array Angle (deg)	Tilt: (x in 12)	Inverter Eff. (%)	Annual Solar Access (%)
20.4		Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	98

[1] See Table D1 for any PV exceptions used.

F1B. PV BATTERY BUILDING TYPE(S)

01	02	03
Building Occupancy Type* (From Table 140.10-A/B and 170.2-U/V)	Conditioned Floor Area (ft^2)	Unconditioned Floor Area (ft^2)
Grocery	0	0
High-Rise Multifamily	0	0
Office, Financial Institutions, Unleased Tenant Space	648.19	0
Retail	1712.26	0
School	0	0
Warehouse	405.766	0
Auditorium, Convention Center, Hotel/Motel, Library, Medical Office Building/Clinic, Restaurant, Theater	13270	0
None	0	0

**Building Occupancy Types are defined in Section 100.1 of the Energy Code*

F2. BATTERY SYSTEMS[1]

01	02	03	04	05	06	07
Control	Capacity (kWh)	Charging Efficiency	Charging Rate (kW)	Discharging Efficiency	Discharging Rate (kW)	Round Trip Efficiency
TOU	29.7	N/A	10.61	N/A	10.61	0.9

[1] See Table D1 for any Battery exceptions used.

G1. ENVELOPE GENERAL INFORMATION (conditioned spaces only)

01	02	03	04
Opaque Surfaces & Orientation	Total Gross Surface Area (ft^2)	Total Fenestration Area (ft^2)	Window to Wall Ratio (%)
North-Facing[1]	3935.9	1539.1	39.1
East-Facing[2]	4078.5	824.88	20.23
South-Facing[3]	3973.69	1417.26	35.67
West-Facing[4]	3898.77	437.84	11.23
Total	**15886.9**	**4219.08**	**26.56**
Roof	16090.4	0	0

Notes
[1] North-Facing is oriented to within 45 degrees of true north, including 45 00'00" east of north (NE), but excluding 45 00'00" west of north (NW),
[2] East-Facing is oriented to within 45 degrees of true east, including 45 00'00" south of east (SE), but excluding 45 00'00" north of east (NE),
[3] South-Facing is oriented to within 45 degrees of true south, including 45 00'00" west of south (SW), but excluding 45 00'00" east of south (SE),
[4] West-Facing is oriented to within 45 degrees of true west, including 45 00'00" north of west (NW), but excluding 45 00'00" south of west (SW),

G4. NONRESIDENTIAL AIR BARRIER

01	02
Building Story Name	Air Barrier
First Floor	Air barrier - not verified

G5. OPAQUE SURFACE ASSEMBLY SUMMARY

01	02	03	04	05	06		07	08	09	10
Surface Name	Construction Type	Area (ft^2)	Framing Type	Cavity R-Value	Continuous R-Value		Units	Value	Description of Assembly Layers	Status[1]
					Interior	Exterior				
Moorpark Exterior Wall - R-19 metal frame wall + 1 Inch ESP + Stone	Exterior Wall	8,791.41	Metal	19	N/A	5	U-factor	0.0846	Stone - 1 in. Air - Wall - 3/4 in. Extruded Polystyrene - XPS - 1 in. R5.00 Gypsum Board - 5/8 in. Metal Fram 16 OC 2x6 W/R19 Gypsum Board - 5/8 in.	N
Moorpark Floor Uninsulated Concrete with Carpet	Underground Floor	16,077.2	N/A	0	N/A	N/A	F-factor	0.73	Slab Type =Unheated slab on grade Insulation Orientation =None Insulation R-Value =none	N
Moorpark Interior Wall - R-0 metal frame wall	Interior Wall	21,103.7	Metal	21	N/A	5	U-factor	0.0865	Gypsum Board - 5/8 in. Extruded Polystyrene - XPS - 1 in. R5.00 Metal Framed Wall + R-21 Batt Gypsum Board - 5/8 in.	N
Moorpark Roof	Roof	16,132.6	Wood	30	N/A	N/A	U-factor	0.0342	Plywood - 5/8 in. R-30 Wood Framed Roof - 2x12 @ 16 OC Gypsum Board - 5/8 in.	N
Moorpark Exterior Wall - R-19 metal frame wall + 1 Inch ESP + Wood	Exterior Wall	1,744.48	Metal	19	N/A	5	U-factor	0.0783	Hard Board - 3/4 in. Air - Wall - 3/4 in. Extruded Polystyrene - XPS - 1 in. R5.00 Gypsum Board - 5/8 in. Metal Fram 16 OC 2x6 W/R19 Gypsum Board - 5/8 in.	N

[1] Status: N - New, A - Altered, E - Existing

G5. OPAQUE SURFACE ASSEMBLY SUMMARY

01	02	03	04	05	06		07	08	09	10
Surface Name	Construction Type	Area (ft^2)	Framing Type	Cavity R-Value	Continuous R-Value		Units	Value	Description of Assembly Layers	Status[1]
					Interior	Exterior				
Moorpark Exterior Wall - CMU + 4 metal stud furring (uninsulated) + Wood	Exterior Wall	2,822.73	Metal	0	N/A	N/A	U-factor	0.1933	Hard Board - 3/4 in. Air - Wall - 3/4 in. Concrete - Solid Grout - 105 lb/ft3 - 8 in. Air - Wall - 3/4 in. 4 in. Metal Wall Framing - 16 in. OC - no insulation	N
Moorpark Exterior Wall - CMU + 4 metal stud furring (uninsulated) + Stone	Exterior Wall	2,834.12	Metal	0	N/A	N/A	U-factor	0.2896	Stone - 1 in. Stone - 1 in. Concrete - Solid Grout - 105 lb/ft3 - 8 in. Air - Wall - 3/4 in. 4 in. Metal Wall Framing - 16 in. OC - no insulation	N

[1] Status: N - New, A - Altered, E - Existing

G7A. FENESTRATION ASSEMBLY SUMMARY (NONRESIDENTIAL)

01	02	03	04	05	06	07	08	09
Fenestration Assembly Name	Fenestration Type/ Product Type / Frame Type	Certification Method[1]	Assembly Method	Area (ft^2)	Overall U-factor	Overall SHGC	Overall VT	Status[2]
Moorpark Window	Vertical fenestration Curtain Wall N/A	NFRC	Manufactured	4,219.08	0.23	0.22	0.49	N

[1] Notes: Newly installed fenestration shall have a certified NFRC Label Certificate or use the CEC default tables found in Table 110.6-A and Table 110.6-B. Center of Glass (COG) values are for the glass-only, determined by the manufacturer, and are shown for ease of verification. Site-built fenestration values are calculated per Nonresidential Appendix NA6 and are used in the analysis.
[2] Status: N - New, A - Altered, E - Existing

H1. DRY SYSTEM EQUIPMENT (FURNACES, AIR HANDLING UNITS, HEAT PUMPS, VRF, ECONOMIZERS ETC.)

01	02	03	04	05	06	07	08	09	10	11	12
			Heating				Cooling				
Equipment Name	Equipment Type	Qty	Total Heating Output (kBtu/h)	Supp Heat Output (kBtu/h)	Efficiency Unit	Efficiency	Total Cooling Output (kBtu/h)	Efficiency Unit	Efficiency	Economizer Type (if present)	Status[1]
FC 2	Single Zone Air Conditioner (SZAC) Air System	1	35.2	0	COP HSPF	2.7 8.7	33.2	EER SEER	9.5 16.7	No Economizer	N
FC 1	Single Zone Air Conditioner (SZAC) Air System	1	35.2	0	COP HSPF	2.7 8.7	33.2	EER SEER	9.5 16.7	No Economizer	N
HP 1	Variable Air Volume Air System	1	190.41	0	N/A	Electric Resistance	342.97	EER	10	Fixed DB	N
HP 2	Variable Air Volume Air System	1	194.49	0	N/A	Electric Resistance	345.18	EER	10	Differential DB	N

[1] Status: N - New, A - Altered, E - Existing

H3. NONRESIDENTIAL / COMMON USE AREA FAN SYSTEMS SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12	13
Name or Item Tag	Qty	Design OA CFM	Supply Fan				Return / Relief Fan					Status[1]
			CFM	Power	Power Units	Control	Fan Type	CFM	Power	Power Units	Control	
FC 2	1	28.76	1,200	0.5	InH2O	Constant Vol	N/A	N/A	N/A	N/A	N/A	N
FC 1	1	0	1,200	0.5	InH2O	Constant Vol	N/A	N/A	N/A	N/A	N/A	N
HP 1	1	1699.03	10,100	10.61	BHP	VSD	N/A	9,500	7.13	BHP	VSD	N
HP 2	1	1483.9	10,395	10.53	BHP	VSD	N/A	9,100	7.13	BHP	VSD	N

[1] Status: N - New, A - Altered, E - Existing

H5. GENERAL EXHAUST FAN SUMMARY

01	02	03	04	05	06	07	08
System ID	Zone Name	Qty	CFM	Power	Power Units	Continuous Operation?	Status[1]
Exhaust System	Zone VAV 1 3 Zone VAV 1 4 Zone VAV 1 7 Zone VAV 2 10	1	1500	1.5	InH2O	No	N

[1] Status: N - New, A - Altered, E - Existing

H8. SYSTEM SPECIAL FEATURES

01	02	03	04
System Name	Equipment Type	Interlocks per 140.4(n)[1]	Other Special Features and Controls
FC 1	Single Zone Air Conditioner (SZAC) Air System	N/A	DDC Controls Fixed Supply Air Temp.
HP 1	Variable Air Volume Air System	N/A	DDC Controls Single Maximum Reheat Controls Zone(s) With CO2 Sensor Vent. Control Supply Air Temp. Reset on Outside Air Temp. Fixed DB
HP 2	Variable Air Volume Air System	N/A	DDC Controls Single Maximum Reheat Controls Zone(s) With CO2 Sensor Vent. Control Supply Air Temp. Reset on Outside Air Temp. Differential DB
AO smith HPTU-66N	Service Hot Water	N/A	Fixed Temperature Control

Notes: This table includes controls related to the performance path only. For projects using the prescriptive path, mandatory and prescriptive controls requirements are documented on the NRCC-MCH-E.

[1] Yes = interlocks are provided, No = interlocks are not provided, NA means no operable openings.

H9. NONRESIDENTIAL / COMMON USE AREA & HOTEL/MOTEL VENTILATION

01	02	03	04	05	06	07
Zone Name	Mechanical Ventilation				Conditioned Area (sf)	DCV or Occupant Sensor Controls, or Both
	Ventilation Function	# of People	Supply OA CFM	Exhaust CFM		
FR 115 (Unconditioned)	NA	0	0	0	0	N/A
Zone FC 1	General - Unoccupied	0.19	0	0	127.78	N/A
Zone FC 2	Misc - Telephone closets	0.29	28.76	0	191.76	N/A
Zone VAV 1 1	General - Conference/meeting	26.14	392.1	0	784.2	DCV
Zone VAV 1 10	Retail - Sales	4.83	145.01	0	580.02	N/A
Zone VAV 1 11	Retail - Sales Office - Office space	4.03	120.79	0	580.07	N/A
Zone VAV 1 2	General - Conference/meeting	15.28	229.24	0	458.48	DCV
Zone VAV 1 3	Exhaust - Toilets, public General - Break rooms Misc - Warehouses	4.37	99.65	75	456.51	N/A
Zone VAV 1 4	Assembly - Libraries (reading rooms and stack areas) Exhaust - Toilets, public General - Corridors Office - Office space	3.86	100.76	75	771.73	N/A
Zone VAV 1 5	Assembly - Libraries (reading rooms and stack areas)	4.81	144.44	0	962.96	N/A
Zone VAV 1 6	Office - Office space General - Corridors	6.22	186.66	0	1244.37	N/A
Zone VAV 1 7	General - Corridors Exhaust - Toilets, public	4.51	58.91	750	902.49	N/A
Zone VAV 1 8	Office - Office space	0.76	22.87	0	152.48	N/A
Zone VAV 1 9	Retail - Sales	6.62	198.61	0	794.46	N/A

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No. M31731
Exp. 06/30/2025
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STATE OF CALIFORNIA

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CITY OF MOORPARK

Revision		Date
A	ADDENDUM #1	06/20/2025

Submittal	Date
SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
80% CONSTRUCTION DOCS	02/02/2024
AGENGY SUBMITTAL #1	08/15/2024
AGENGY SUBMITTAL #2	10/31/2024
AGENCY SUBMITTAL #3	03/27/2025
BID DOCUMENTS	05/23/2025

Job Number	30647
Date Published	02/13/2025
Checked By	LPA
Scale	

MECHANICAL TITLE-24 FORMS

M0.30

A

N. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

Selections made by Documentation Author indicate which Certificates of Verification must be submitted for the features to be recognized for compliance. These documents must be retained and provided to the building inspector during construction and can be found online

Building Component	Form/Title
Mechanical	NRCV-MCH-04-H Duct Leakage Test
Mechanical	NRCV-MCH-27 Indoor Air Quality & Mechanical Ventilation
Mechanical	NRCV-MCH-32 Local Mechanical Exhaust

M. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections made by Documentation Author indicate which Certificates of Acceptance must be submitted for the features to be recognized for compliance. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP).

Building Component	Form/Title & System Name(s)
Envelope	NRCA-ENV-02-F - NRFC label verification for fenestration
Indoor Lighting	NRCA-LTI-02-A - Occupancy Sensors and Automatic Time Switch Controls.
Indoor Lighting	NRCA-LTI-03-A - Automatic Daylight Controls.
Indoor Lighting	NRCA-LTI-04-A - Demand Responsive Lighting Controls.
Mechanical	NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap FC 2, HP 1 and HP 2.
Mechanical	NRCA-MCH-03-A - Constant Volume Single Zone HVAC FC 2 and FC 1.
Mechanical	NRCA-MCH-04(a)-H - Air Distribution Duct Leakage - HERS Verification required FC 2 and FC 1.
Mechanical	NRCA-MCH-05-A - Air Economizer Controls HP 1 and HP 2.
Mechanical	NRCA-MCH-06-A Demand Control Ventilation Systems must be submitted for all systems required to employ demand controlled ventilation (refer to) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO2) concentration setpoints. HP 1 and HP 2.
Mechanical	NRCA-MCH-07-A Supply Fan Variable Flow Controls HP 1 and HP 2.
Mechanical	NRCA-MCH-11-A Automatic Demand Shed Controls FC 1, HP 1 and HP 2.
Mechanical	NRCA-MCH-12-A FDD for Packaged Direct Expansion Units HP 1 and HP 2.
Mechanical	NRCA-MCH-16-A Supply Air Temperature Reset Controls HP 1 and HP 2.
Mechanical	NRCA-MCH-19-A Occupancy Sensor Controls HP 1 and HP 2.

K2. INDOOR CONDITIONED LIGHTING SCHEDULE

Luminaire Schedule (includes all permanent installed lighting in conditioned space, and portable lighting over 0.3 w/ft^2 in offices)

01	02	03	04	05	06
Name or Item Tag	Complete Luminaire Description (i.e. 3-lamp fluorescent troffer, F32T8, one dimmable electronic ballast)	Installed Watts (Conditioned)			
		Watts per luminaire	How is Wattage determined	Total Number of Luminaires	Installed Watts
Luminaire 100W	---	100	CEC Default	45	4500
Luminaire 10W	---	10	CEC Default	31	310
Luminaire 1W	---	1	CEC Default	59	59

[1]If lighting power densities were used in the compliance model Building Departments will need to check prescriptive forms for Luminaire Schedule details.

K4. INDOOR CONDITIONED LIGHTING MANDATORY LIGHTING CONTROL

See NRCC-LTI-E for mandatory controls

L. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections made by Documentation Author indicate which Certificates of Installation must be submitted for the features to be recognized for compliance. These documents must be retained and provided to the building inspector during construction and can be found online

Building Component	Form/Title
Envelope	NRCI-ENV-E - Envelope (for all buildings)
Plumbing	NRCI-PLB-E - For all buildings with Plumbing Systems
	NRCI-SAB-E - Solar Water Heating, PV and Battery Storage Systems
Indoor Lighting	NRCI-LTI-E - Indoor Lighting (for all buildings)

Documentation Author's Declaration Statement

I. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Peter Wu	Documentation Author Signature:
Company: LPA design studios	Signature Date:
Address: 5301 California Ave # 100	CEA/HERS Certification Identification (if applicable):
City/State/Zip: Irvine, CA 92617	Phone: (949) 261-1001

Responsible Person's Declaration statement

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I understand that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections, and I will take the necessary steps to accomplish this requirement.
6. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy, and I will take the necessary steps to accomplish these requirements.

Responsible Designer Name: Lawrence C. Chiu	Responsible Designer Signature:	
Company: LPA design studios		
Address: 5301 California Ave # 100	Date Signed:	
City/State/Zip: Irvine, CA 92617	License #: C15614	
Phone: (949) 261-1001	Title: Architect	Scope: Envelope
Responsible Designer Name: Erik Ring	Responsible Designer Signature:	
Company: LPA design studios		
Address: 5301 California Ave # 100	Date Signed: 02-11-2025	
City/State/Zip: Irvine, CA 92617	License #: M31731	
Phone: (949) 261-1001	Title: Engineer	Scope: Mechanical

K1. INDOOR CONDITIONED LIGHTING GENERAL INFO

01	02	03	04	05	06
Occupancy Type[1]	Conditioned Floor Area[2] (ft^2)	Installed Lighting Power (Watts)	Lighting Control Credits (Watts)	Additional (Custom) Allowance	
				Area Category Footnotes (Watts)	Area Category Footnotes (Watts)
Convention, Conference, Multipurpose and Meeting Center	2190.89	1485.62	0	0	0
Copy Room	925.26	462.63	0	0	0
Corridor	1604.13	794.56	0	0	0
Electrical Mechanical Telephone Room	319.53	127.81	0	0	0
Library - Reading Area	1383.32	1106.65	0	0	0
Library - Stacks	5660.55	5407.79	0	0	0
Lounge	408.26	224.54	0	0	0
Office (250 square feet)	401.23	240.74	0	0	0
Office (250 square feet)	246.96	160.53	0	0	0
Retail Merchandise Sales	1712.26	1626.65	0	0	0
Restroom	778.06	505.74	0	0	0
Commercial Industrial Warehouse	405.77	162.31	0	0	0
Building Totals:	**16036.2**	**12305.6**	**0**	**0**	**0**

[1]See Table 140.6-C
[2]See NRCC-LTI--E for unconditioned spaces
[3]Lighting information for existing spaces modeled is not included in this table

H11. ZONAL SYSTEM AND TERMINAL UNIT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12
System ID	System Type	Qty	Rated Capacity (kBtuh)		Airflow (cfm)			Fan			VSD
			Heating	Cooling	Design	Min.	Min. Ratio	Power	Power Units	Cycles	
ZE VAV 1 9	Variable Air Volume Reheat Box	1	18.77	N/A	1,000	200	0.2	N/A	N/A	N/A	☐
ZE VAV 1 10	Variable Air Volume Reheat Box	1	28.32	N/A	1,000	200	0.2	N/A	N/A	N/A	☐
ZE VAV 1 11	Variable Air Volume Reheat Box	1	7.51	N/A	900	175	0.19	N/A	N/A	N/A	☐
ZE VAV 2 1	Variable Air Volume Reheat Box	1	39.58	N/A	2,100	425	0.2	N/A	N/A	N/A	☐
ZE VAV 2 2	Variable Air Volume Reheat Box	1	39.58	N/A	2,100	425	0.2	N/A	N/A	N/A	☐
ZE VAV 2 3	Variable Air Volume Reheat Box	1	4.44	N/A	230	50	0.22	N/A	N/A	N/A	☐
ZE VAV 2 4	Variable Air Volume Reheat Box	1	4.44	N/A	230	50	0.22	N/A	N/A	N/A	☐
ZE VAV 2 5	Variable Air Volume Reheat Box	1	2.73	N/A	130	25	0.19	N/A	N/A	N/A	☐
ZE VAV 2 6	Variable Air Volume Reheat Box	1	7.51	N/A	500	100	0.2	N/A	N/A	N/A	☐
ZE VAV 2 7	Variable Air Volume Reheat Box	1	15.01	N/A	750	150	0.2	N/A	N/A	N/A	☐
ZE VAV 2 8	Variable Air Volume Reheat Box	1	5.8	N/A	300	125	0.42	N/A	N/A	N/A	☐
ZE VAV 2 9	Variable Air Volume Reheat Box	1	10.24	N/A	550	150	0.27	N/A	N/A	N/A	☐
ZE VAV 2 10	Variable Air Volume Reheat Box	1	15.01	N/A	900	150	0.17	N/A	N/A	N/A	☐

H11. ZONAL SYSTEM AND TERMINAL UNIT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12
System ID	System Type	Qty	Rated Capacity (kBtuh)		Airflow (cfm)			Fan			VSD
			Heating	Cooling	Design	Min.	Min. Ratio	Power	Power Units	Cycles	
ZE VAV 2 11	Variable Air Volume Reheat Box	1	26.61	N/A	1,400	275	0.2	N/A	N/A	N/A	☐
ZE VAV 2 12	Variable Air Volume Reheat Box	1	23.54	N/A	1,250	250	0.2	N/A	N/A	N/A	☐

I1. WATER HEATER EQUIPMENT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	Heater Element Type	Tank Type	Qty	Tank Vol (gal)	Rated Input	Rated Input Unit	Efficiency	Efficiency Unit	Tank Insulation R-value hr•ft•F/Btu	Standby Loss Fraction	1st Hr Rating or Flow Rate (gal)	Heat Pump Type	Tank Location or Ambient Condition
NonResBaseHPumpWaterHeater	Electricity	Storage	1	66	4.5	kW	3.4	UEF	N/A	N/A	80	Packaged Heat Pump Water Heater	N/A

H9. NONRESIDENTIAL / COMMON USE AREA & HOTEL/MOTEL VENTILATION

01	02	03	04	05	06	07
Zone Name	Mechanical Ventilation				Conditioned Area (sf)	DCV or Occupant Sensor Controls, or Both
	Ventilation Function	# of People	Supply OA CFM	Exhaust CFM		
Zone VAV 2 8	General - Conference/meeting	10.73	160.94	0	321.87	DCV
Zone VAV 2 9	General - Break rooms	9.81	147.21	0	294.43	DCV

H11. ZONAL SYSTEM AND TERMINAL UNIT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12
System ID	System Type	Qty	Rated Capacity (kBtuh)		Airflow (cfm)			Fan			VSD
			Heating	Cooling	Design	Min.	Min. Ratio	Power	Power Units	Cycles	
ZE FC 2	Uncontrolled	1	N/A	N/A	1,200	N/A	0	N/A	N/A	N/A	☐
ZE FC 1	Uncontrolled	1	N/A	N/A	1,200	N/A	0	N/A	N/A	N/A	☐
ZE VAV 1 1	Variable Air Volume Reheat Box	1	20.81	N/A	1,100	300	0.27	N/A	N/A	N/A	☐
ZE VAV 1 2	Variable Air Volume Reheat Box	1	22.52	N/A	1,200	250	0.21	N/A	N/A	N/A	☐
ZE VAV 1 3	Variable Air Volume Reheat Box	1	4.78	N/A	250	100	0.4	N/A	N/A	N/A	☐
ZE VAV 1 4	Variable Air Volume Reheat Box	1	7.51	N/A	400	105	0.26	N/A	N/A	N/A	☐
ZE VAV 1 5	Variable Air Volume Reheat Box	1	28.32	N/A	1,500	300	0.2	N/A	N/A	N/A	☐
ZE VAV 1 6	Variable Air Volume Reheat Box	1	30.37	N/A	1,600	325	0.2	N/A	N/A	N/A	☐
ZE VAV 1 7	Variable Air Volume Reheat Box	1	18.77	N/A	1,000	200	0.2	N/A	N/A	N/A	☐
ZE VAV 1 8	Variable Air Volume Reheat Box	1	2.73	N/A	150	25	0.17	N/A	N/A	N/A	☐

H9. NONRESIDENTIAL / COMMON USE AREA & HOTEL/MOTEL VENTILATION

01	02	03	04	05	06	07
Zone Name	Mechanical Ventilation				Conditioned Area (sf)	DCV or Occupant Sensor Controls, or Both
	Ventilation Function	# of People	Supply OA CFM	Exhaust CFM		
Zone VAV 2 1	Assembly - Libraries (reading rooms and stack areas)	6	180.01	0	1200.06	N/A
Zone VAV 2 10	General - Corridors Exhaust - Toilets, public Exhaust - Copy, printing rooms Misc - Warehouses	5.7	30.12	537.63	1236.51	N/A
Zone VAV 2 11	Assembly - Libraries (reading rooms and stack areas)	4.95	148.45	0	989.65	N/A
Zone VAV 2 12	Assembly - Libraries (reading rooms and stack areas)	4.05	121.52	0	810.13	N/A
Zone VAV 2 2	Assembly - Libraries (reading rooms and stack areas)	5.83	174.99	0	1166.61	N/A
Zone VAV 2 3	General - Conference/meeting	5.62	84.27	0	168.53	DCV
Zone VAV 2 4	General - Conference/meeting	9.6	144	0	287.99	DCV
Zone VAV 2 5	General - Conference/meeting	5.66	84.91	0	169.82	DCV
Zone VAV 2 6	Assembly - Libraries (reading rooms and stack areas)	5.58	83.71	0	558.05	N/A
Zone VAV 2 7	Assembly - Libraries (reading rooms and stack areas)	8.25	123.79	0	825.27	N/A

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SCHEMATIC DESIGN	07/18/2022
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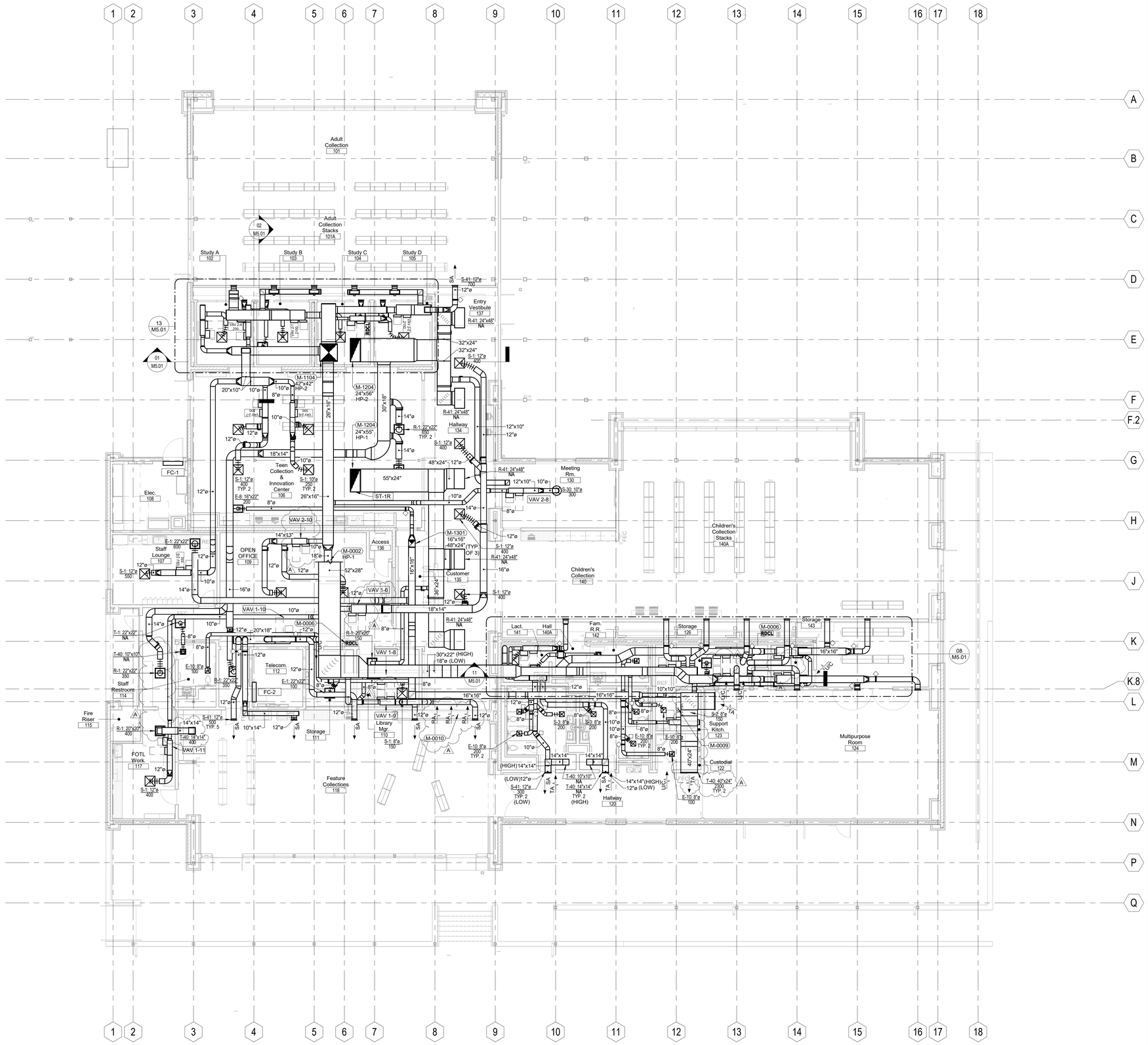
Scale	

MECHANICAL
TITLE-24 FORMS

M0.31



PROJECT NORTH

KEYNOTES

ITEM	DESCRIPTION
M-0002	SEE MECHANICAL ROOF PLAN M2.02 FOR CONTINUATION
M-0006	LOCATE RDCL PORT PANELS ABOVE T-BAR CEILING. MOUNT WITHIN 12" OF CEILING. RACK MULTIPLE PANELS HORIZONTALLY ALONG WALL AS REQUIRED
M-0009	24"X24" ACCESS DOOR IN CEILING. SEE INTERIORS FOR LOCATION
M-0010	OPEN AREA ABOVE BEAM TO PROVIDE RETURN AIR PATH BACK TO CORRIDOR GRILLES
M-1104	SUPPLY AIR DUCT UP THRU ROOF
M-1204	RETURN AIR DUCT UP THRU ROOF
M-1301	EXHAUST AIR DUCT UP

LEGEND

- METAL STUD WALL CONSTRUCTION
- 1 HOUR RATED METAL STUD WALL CONSTRUCTION
- 2 HOUR RATED METAL STUD WALL CONSTRUCTION
- MASONRY WALL CONSTRUCTION

GENERAL NOTES

1. PROVIDE ACCESS PANELS IN NON-ACCESSIBLE AREAS (RATED OR NON-RATED) MINIMUM 12"x12" SIZE FOR COMBINATION FIRE/SMOKE DAMPERS. INSTALL LARGER ACCESS PANELS FOR LARGER EQUIPMENT AS REQUIRED BY CODE. COORDINATE WITH ARCHITECT FOR FINAL APPROVAL OF FINAL LOCATIONS PRIOR TO INSTALLATION.
2. PROVIDE FIRESTOPPING AT PASS THROUGH DUCT PENETRATIONS THROUGH RATED WALLS. DUCTWORK SHALL BE A MINIMUM 26 GA SHEET METAL. COORDINATE WITH OTHER TRADES THAT MAY HAVE PENETRANTS AROUND THE SAME AREAS. REFER TO ARCHITECTURAL SHEETS FOR FIRE RATING ASSEMBLIES.
3. INSULATION MATERIALS APPLIED TO DUCTWORK SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND SMOKE DENSITY NOT EXCEEDING 50.
4. REQUIRED OFFSETS, COMPONENTS, ACCESSORIES, AND FITTINGS MAY NOT BE SHOWN BUT SHALL BE PROVIDED AS REQUIRED TO AVOID INTERFERENCES WITH UNFORSEEN COMPONENTS.
5. REFER TO PLUMBING DRAWINGS FOR CONDENSATE DRAIN PIPE ROUTING.
6. FLEXIBLE DUCT CONNECTION TO AIR TERMINAL SHALL BE MAXIMUM 5'-0"
7. THERE SHALL BE A CLEAR RETURN PATH BACK TO THE HVAC UNIT IN THE PLENUM SPACE FOR SYSTEMS WITH NO RETURN DUCTWORK. REPORT ANY OBSTRUCTIONS SUCH AS FULL HEIGHT WALLS NOT SHOWN ON THE DRAWINGS TO THE ARCHITECT.
8. PROVIDE A MINIMUM OF 3 FEET OF STRAIGHT DUCT INTO THE VARIABLE VOLUME BOXES OR AS REQUIRED BY THE MANUFACTURER. INSTALL BOXES AS LOW ABOVE THE CEILING AS POSSIBLE FOR EASIER ACCESS.
9. SET VARIABLE VOLUME BOX MINIMUM DAMPER SETTING ACCORDING TO THE MINIMUM AIRFLOW AS SCHEDULED ON SHEET M0.20
10. INSTALL DUCT SYSTEMS IN THE FOLLOWING ORDER FROM LOWEST TO HIGHEST REFERENCED FROM THE FINISHED CEILING HEIGHT UNLESS OTHERWISE NOTED:
    A. SUPPLY
    B. RETURN / RELIEF
    C. EXHAUST
11. ALL DUCTWORK IN EXPOSED CEILING AREAS TO BE PAINTED PER ARCHITECTURAL DIRECTION

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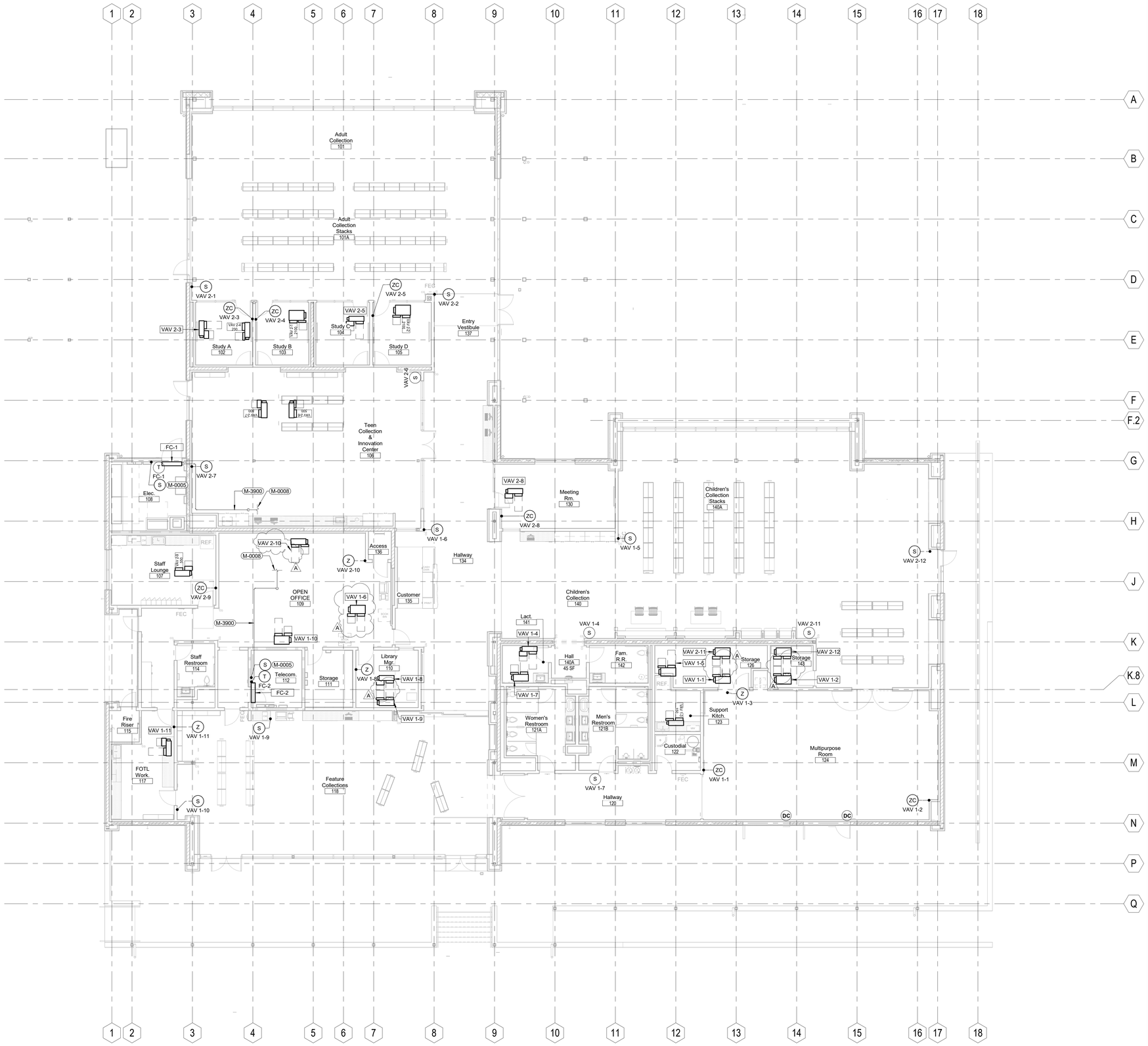
MECHANICAL FLOOR PLAN

M2.01



PROJECT NORTH

KEYNOTES

ITEM	DESCRIPTION
M-0005	FLAT PLATE BACNET SENSOR
M-0008	SEE PIPING & CONTROL ROOF PLAN M3.02 FOR CONTINUATION
M-3900	PROVIDE INSULATED REFRIGERANT PIPING LIQUID AND SUCTION LINES

LEGEND

- METAL STUD WALL CONSTRUCTION
- 1 HOUR RATED METAL STUD WALL CONSTRUCTION
- 2 HOUR RATED METAL STUD WALL CONSTRUCTION
- MASONRY WALL CONSTRUCTION

GENERAL NOTES

1. PROVIDE ACCESS PANELS IN NON-ACCESSIBLE AREAS (RATED OR NON RATED) MINIMUM 8"x8" SIZE FOR VALVES, METERS, OR DEVICES REQUIRING MAINTENANCE. INSTALL LARGER ACCESS PANELS FOR LARGER EQUIPMENT AS REQUIRED BY CODE. COORDINATE WITH ARCHITECT FOR FINAL APPROVAL OF FINAL LOCATIONS PRIOR TO INSTALLATION.
2. PROVIDE FIRESTOPPING AT PIPE PENETRATIONS THROUGH RATED WALLS. COORDINATE WITH OTHER TRADES THAT MAY HAVE PENETRANTS AROUND THE SAME AREAS. REFER TO ARCHITECTURAL SHEETS FOR FIRE RATING ASSEMBLIES.
3. INSULATION MATERIALS APPLIED TO PIPING SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND SMOKE DENSITY NOT EXCEEDING 50.
4. REQUIRED OFFSETS, COMPONENTS, ACCESSORIES, AND FITTINGS MAY NOT BE SHOWN BUT SHALL BE PROVIDED AS REQUIRED TO AVOID INTERFERENCES WITH UNFORSEEN COMPONENTS.
5. PROVIDE DIELECTRIC UNIONS, GASKETS, AND FASTENERS AT DISSIMILAR METAL CONNECTIONS OF CONTACT POITNS.
6. PROVIDE THERMAL EXPANSION JOINT AT EVERY 75 FEET ON PIPING MAIN.
7. ROUTE MECHANICAL PIPING PARALLEL TO PLUMBING DOMESTIC PIPING TO SHARE TRAPEZE SUPPORTS AS MUCH AS POSSIBLE. REFER TO PLUMBING DRAWINGS FOR REFERENCE.
8. ALIGN THERMOSTATS, TEMPERATURE SENSORS, AND CO2 SENSORS (IF APPLICABLE) WITH OTHER WALL DEVICES SUCH AS LIGHT SWITCHES. FIELD COORDINATE WITH OTHER TRADES PRIOR TO INSTALLATION
9. PENETRATION OF REFRIGERANT PIPING SHALL NOT PENETRATE FLOORS, CEILING, OR ROOFS. SECTION (1109.3) EXCEPTIONS:
   1. PENETRATIONS CONNECTING THE BASEMENT AND THE FIRST FLOOR.
   2. PENETRATIONS CONNECTING THE TOP FLOOR AND MACHINERY PENTHOUSE OR ROOF INSTALLATION.
   3. PENETRATIONS CONNECTING ADJACENT FLOORS SERVED BY THE REFRIGERATION SYSTEM.
   4. PENETRATIONS OF A DIRECT SYSTEM WHERE THE REFRIGERANT CONCENTRATION DOES NOT EXCEED THAT LISTED IN TABLE 1102.2 FOR THE SMALLEST OCCUPIED SPACE THROUGH WHICH THE REFRIGERANT PIPING PASSES.
   5. IN OTHER THAN INDUSTRIAL OCCUPANCIES AND WHERE THE REFRIGERANT CONCENTRATION EXCEEDS THAT LISTED IN TABLE 1102.2 FOR THE SMALLEST OCCUPIED SPACE, PENETRATIONS THAT CONNECT SEPARATE PIECES OF EQUIPMENT THAT ARE IN ACCORDANCE WITH ONE OF THE FOLLOWING:
      a. ENCLOSED BY AN APPROVED GASTIGHT, FIRE-RESISTIVE DUCT OR SHAFT WITH OPENINGS TO THE FLOOR SERVED BY THE REFRIGERATING SYSTEM.
      b. LOCATED ON THE EXTERIOR WALL OF A BUILDING WHERE VENTED TO THE OUTDOORS OR TO THE SPACE SERVED BY THE SYSTEM AND NOT USED AS AN AIR SHAFT, CLOSED COURT, OR SIMILAR SPACE.
10. REFRIGERANT PIPING SHALL NOT BE INSTALLED IN AN ENCLOSED PUBLIC STAIRWAY, STAIR LANDING, OR MEAN OF EGRESS. SECTION 1109.4.1.

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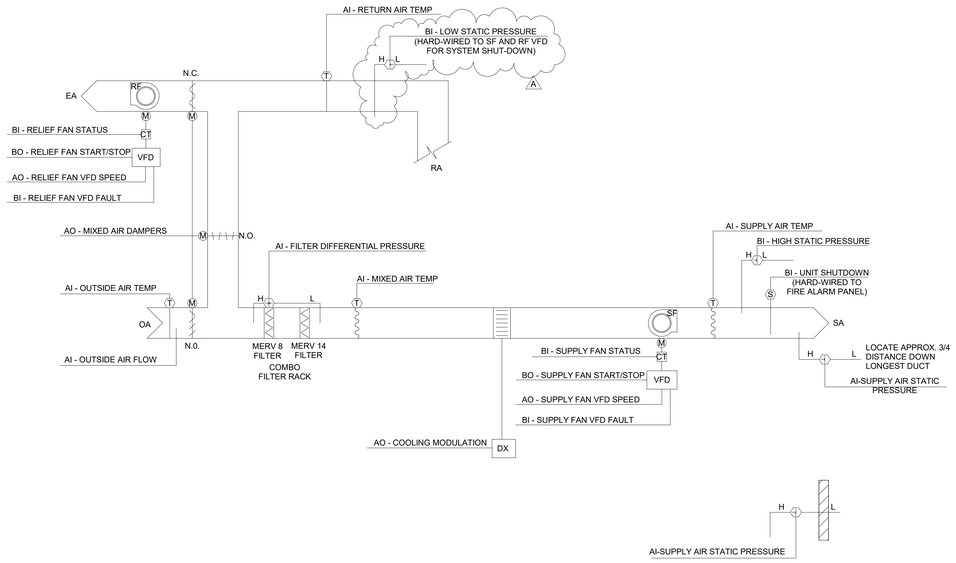
PIPING & CONTROLS FLOOR PLAN

M3.01



HVAC UNIT CONTROLLER
THE HVAC UNIT SHALL BE CONTROLLED BY A FACTORY INSTALLED CONTROLLER PROVIDED.

HVAC CONTROLLER SHALL MAINTAIN SYSTEM SUPPLY AIR TEMPERATURE SETPOINT BY SEQUENCING AND STAGING/MODULATING INDIVIDUAL DX COMPRESSORS AS REQUIRED. HVAC SYSTEM CONTROLLER SHALL FUNCTION BASED ON ITS INTERNAL CONTROL ALGORITHMS/SEQUENCE AND THE SEQUENCE/ALARMS LISTED BELOW.

ALL POINTS INDICATED BELOW IN THE SEQUENCE AND DIAGRAM SHALL BE VIEWABLE THROUGH THE EMS.

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN BASED UPON AN OPERATOR ADJUSTABLE SCHEDULE.
- MONDAY - FRIDAY: 6:00 AM TO 6:00 PM
- AFTER HOURS - CERTAIN VAV(S) ON (ADJ.)
- WEEKEND: OFF
- HOLIDAYS: OFF

HIGH STATIC SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A HIGH DUCT STATIC SHUTDOWN SIGNAL. HIGH DUCT STATIC PRESSURE RELAY SHALL BE HARD-WIRED TO SUPPLY FAN VFD AND RELIEF FAN VFD FOR SYSTEM SHUT-DOWN.

LOW STATIC SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A LOW DUCT STATIC SHUTDOWN SIGNAL. LOW DUCT STATIC PRESSURE RELAY SHALL BE HARD-WIRED TO SUPPLY FAN VFD AND RELIEF FAN VFD FOR SYSTEM SHUT-DOWN.

EMERGENCY UNIT SHUTDOWN:
THE UNIT SHALL SHUT DOWN UPON DETECTION OF SMOKE AND GENERATE AN ALARM TO THE FIRE ALARM PANEL AND EMS SYSTEM. THE SIGNAL TO THE FIRE ALARM PANEL SHALL BE HARD-WIRED FROM THE UNIT.

OPTIMAL START:
THE UNIT SHALL START PRIOR TO SCHEDULED OCCUPANCY BASED ON THE TIME NECCESARY FOR THE ZONES TO REACH THEIR OCCUPIED SETPOINTS. THE START TIME SHALL AUTOMATICALLY ADJUST BASED ON CHANGES IN OUTSIDE AND ZONE TEMPERATURES.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR DUCT STATIC PRESSURE CONTROL:
THE CONTROLLER SHALL MEASURE DUCT STATIC PRESSURE AND MODULATE THE SUPPLY FAN VFD SPEED TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT. THE SPEED SHALL NOT DROP BELOW 30% (ADJ.). THE STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON TRIM AND RESPOND LOGIC AS FOLLOWS:

PRESSURE REQUEST: SHALL BE DEFINED AS ANY VAV BOX WITH A DAMPER POSITION OF 80% OPEN. A VAV BOX WITH DAMPER POSITION 95% OR MORE OPEN SHALL COUNT AS TWO PRESSURE REQUESTS.

EVERY 2 (ADJ.) MINUTES IF THERE ARE NO PRESSURE REQUESTS THE STATIC PRESSURE SET POINT SHALL BE REDUCED BY O.O5 IN (ADJ.). IF THERE ARE 3 (ADJ.) OR MORE PRESSURE REQUESTS THE STATIC PRESSURE SETPOINT SHALL INCREASE BY O.O5 IN (ADJ.).
- THE INITIAL DUCT STATIC PRESSURE SETPOINT SHALL BE 1.25IN H2O (ADJ.)
- AS COOLING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 2.00 IN WG (ADJ.)
- AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 0.75 IN WG (ADJ.)

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT
- LOW SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT
- SUPPLY FAN VFD FAULT

RELIEF FAN:
THE RELIEF FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS. THE RELIEF FAN VFD SPEED SHALL NOT DROP BELOW 20% (ADJ.).

BUILDING STATIC PRESSURE CONTROL:
THE CONTROLLER SHALL MEASURE BUILDING STATIC PRESSURE AND MODULATE THE RELIEF FAN VFD SPEED TO MAINTAIN THE AVERAGE BUILDING STATIC PRESSURE SETPOINT OF 0.05 IN H2O (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH BUILDING STATIC PRESSURE: IF THE AVERAGE BUILDING AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT
- LOW BUILDING STATIC PRESSURE: IF THE AVERAGE BUILDING AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT

SUPPLY AIR TEMPERATURE SETPOINT - OPTIMIZED:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A SUPPLY AIR TEMPERATURE SETPOINT RESET BASED ON ZONE COOLING REQUESTS. ZONE COOLING REQUESTS SHALL BE DEFINED AS A ZONE WITH TEMPERATURE ABOVE ZONE COOLING SETPOINT.

EVERY 2 MIN (ADJ), IF THERE ARE NO COOLING REQUESTS THE SUPPLY AIR TEMPERATURE SHALL BE INCREASED BY 0.5 F (ADJ). IF THERE ARE 3 (ADJ.) OR MORE COOLING REQUESTS THE SUPPLY AIR TEMPERATURE SHALL DECREASE BY 0.5 F.
- THE INITIAL SUPPLY AIR TEMPERATURE SHALL BE 62 F (ADJ.)
- AS COOLING DEMAND INCREASES, THE SUPPLY AIR TEMPERATURE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 55 F (ADJ.)
- AS COOLING DEMAND DECREASES, THE SUPPLY AIR TEMPERATURE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 68 F (ADJ.)

COOLING STAGES / MODULATION:
THE MFGR PROVIDED HVAC UNIT CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND STAGE/MODULATE THE COOLING TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A DELAY BETWEEN STAGES AND EACH STAGE SHALL HAVE A MINIMUM RUNTIME AS RECOMMENDED BY THE MANUFACTURER..

THE COOLING SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 65°F (ADJ.)
- AND THE SUPPLY FAN STATUS IS ON

ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F (ADJ.) LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN WHENEVER SYSTEM IS IN OCCUPIED MODE.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 71°F (ADJ.).
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATUREBY AT LEAST 5°F (ADJ).
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:
- MIXED AIR TEMPERATURE DROPS TO 40°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.

THE OUTSIDE AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF.

OUTSIDE AIR FLOW RATE:
THE CONTROLLER SHALL MEASURE THE OUTSIDE AIR FLOW RATE AND MODULATE THE OUTSIDE AIR DAMPER TO MAINTAIN THE OSA SETPOINT.

THE MINIMUM OSA SETPOINT (ADJ.) DURING OCCUPIED HOURS SHALL BE AS SCHEDULED ON THE DRAWINGS.

THE OSA SETPOINT SHALL BE RESET BASED ON ZONE VENTILATION REQUESTS. ZONE VENTILATION REQUESTS SHALL BE DEFINED AS A ZONE CO2 CONCENTRATION ABOVE 1000 PPM (ADJ). A ZONE CO2 CONCENTRATION ABOVE 1250 PPM (ADJ) SHALL BE CONSIDERED 2 ZONE VENTILATION REQUESTS.

EVERY 10 MIN. (ADJ.) IF THERE ARE 2 (ADJ.) OR MORE ZONE VENTILATION REQUESTS THE OSA SET POINT SHALL INCREASE BY 500 CFM (ADJ). IF THERE ARE 0 (ADJ.) ZONE VENTILATION REQUESTS THE OSA SETPOINT DECREASE BY 500 CFM (ADJ).
- THE INITIAL OSA SETPOINT SHALL BE AIR FLOW RATE DEFINED ON MECHANICAL SCHEDULES.
- AS VENTILATION DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF AIRFLOW RATE DEFINED ON MECHANICAL SCHEDULES.
- AS VENTILATION DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF AIRFLOW RATE DEFINED ON MECHANICAL SCHEDULES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH ZONE CO2 CONCENTRATION: IF THE HIGHEST ZONE CO2 CONCENTRATION IS GREATER THAN 1500 PPM (ADJ.).

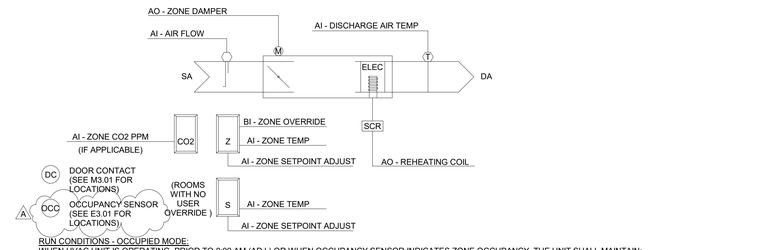
FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER AND FINAL FILTER
ALARMS SHALL BE PROVIDED AS FOLLOWS:
- PREFILTER CHANGE REQUIRED: FILTERS DIFFERENTIAL PRESSURE EXCEEDS 1.25 IN WG (ADJ.).

MIXED AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

RETURN AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE .
ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 50°F (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY TEMP: IF THE SUPPLY AIR TEMP IS 7°F (ADJ.) GREATER THAN SETPOINT.
- LOW SUPPLY TEMP: IF THE SUPPLY AIR TEMP IS LESS THAN 48°F (ADJ.)

MULTI-ZONE VAV HVAC UNIT, DDC | NTS | 13



RUN CONDITIONS - OCCUPIED MODE:
WHEN HVAC UNIT IS OPERATING, PRIOR TO 8:00 AM (ADJ.) OR WHEN OCCUPANCY SENSOR INDICATES ZONE OCCUPANCY, THE UNIT SHALL MAINTAIN:
- 75°F (ADJ.) COOLING SETPOINT
- 70°F (ADJ.) HEATING SETPOINT.

A NOTE: CONTROLS CONTRACTOR TO COORDINATE WITH ELECTRICAL FOR OCCUPANCY SENSOR CONTROLS SET-UP.

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN BASED UPON AN OPERATOR ADJUSTABLE SCHEDULE.
- MONDAY - FRIDAY: 6:00 AM TO 6:00 PM
- AFTER HOURS - CERTAIN VAV(S) ON (ADJ.)
- WEEKEND: OFF
- HOLIDAYS: OFF

A

RUN CONDITIONS - UNOCCUPIED SETBACK MODE:
WHEN HVAC UNIT IS OPERATING, AFTER 8:00 AM (ADJ.) AND WHEN OCCUPANCY SENSOR INDICATES NO ZONE OCCUPANCY, THE UNIT SHALL MAINTAIN:
- 79°F (ADJ.) COOLING SETPOINT.
- 66°F (ADJ.) HEATING SETPOINT.

RUN CONDITIONS - DEMAND SHED MODE:
WHEN DEMAND SHED MODE IS TRIGGERED THE UNIT SHALL CONDUCT A CENTRALIZED DEMAND SHED TO MAINTAIN THE FOLLOWING TEMPERATURES IN ALL NON-CRITICAL ZONES (SEE VAV SCHEDULE ON M0.20 FOR CRITICAL ZONES):
- 79°F (ADJ.) COOLING SETPOINT.
- 66°F (ADJ.) HEATING SETPOINT.

CONTROLS SHALL BE CAPABLE OF BEING REMOTELY RESET TO ORIGINAL SETPOINTS.
CONTROLS SHALL HAVE THE FOLLOWING FEATURES:
- DISABLE (BY AUTHORIZED FACILITIES OPERATOR)
- MANUAL CONTROL (BY AUTHORIZED FACILITIES OPERATOR)
- AUTOMATIC DEMAND SHED CONTROL UPON RECEIPT OF DEMAND RESPONSE SIGNAL, UNIT SHALL RUN DEMAND SHED OPERATION.

RUN CONDITIONS - OPEN DOOR SETBACK MODE:
WHEN HVAC UNIT IS OPERATING AND DOOR STATUS HAS BEEN OPEN FOR 5 MIN (ADJ.), THE UNIT SHALL MAINTAIN:
- 79°F (ADJ.) COOLING SETPOINT.
- 66°F (ADJ.) HEATING SETPOINT.

RUN CONDITIONS - OFF-HOURS:
WHEN HVAC UNIT IS NOT OPERATING, THE UNIT SHALL NOT BE ENABLED.

RUN CONDITIONS - AFTER-HOURS:
WHEN UNIT(S) ARE RUNNING AFTER HOURS USER(S) NEED TO DEFINE WHICH ZONES ARE TO BE RUNNING ON OCCUPIED MODE (ADJ.)

ZONE SETPOINT ADJUST:
THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR BY UP TO +/- 2°F (ADJ.). THIS SHALL ONLY OCCUR IN CLASSROOMS, COMPUTER LABS, OFFICES, AND CONFERENCE ROOMS.

ZONE MINIMUM AIRFLOW SETPOINT RESET:
WHEN THE ZONE C02 CONCENTRATION IS BELOW THE ZONE CO2 SETPOINT OF 1000 PPM (ADJ.) THE ZONE MINIMUM AIRFLOW SETPOINT WILL BE 20% (ADJ.). WHEN ZONE C02 CONCENTRATION IS ABOVE THE SETPOINT, FROM 0 - 50% CONTROL LOOP SIGNAL (IE ZONE CO2 IS 0 TO 250 PPM (ADJ.) ABOVE THE ZONE CO2 SETPOINT) THE ZONE MINIMUM AIRFLOW SETPOINT WILL RESET PROPORTIONALLY UP TO THE ZONE COOLING MAXIMUM AIRFLOW SETPOINT (FOR ZONES WITH CO2 SENSORS).

VARIABLE VOLUME TERMINAL UNIT - FLOW CONTROL AND REHEAT COIL:
THE UNIT SHALL MAINTAIN ZONE SETPOINTS BY CONTROLLING THE AIRFLOW AND HEATING COIL:

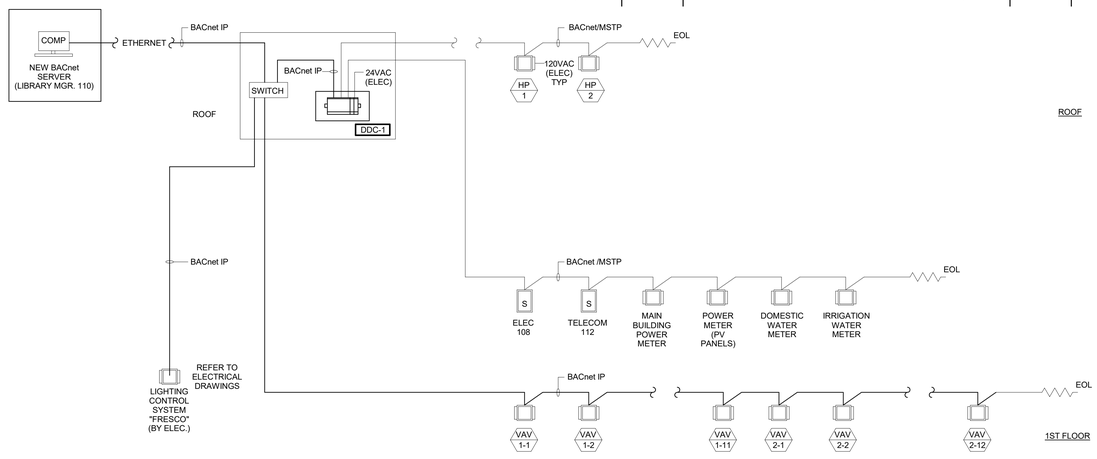
- WHEN ZONE TEMPERATURE IS GREATER THAN ITS COOLING SETPOINT, FROM 0 - 100% CONTROL LOOP SIGNAL (IE ZONE TEMPERATURE 0°F TO 2°F (ADJ.) ABOVE THE COOLING SETPOINT) THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM OCCUPIED AIRFLOW SETPOINT (ADJ.) AND THE MAXIMUM COOLING AIRFLOW (ADJ.).
- WHEN THE ZONE TEMPERATURE IS BETWEEN THE COOLING SETPOINT AND THE HEATING SETPOINT, THE ZONE DAMPER SHALL MAINTAIN THE MINIMUM AIRFLOW SETPOINT (ADJ.).
- WHEN ZONE TEMPERATURE IS LESS THAN ITS HEATING SETPOINT, FROM 0 - 50% CONTROL LOOP SIGNAL (IE ZONE TEMPERATURE 0°F TO 1°F (ADJ.) BELOW THE HEATING SETPOINT) THE ZONE DAMPER SHALL BE AT MINIMUM POSITION. THE REHEAT COIL WILL MODULATE TO RESET THE SUPPLY AIR TEMPERATURE UP TO 90°F (ADJ.).
- IF SPACE TEMPERATURE IS NOT ABLE TO BE MAINTAINED, FROM 50-100% CONTROL LOOP SIGNAL (IE ZONE TEMPERATURE 1°F TO 2°F (ADJ.) BELOW THE HEATING SETPOINT) THE ZONE DAMPER WILL MODULATE TO THE HEATING MAXIMUM AIRFLOW (ADJ).

REHEATING - HIGH DISCHARGE AIR TEMPERATURE LIMIT:
THE CONTROLLER SHALL MEASURE THE DISCHARGE AIR TEMPERATURE AND LIMIT REHEATING IF THE DISCHARGE AIR TEMPERATURE IS MORE THAN 95°F (ADJ.).

DAMPER POSITION:
THE CONTROLLER SHALL MONITOR DAMPER POSITION TO ACCOMPLISH STATIC PRESSURE RESET PRESSURE REQUEST LOGIC.

ALARMS:
- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY 6°F (ADJ.).
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY 6°F (ADJ.).
- HIGH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS GREATER THAN 100°F (ADJ.).
- LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 50°F (ADJ.).

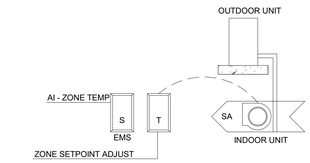
VAV ZONE TERMINAL AIR UNIT, DDC | NTS | 11



NOTES:

1. AN IP ADDRESS AND THE FINAL CONNECTION TO THE LOCAL AREA NETWORK WILL BE PROVIDED BY THE OWNER.
2. COORDINATE WITH OWNERS REPRESENTATIVES AND MAINTENANCE STAFF FOR CONTROLS INTEGRATION BEFORE BID AND DURING CONSTRUCTION. ATTEND CONSTRUCTION COORDINATION MEETINGS AS REQUIRED.
3. COORDINATE WITH MECHANICAL EQUIPMENT MANUFACTURER ENGINEERS TO ACCOMPLISH THE SEQUENCE OF OPERATIONS AS DESCRIBED IN THE CONSTRUCTION DOCUMENTS, AND VERIFY CAPABILITIES OF MANUFACTURER'S CONTROL BOARDS AND PROVIDE ADDITIONAL COMPONENTS AS NECESSARY.
4. COORDINATE ELECTRICAL POWER/SEPARATE CIRCUIT REQUIREMENTS OF CONTROLLERS WITH ELECTRICAL CONTRACTOR PRIOR TO BID. CONTROLS CONTRACTOR TO PROVIDE 120/24VAC TRANSFORMERS AS REQUIRED FOR A FULLY FUNCTIONAL CONTROL SYSTEM.
5. CONTROL THERMOSTATS/SENSORS AND LOW VOLTAGE WIRING (LESS THAN 50 VOLTS) SHALL BE FURNISHED, WIRED AND INSTALLED BY CONTROLS CONTRACTOR. ALL WIRING SHALL BE PLENUM RATED OR ELSE RUN IN CONDUIT SEPARATE FROM AC POWER WIRING UNLESS NOTED OTHERWISE.
6. CONTROL WIRING SHALL BE RUN IN CONDUIT (UNLESS OTHERWISE NOTED). COORDINATE ROUTING WITH OTHER TRADES.
7. INTERLOCK AC UNITS WITH FIRE ALARM SYSTEM FOR SHUTDOWN UPON SIGNAL FROM SMOKE DETECTOR.
8. WHERE NOT SHOWN ON THE ELECTRICAL DRAWINGS, PROVIDE POWER WIRING FROM THE ELECTRICAL PANEL CIRCUIT BREAKERS TO CONTROLS SYSTEM PANELS AND DEVICES REQUIRING LINE VOLTAGE POWER. PROVIDE LIMITED ENERGY TRANSFORMERS. COMPLY WITH NEC. PROVIDE A DISCONNECT ON PRIMARY SIDE OF TRANSFORMER AND A RESETTABLE, FUSED CUT-OUT ON THE SECONDARY SIDE OF THE TRANSFORMER.
9. DO NOT CONNECT CONTROL WIRING TO RECEPTACLE OR LIGHTING CIRCUITS.
10. SEE ELECTRICAL DRAWINGS FOR EXACT LOCATION OF BUILDING CONTROLLERS.

CONTROL SYSTEM ARCHITECTURE | NTS | 01



SEQUENCE OF OPERATION

RUN CONDITIONS - ALL HOURS:
THE SYSTEM SHALL BE CONTROLLED BY STANDALONE PROGRAMMABLE THERMOSTAT.

THE AIR CONDITIONING UNIT WILL BE OPERATED ON 24 HOURS PER DAY, 7 DAYS PER WEEK TIME SCHEDULE (ADJ.).
THE UNIT SHALL MAINTAIN:
- 76°F (ADJ.) COOLING SETPOINT.
- 66°F (ADJ.) HEATING SETPOINT.

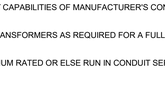
A

THE DDC SYSTEM SHALL MONITOR TEMPERATURE AND PROVIDE ALARM FOR THE UNIT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN 80°F (ADJ.)
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN 60°F (ADJ.)
- PUMP FAILURE ALARM: UNIT TO SHUT-DOWN UPON DETECTION OF PUMP FAILURE

A

SPLIT SYSTEM, ELECT. CONTROLS W/ DDC MONITORING | NTS | 04



THE FAN SHALL RUN ANYTIME THE BUILDING HVAC UNITS ARE OPERATING.

THE FAN SHALL HAVE A MINIMUM RUNTIME OF 10 MIN (ADJ.).

THE CONTROLLER SHALL MONITOR THE FAN STATUS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN, SCHEDULED, DDC | NTS | 03

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SCHEMATIC DESIGN	07/18/2022
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Date Published	02/13/2025
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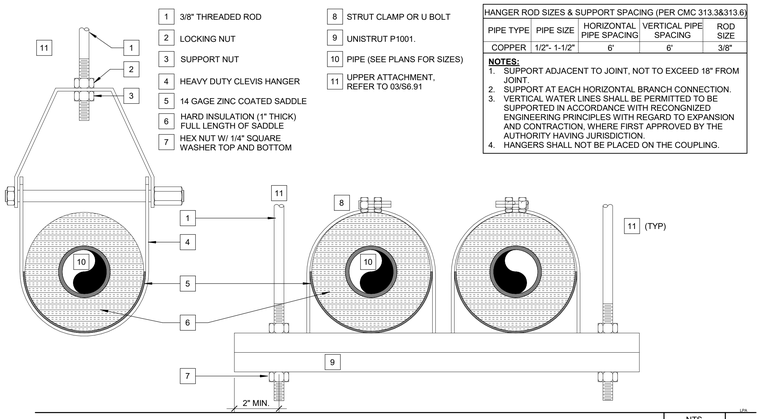
Scale	

MECHANICAL CONTROL SEQUENCES AND DIAGRAMS

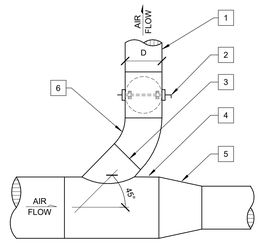
M6.10



HANGER ROD SIZES & SUPPORT SPACING (PER CMC 313.3&313.6)				
PIPE TYPE	PIPE SIZE	HORIZONTAL PIPE SPACING	VERTICAL PIPE SPACING	ROD SIZE
COPPER	1/2"- 1-1/2"	6'	6'	3/8"

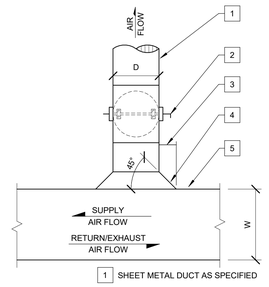
NOTES:
1. SUPPORT ADJACENT TO JOINT, NOT TO EXCEED 18" FROM JOINT.
2. SUPPORT AT EACH HORIZONTAL BRANCH CONNECTION.
3. VERTICAL WATER LINES SHALL BE PERMITTED TO BE SUPPORTED IN ACCORDANCE WITH RECONGNIZED ENGINEERING PRINCIPLES WITH REGARD TO EXPANSION AND CONTRACTION, WHERE FIRST APPROVED BY THE AUTHORITY HAVING JURISDICTION.
4. HANGERS SHALL NOT BE PLACED ON THE COUPLING.

PIPE HANGER | NTS | 04



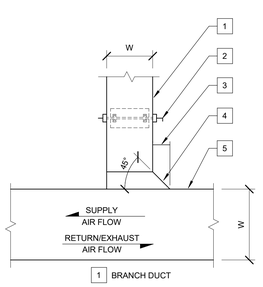
NOTE:
1. LATERAL TAKE-OFF UNLESS OTHERWISE NOTED ON PLANS.

ROUND DUCT TAKEOFF | NTS | 03



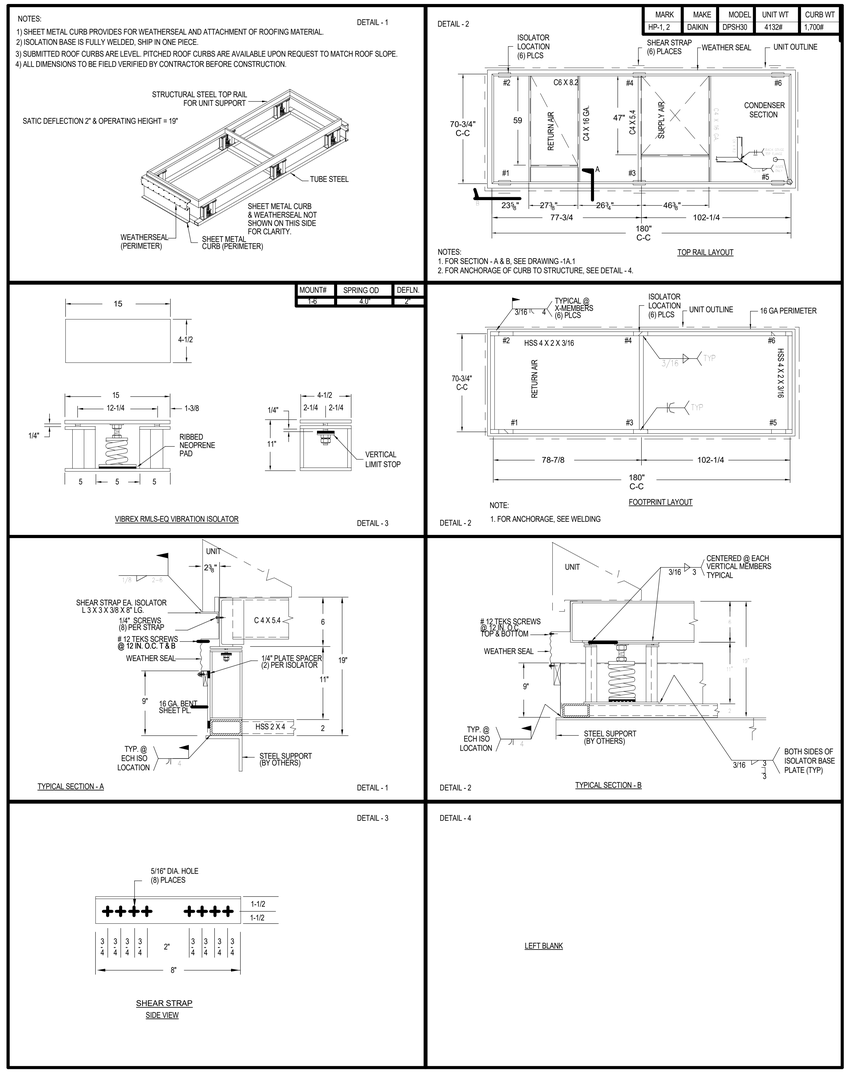
NOTE:
1. LATERAL TAKE-OFF UNLESS OTHERWISE NOTED ON PLANS.

RECTANGULAR TO ROUND DUCT TAKEOFF | NTS | 06

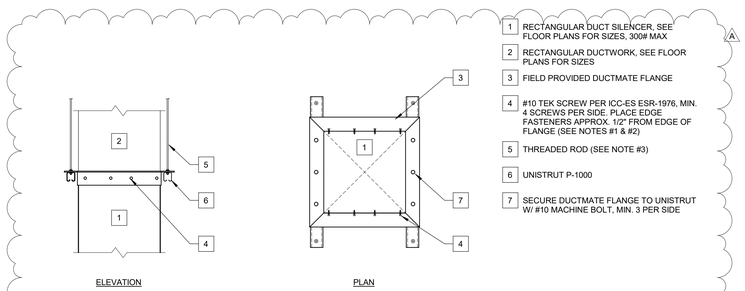


NOTE:
1. LATERAL TAKE-OFF UNLESS OTHERWISE NOTED ON PLANS.

RECTANGULAR DUCT TAKEOFF | NTS | 02

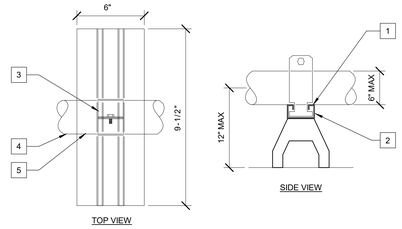


VIBRATION ISOLATION CURB | NTS | 10



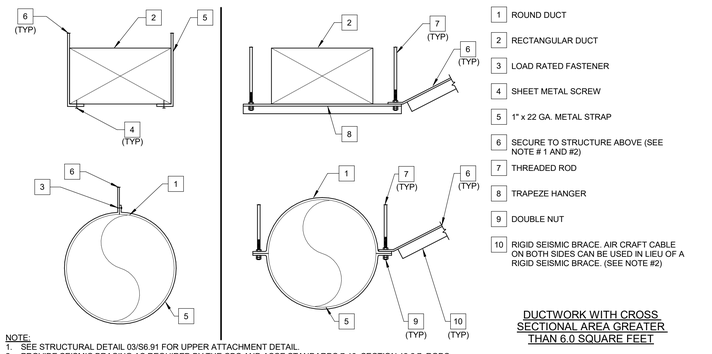
NOTE:
1. DO NOT PLACE FASTENERS INTO THE AIR GAP. REFER TO MANUFACTUERS INSTALLATION MANUAL FOR MORE INFO.
2. SCREWS INTO DUCT SILENCER SHALL ONLY BE AT FLANGE. NO SCREWS TO PENERATE SILENCER CASING BEYOND FLANGE. SEAL ALL SCREW PENETRATIONS IN FLANGE.
3. SEE STRUCTURAL DETAIL 03/S6.91 FOR UPPER ATTACHMENT DETAILS.

DUCT SILENCER RISER SUPPORT IN SHAFT | NTS | 17



NOTE:
1. PROVIDE A MAXIMUM OF 6'-0" BETWEEN SUPPORT BLOCKS. ADDITIONALLY PROVIDE BLOCK WITHIN 2'-0" OF ANY CHANGE OF DIRECTION. REFER TO MANUFACTUER'S DATA FOR BLOCK SPACING OF MULTIPLE PIPES.

PIPE SUPPORT ON ROOF | NTS | 09



DUCTWORK WITH CROSS SECTIONAL AREA GREATER THAN 6.0 SQUARE FEET

NOTE:
1. SEE STRUCTURAL DETAIL 03/S6.91 FOR UPPER ATTACHMENT DETAIL.
2. PROVIDE SEISMIC BRACING AS REQUIRED BY THE CBC AND ASCE STANDARDS 7-10, SECTION 13.6.7. RODS, TRAPEZE HANGERS, STRAPS, BANDS, DUCT SPACING, ETC. SHALL BE SIZED PER THE CURRENT EDITION OF SMACNA SEISMIC RESTRAINT MANUAL.

TYPICAL DUCT SUPPORT | NTS | 01

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Scale	

MECHANICAL DETAILS AND DIAGRAMS

M7.11

ABBREVIATIONS

NOT ALL ABBREV. MAY BE USED

4S/DP	4" SQUARE BY 2-1/8" DEEP BOX
ADA	AMERICAN WITH DISABILITIES ACT
A.F.F.	ABOVE FINISH FLOOR
A.F.G.	ABOVE FINISH GRADE
AWG	AMERICAN WIRE GAUGE
AMP, A	AMPERE
A.I.C. or AIC	AMPERES INTERRUPTING CAPACITY (SYMMETRICAL)
A.F.C. or AFC	AVAILABLE FAULT CURRENT
AF/AT	AMP FRAME, AMP TRIP
AHJ	AUTHORITY HAVING JURISDICTION
AS/AF	AMP SWITCH, AMP FUSE
ATS	AUTOMATIC TRANSFER SWITCH
AVG	AVERAGE
BJ	BONDING JUMPER
BDF	BUILDING DISTRIBUTION FRAME
BR	BRANCH
BLDG	BUILDING
CBC	CALIFORNIA BUILDING CODE
CEC	CALIFORNIA ELECTRICAL CODE
CIRC., CKT.	CIRCUIT
CB	CIRCUIT BREAKER
CSFD	COMBINATION SMOKE FIRE DAMPER
C	CONDUIT
C.O.	CONDUIT ONLY, COMPLETE WITH PULLSTRING
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CONN	CONNECTED
CPT	CONTROL POWER TRANSFORMER
CLCB	CURRENT LIMITING CIRCUIT BREAKER
CLF	CURRENT LIMITING FUSE
CT	CURRENT TRANSFORMER
(D)	EXISTING DEVICE TO BE DEMOLISHED
DAS	DISTRIBUTED ANTENNA SYSTEM
DIA	DIAMETER
DISC	DISCONNECT
DIST	DISTRIBUTION
D.P.C.S.	DIMMING PANEL CONTROL STATION
E.C.	ELECTRICAL CONTRACTOR
EMS	ENERGY MANAGEMENT CONTROL SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ENT	ELECTRICAL NON-METALLIC TUBING
EWC	ELECTRIC WATER COOLER
E.P.O.	EMERGENCY POWER OFF
E-O-L	END-OF-LINE CIRCUIT TERMINATOR
EF	EXHAUST FAN
EGC or EG or E/G	EQUIPMENT GROUND (GREEN)
(E)	EXISTING DEVICE TO REMAIN
EP	EXPLOSION PROOF
(ER)	EXISTING DEVICE TO BE RELOCATED
FT or '	FEET
FA or F.A.	FIRE ALARM
FLA	FULL LOAD AMPS
GRD	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GE or GEC	GROUNDING ELECTRODE CONDUCTOR
HACR	HEATING AIR CONDITIONING REFRIGERATION
HOA	HAND-OFF-AUTO
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
H.,W.,D.,L.	HEIGHT, WIDTH, DEPTH, LENGTH
HID	HIGH INTENSITY DISCHARGE
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
IN. or "	INCHES
I/G	ISOLATED GROUND
IBC	INTERNATIONAL BUILDING CODE
I.D.C.S.	INTEGRATED DIMMING CONTROL PANEL
IDF	INTERMEDIATE DISTRIBUTION FRAME
JBOX	JUNCTION BOX
K	DEGREE KELVIN
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPERES
KW	KILOWATT
KWH	KILOWATT HOUR
LCL	LONG CONTINUOUS LOAD
LF, L.F.	LINEAR FEET
LTG, LTS	LIGHTING
LPS	LOW PRESSURE SODIUM
LV	LOW VOLTAGE
MAX.	MAXIMUM
MBJ	MAIN BONDING JUMPER
MDF	MAIN DISTRIBUTION FRAME
MOCP	MAXIMUM OVERCURRENT PROTECTION
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
M.C.	MECHANICAL CONTRACTOR
M	METER
M/M	METER MAIN
MV	MERCURY VAPOR
MH	METAL HALIDE
MIN.	MINIMUM
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MCM	THOUSAND CIRCULAR MILS
MCP	MOTOR CIRCUIT PROTECTOR
MFR.	MANUFACTURER
MTD	MOUNTED
MW	MICROWAVE
NATS	NON AUTOMATIC DISCONNECT
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NC	NORMALLY CLOSED
NO	NORMALLY OPENED
NF	NON-FUSED
NIC	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NL	NIGHT LIGHT
NO. or #	NUMBER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
%Z	PERCENT IMPEDANCE
PH. or ø	PHASE
PC	PHOTOCELL
P.C.	PLUMBING CONTRACTOR
P	POLE
PVC	POLY VINYL CHLORIDE
POU	POWER DISTRIBUTION UNIT
PRIMARY	OVER 600 VOLTS
PROVIDE	FURNISH, INSTALL AND CONNECT
PT	POTENTIAL TRANSFORMER
PA	PUBLIC ADDRESS
(R)	DENOTES RELOCATED DEVICE LOCATION
REC, RECEPT	RECEPTACLE
REF	REFRIGERATOR
RGS	RIGID GALVANIZED STEEL
RMS	ROOT MEAN SQUARE
SCC	SHORT CIRCUIT CURRENT
SCCR	SHORT CIRCUIT CURRENT RATING
SCS	STRUCTURED CABLING SYSTEM
SFD	SMOKE FIRE DAMPER
SECONDARY	600 VOLTS AND LESS
SMACNA	SHEET METAL AND AIR COND. CONTRACTOR'S NAT'L ASSOC.
SQ.	SQUARE
SSBJ	SUPPLY SIDE BONDING JUMPER
SBJ	SYSTEM BONDING JUMPER
TC	TIMECLOCK
TEL/DATA	TELEPHONE AND DATA
TV	TELEVISION
T.V.S.S.	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
U.G.P.S.	UNDERGROUND PULL SECTION
U.O.N.	UNLESS OTHERWISE NOTED
U.P.S. or UPS	UNINTERRUPTABLE POWER SYSTEM
VAV	VARIABLE AIR VOLUME
V	VOLTS
VA	VOLT AMPERES
VD	VOLTAGE DROP
WP	WEATHERPROOF
W	WIRE
XFMR	TRANSFORMER

GENERAL

NOT ALL SYMBOLS MAY BE USED

FLOOR BOX/SPECIALTY WALL BOX/IN-GRADE BOX SYMBOLS

- SINGLE SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE FLOOR BOX DETAILS AND SPECIFICATIONS FOR MORE INFORMATION.
- TWO SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE FLOOR BOX DETAILS AND SPECIFICATIONS FOR MORE INFORMATION.
- THREE SERVICE IN FLOOR BOX. PROVIDE DEVICES PER PLAN. SEE FLOOR BOX DETAILS AND SPECIFICATIONS FOR MORE INFORMATION.
- PB OR P — FLUSH IN GRADE PULLBOX, SIZED PER N.E.C. OR AS NOTED.

CONDUIT/PATHWAY/BACKBOARD SYMBOLS

- T — CONCEALED TELEPHONE/DATA CONDUIT RUN, 1-INCH CONDUIT (MIN) OR AS NOTED ON PLANS. SEE TABLE BELOW FOR CONDUIT SIZE VARIATIONS.
  T2 = 1-1/4" C. T3 = 1-1/2" C. T4 = 2" C.
- CONCEALED CONDUIT UNLESS OTHERWISE NOTED, SIZE AS NOTED ON PLANS
- CONDUIT CONCEALED BELOW GRADE, SIZE AS NOTED ON PLANS
- CONDUIT STUB OUT, PROVIDE A BUSHING ON BOTH ENDS
- CONDUIT CONTINUATION
- CONDUIT CONTINUATION DOWN WALL TO FLOOR BELOW
- CONDUIT CONTINUATION UP WALL TO FLOOR ABOVE
- SURFACE MOUNTED, LOCKABLE TERMINAL CABINET WITH TERMINAL STRIPS AS REQUIRED.
- PAINTED TELEPHONE TERMINAL BACKBOARD SIZED AS NOTED, REFER TO TELECOM SYSTEM GROUND DETAIL.
- TELECOM GROUND BUS BAR, REFER TO TELECOM SYSTEM GROUND DETAIL AND SPECIFICATIONS.

TELECOMMUNICATIONS

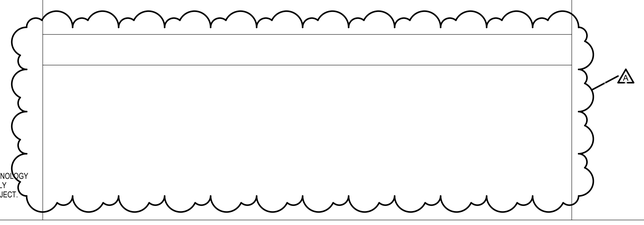
NOT ALL SYMBOLS MAY BE USED

- (#) — COMBINATION TELEPHONE AND DATA OUTLET BOX, WALL MOUNTED. STUB A 1" C. TO NEAREST ACCESSIBLE CEILING AND PROVIDE A BUSHING. 4S/DP MINIMUM WITH SINGLE GANG RING.
- (#) — COMBINATION TELEPHONE AND DATA OUTLET BOX FLUSH MOUNTED IN CEILING - MOUNT FLUSH IN FLOOR WHEN INDICATED IN A FLOOR BOX SYMBOL. STUB A 1" C. TO NEAREST ACCESSIBLE CEILING AND PROVIDE A BUSHING.
- (#) — COMBINATION TELEPHONE AND DATA OUTLET BOX. WALL MOUNTED 6-INCHES ABOVE COUNTER OR SPLASH. STUB A 1" C. TO NEAREST ACCESSIBLE CEILING AND PROVIDE A BUSHING. 4S/DP MINIMUM WITH SINGLE GANG RING.
- F(#) — COMBINATION TELEPHONE AND DATA OUTLET BOX, WALL MOUNTED. STUB A 1" C. TO NEAREST ACCESSIBLE CEILING AND PROVIDE A BUSHING. 4S/DP MINIMUM WITH SINGLE GANG RING.
- TV — WALL MOUNT DATA OUTLET AT TV DISPLAY.
- (#) (#) — DATA OUTLET(S) IN FLOOR BOX OR POKE-THRU. PROVIDE DEVICES PER PLAN. SEE FLOOR BOX DETAILS AND SPECIFICATIONS FOR MORE INFORMATION.
- INTERIOR CEILING MOUNTED WIRELESS ACCESS POINT OUTLET DATA OUTLET(S) AND 1" CONDUIT WITH CONDUCTORS TO NEAREST ACCESSIBLE CEILING SPACE, OR AS SHOWN ON THE FLOOR PLANS. WHEN INSTALLED AT ACCESSIBLE CEILING TILE LOCATIONS, PROVIDE WAP OUTLET ABOVE ACCESSIBLE CEILING TILE AND MOUNTED TO THREADED ROD ATTACHED TO STRUCTURE ABOVE. REFER TO FACEPLATE DETAILS FOR ADDITIONAL INFORMATION. WAP ELECTRONICS AND ANTENNA ARE CFCI.
- EXTERIOR WIRELESS ACCESS POINT OUTLET DATA OUTLET(S) WITH FLUSH 4S DEEP BOX, WEATHERPROOF BLANK PLATE, AND 1" CONDUIT WITH CONDUCTORS TO NEAREST ACCESSIBLE CEILING SPACE, OR AS SHOWN ON THE FLOOR PLANS. REFER TO FACEPLATE DETAILS FOR ADDITIONAL INFORMATION. WAP ELECTRONICS AND ANTENNA ARE CFCI.
- 2 — CEILING MOUNTED DATA OUTLET(S) AND 1" CONDUIT WITH CONDUCTORS TO NEAREST ACCESSIBLE CEILING SPACE, OR AS SHOWN ON THE FLOOR PLANS. WHEN INSTALLED AT ACCESSIBLE CEILING TILE LOCATIONS, PROVIDE OUTLET ABOVE ACCESSIBLE CEILING TILE AND MOUNTED TO THREADED ROD ATTACHED TO STRUCTURE ABOVE. REFER TO FACEPLATE DETAILS FOR ADDITIONAL INFORMATION. WAP ELECTRONICS AND ANTENNA ARE CFCI.

SECURITY & ALARM SYSTEMS

NOT ALL SYMBOLS MAY BE USED

- I-S3#I — WALL MOUNT IP-CCTV CAMERA WITH CAT-6A DATA CABLE - SEE SPECIFICATIONS AND CAMERA SCHEDULE. # INDICATES NUMBER OF IMAGE SENSORS
- CEILING OR PENDANT MOUNTED - IP-CCTV FIXED POSITION CAMERA WITH CAT-6A DATA CABLE. # INDICATES NUMBER OF IMAGE SENSORS - SEE SPECIFICATIONS AND CAMERA SCHEDULE
- CC — CCTV SYSTEM CONDUIT WITH CONDUCTORS PER CCTV SYSTEM RISER DIAGRAM AND/OR SPECIFICATIONS.
- ACCP — ACCESS CONTROL PANEL - SEE SPECIFICATIONS.
- APS — ACCESS CONTROL SYSTEM POWER SUPPLY - SEE SPECIFICATIONS.
- SETC — SECURITY SYSTEM TERMINAL CABINET COMPLETE. SEE SPECIFICATIONS.
- SPS — SECURITY SYSTEM TERMINAL CABINET POWER SUPPLY. SEE SPECIFICATIONS.
- MS — MOTION DETECTOR 360 - CEILING MOUNTED DUAL TECHNOLOGY MOTION SENSOR - ROUGH IN CONDUIT / BOX ONLY.
- MS — MOTION DETECTOR - WALL MOUNTED DUAL TECHNOLOGY MOTION SENSOR - ROUGH IN CONDUIT / BOX ONLY.
- HS — HORN STROBE - WALL MOUNTED - ROUGH IN CONDUIT / BOX ONLY.
- PB — UNDER-DESK MOUNTED PANIC BUTTON . ROUGH IN CONDUIT / BOX ONLY.
- DC — DOUBLE POLE DOUBLE THROW SECURITY ALARM DOOR CONTACT. ROUGH IN CONDUIT / BOX ONLY.
- CR — ACCESS CONTROL WALL MOUNTED CARD/PROXIMITY READER - SEE SPECIFICATIONS.
- EL — ACCESS CONTROL ELECTRIFIED LOCK. SEE SPECIFICATIONS.
- KP — SECURITY ALARM KEY PAD - ROUGH IN CONDUIT / BOX ONLY.
- SA — CONCEALED SECURITY ALARM CONDUIT RUN, 3/4-INCH CONDUIT (MIN). SEE TABLE BELOW FOR CONDUIT SIZE VARIATIONS:
  SA = 3/4" C. SA1 = 1" C. SA2 = 1-1/4" C. SA3 = 1-1/2" C. SA4 = 2" C.



THE PURPOSE OF THIS SHEET IS TO ILLUSTRATE AND DEFINE GRAPHIC SYMBOLS WHICH MAY OCCUR ON THE TECHNOLOGY DRAWING SET. THE ILLUSTRATION OF A SYMBOL, OR SYSTEM OF SYMBOLS, ON THIS SHEET DOES NOT NECESSARILY INDICATE THAT THE BUILDING COMPONENT REPRESENTED SYSTEM BY THE SYMBOL IS USED AS PART OF THIS PROJECT. REFER TO THE COMPLETE DRAWING PACKAGE AND SPECIFICATIONS TO DETERMINE THE SCOPE OF THE WORK.

GENERAL NOTES

APPLIES TO ALL SHEETS IN THIS SET

TELECOMMUNICATIONS PATHWAYS AND GENERAL NOTES:

1. CONDUITS SHALL (a) CONTAIN NO CONTINUOUS SECTIONS LONGER THAN 30M (98 FT.), AND (b) CONTAIN NO MORE THAN (2) 90° BENDS OR (1) REVERSE BEND WITHOUT INSTALLING A PULL BOX. SPLIT CONDUITS IN PLACE OF PULL BOXES ARE UNACCEPTABLE.
2. CONDUITS SHALL CONTAIN PLASTIC OR NYLON PULL TAPE RATED AT 200 LBS. WITH A MINIMUM OF 5 FEET OF EXTRA PULL TAPE COILED AT EACH END.
3. CONDUIT BEND RADIUS SHALL BE (a) A MINIMUM OF 6 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS 2-INCHES IN DIAMETER OR LESS, AND (b) 10 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS MORE THAN 2-INCHES IN DIAMETER.
4. TERMINATE CONDUIT STUBS AND SLEEVES THAT PROTRUDE THROUGH STRUCTURAL FLOORS 2-INCHEST TO 3-INCHES ABOVE THE FLOOR SURFACE.
5. INSTALL BUSHINGS OR BELL ENDS AS REQUIRED ON ALL CONDUITS.
6. FLEX CONDUIT IS UNACCEPTABLE FOR USE AS A COMMUNICATIONS CONDUIT EXCEPT AT SEISMIC JOINTS AND/OR IF APPROVED IN WRITING BY THE ENGINEER.
7. ALL UNDER SLAB OR IN-SLAB CONDUITS SHALL BE INSTALLED IN A MANNER THAT PREVENTS WATER INFILTRATION OF THE CONDUIT. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE GROUND WATER, RAIN WATER OR CONSTRUCTION WATER IS PREVENTED FROM ENTERING AND/OR REMOVED FROM THE CONDUITS PRIOR TO PLACEMENT OF COMMUNICATIONS CABLES. SEE ELECTRICAL SPECIFICATIONS, DETAILS AND PLANS FOR ADDITIONAL CONDUIT SEALING REQUIREMENTS.
8. WHERE OPEN CEILINGS OCCUR CONDUCTORS SHALL BE INSTALLED INSIDE SURFACE MOUNTED RACEWAY (CONDUIT). PROVIDE ALL SURFACE MOUNTED RACEWAY, CONDUITS AND CONDUIT SLEEVES WHETHER OR NOT SHOWN ON THE PLAN DRAWINGS. THIS APPLIES TO ALL LOW VOLTAGE AND SIGNAL SYSTEMS CONDUCTORS INCLUDING DATA, TELEPHONE, SECURITY, PUBLIC ADDRESS, CLOCKS, AUDIO VISUAL, CATV, SURVEILLANCE CAMERAS, FIRE ALARM, BMS/EMS, ETCETERA.
9. WHERE INACCESSIBLE CEILINGS OCCUR CONDUCTORS SHALL BE INSTALLED INSIDE CONDUIT RACEWAY. PROVIDE ALL CONDUITS AND CONDUIT SLEEVES WHETHER OR NOT SHOWN ON THE PLAN DRAWINGS. THIS APPLIES TO ALL LOW VOLTAGE AND SIGNAL SYSTEMS CONDUCTORS INCLUDING DATA, TELEPHONE, SECURITY, PUBLIC ADDRESS, CLOCKS, AUDIO VISUAL, CATV, SURVEILLANCE CAMERAS, FIRE ALARM, BMS/EMS, ETCETERA.
10. PROVIDE ANY AND ALL CONDUIT SLEEVES AS MAY BE REQUIRED WHENEVER LOW VOLTAGE CONDUCTORS PASS THROUGH AN INTERIOR OR EXTERIOR WALL, FLOOR, OR ANY STRUCTURAL ASSEMBLY. PROPERLY FIRE STOP ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES PER THE NEC AND ELECTRICAL SPECIFICATIONS.
11. PROVIDE SOUND STOP MATERIAL FOR ALL CONDUIT PENETRATIONS IN SOUND RATED WALL ASSEMBLIES.
12. ALL PULL BOXES SHALL BE SIZED AND INSTALLED PER ANSI-TIA-569-C. PULL BOXES FOR IN/UNDER SLAB CONDUIT RUNS ARE NOT PERMITTED UNLESS OTHERWISE NOTED. PULL BOXES FOR OVERHEAD CONDUIT RUNS SHALL BE LOCATED ABOVE ACCESSIBLE CEILINGS WITHIN THE ACCESSIBLE CEILING SPACE AND SUPPORTED INDEPENDENTLY FROM THE STRUCTURE AND CONDUIT SUPPORTS. PULL BOXES FOR ROOF MOUNTED OR EXTERIOR ABOVE GRADE APPLICATIONS SHALL BE NEMA 3R RATED. PULL BOXES SHALL BE SIZED ACCORDING TO THE FOLLOWING:

CONDUIT SIZE	WIDTH	LENGTH	DEPTH	WIDTH INCREASE PER ADDITIONAL CONDUIT
1"	4"	16"	3"	2"
2"	8"	36"	4"	5"
3"	12"	48"	5"	6"
4"	15"	60"	8"	8"

FOR OTHER CONDUIT SIZES REFER TO ANSI/TIA 569 C TABLE 12. LATEST PUBLISHED EDITION.

13. CONDUIT(S) SHALL EXIT A PULL BOX ON THE WALL OPPOSITE THE WALL ENTERED.
14. ALL PULL BOXES INSTALLED ON TOP OF ROOFS OR ATTACHED TO CANOPIES SHALL BE RATED NEMA-3R OR NEMA-4. PROVIDE QUANTITY AND SIZE OF PULL BOXES AS REQUIRED TO COMPLY WITH THESE GENERAL PATHWAY NOTES. PAINT BOXES TO MATCH SURROUNDING SURFACES.
15. ALL CONDUITS INSTALLED ON EXTERIOR OF BUILDINGS AND CANOPIES SHALL BE GALVANIZED. PAINT ALL CONDUITS TO MATCH SURROUNDING SURFACES.
16. PROVIDE LABELING OF EACH CONDUIT PER GENERAL ELECTRICAL SPECIFICATIONS.
17. PROVIDE INTERNAL/EXTERNAL GAS AND WATER TIGHT MECHANICAL SEALING/PLUGGING OF EACH UNDERGROUND BUILDING ENTRY CONDUIT AS SPECIFIED ELSEWHERE IN THE DRAWINGS AND SPECIFICATIONS.
18. ALL CONDUITS EXPOSED TO VIEW (I.E.: OPEN CEILING SPACES) SHALL BE PAINTED TO MATCH SURROUNDING SURFACES. CONDUITS INSTALLED ABOVE HARD CEILINGS OR INACCESSIBLE CEILINGS ARE EXEMPT FROM PAINTING.
19. ELECTRICAL CONTRACTOR SHALL REFERENCE ALL E-SERIES, T-SERIES AND AV-SERIES SHEETS FOR ADDITIONAL CONDUIT REQUIREMENTS.

SHEET INDEX	
Sheet Number	Sheet Name
T0.01	TECHNOLOGY LEAD SHEET
T1.00	TECHNOLOGY SITE PLAN
T2.01	TECHNOLOGY FIRST FLOOR PLAN
T2.31	TECHNOLOGY REFLECTED CEILING PLAN
T4.01	TECHNOLOGY ENLARGED MDF ROOM LAYOUT
T6.11	TECHNOLOGY MOUNTING DETAILS
T6.12	TECHNOLOGY FACEPLATE DETAILS
T6.13	TECHNOLOGY SECURITY DETAILS
T6.14	TECHNOLOGY SINGLE LINE
T6.15	TECHNOLOGY DETAILS
T6.16	TECHNOLOGY DETAILS

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REGISTERED PROFESSIONAL ENGINEER RAYMOND W. SIU No. E15610 EXP. 12/31/2025 ELECTRICAL STATE OF CALIFORNIA

MOORPARK CITY LIBRARY

83 HIGH STREET

Developed for CITY OF MOORPARK

Revision	Date
A ADDENDUM #1	06/20/2025

Submittal	Date
SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
90% CONSTRUCTION DOCS	02/02/2024
AGENCY SUBMITTAL #1	05/15/2024
AGENCY SUBMITTAL #2	10/31/2024
AGENCY SUBMITTAL #3	03/27/2025
BID DOCUMENTS	05/23/2025

Job Number	30647
Date Published	10/27/2022
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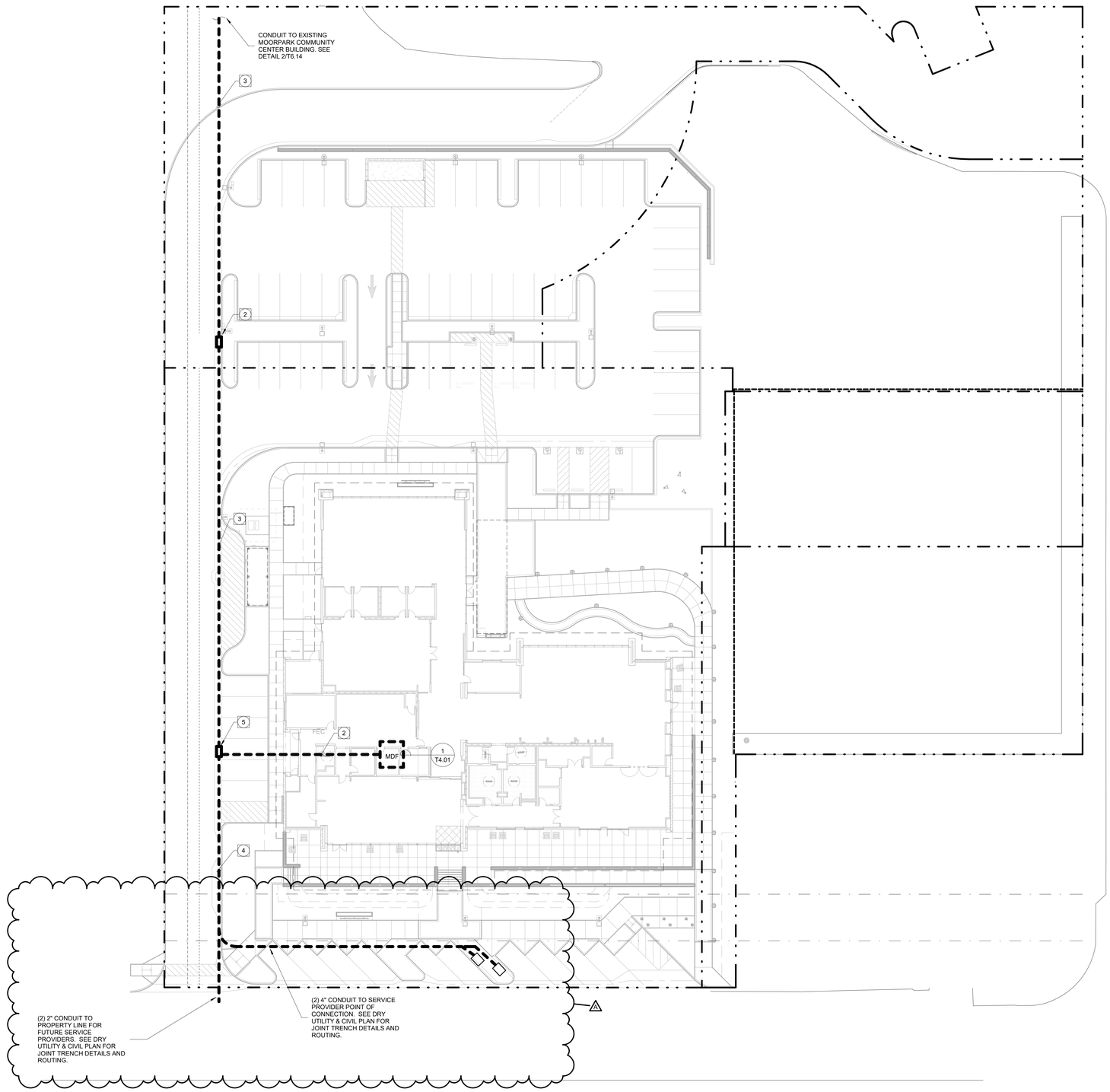
Scale	

TECHNOLOGY LEAD SHEET

T0.01



KEYNOTES:

1. PROVIDE 2' x 3' CONCRETE PULLBOX WITH TRAFFIC-RATED COVER ENGRAVED 'SIGNAL'. DEPTH AS REQUIRED.
2. PROVIDE THE FOLLOWING SIGNAL SYSTEM CONDUCTORS IN CONDUIT AS SPECIFIED:
   - (1) 2"C. MOORPARK CITY SYSTEMS
   - (1) 4"C. SERVICE PROVIDER #1
   - (1) 4"C. SERVICE PROVIDER #2
   - (1) SPARE
3. PROVIDE THE FOLLOWING SIGNAL SYSTEM CONDUIT & CONDUCTORS AS SPECIFIED:
   - (1) 2"C. MOORPARK CITY SYSTEMS
   - (1) 2"C. SPARE
4. PROVIDE THE FOLLOWING SIGNAL SYSTEM CONDUIT & CONDUCTORS AS SPECIFIED:
   - (1) 4"C. SERVICE PROVIDER #1
   - (1) 4"C. SERVICE PROVIDER #2
   - (1) SPARE
5. PROVIDE 4' x 4' CONCRETE PULLBOX WITH TRAFFIC-RATED COVER ENGRAVED 'SIGNAL'. DEPTH AS REQUIRED.

SITE UTILITY PLAN CONSTRUCTION NOTES:

THESE NOTES ESTABLISH MINIMUM QUALITY LEVELS AND COORDINATION REQUIREMENTS. RESPECTIVE UTILITY COMPANY PLANS AND REQUIREMENTS TAKE PRECEDENCE OVER THESE NOTES WITH REGARD TO RESPECTIVE UTILITY COMPANY CONDUIT AND UNDERGROUND STRUCTURE SYSTEMS.

1. CALL UNDERGROUND SERVICE ALERT (USA) AT (800) 422-4133 OR APPLICABLE STATE AND LOCAL DIG SAFE OR UNDERGROUND ALERT HOTLINES PRIOR TO CONSTRUCTION START.
2. COORDINATE ALL UNDERGROUND STRUCTURES AND CONDUIT ROUTING WITH LANDSCAPE ARCHITECT PRIOR TO ROUGH-IN TO ENSURE THAT SUCH ITEMS ARE NOT PLACED IN CRITICAL LANDSCAPE PLANTING/HARDSCAPE AREAS.
3. VAULTS, MAINTENANCE HOLES (MH's), FORMERLY KNOWN AS MANHOLES, AND CONDUITS SHALL MAINTAIN A MINIMUM COVER OF 24" BELOW FINAL SURFACE AT ALL CONDITIONS. I NCLUDE ALL COSTS IN BASE BID TO MEET UTILITY COMPANY REQUIREMENTS WHICH MAY REQUIRE GREATER MINIMUM CONDUIT DEPTHS.
4. VAULTS, MH's AND PULLBOXES (PB's) SHALL BE EQUIPPED WITH KNOCKOUT PANELS OR PRE-CAST INDIVIDUAL CONDUIT OPENINGS. CONDUITS SHALL ONLY ENTER AND EXIT ON END/SHORT WALLS. CONDUITS MAY NOT ENTER AND EXIT ON SIDE/LONG WALLS, CEILINGS OR FLOORS UNLESS OTHERWISE NOTED.
5. CUT DUCTS FLUSH WITH INTERIOR VAULT/MH/PB WALL.
6. GROUT AROUND DUCT ENTRANCES ON VAULT/MH/PB WALLS.
7. SLURRY BACKFILL AROUND DUCTS WITHIN 5 FEET OF VAULT/MH/PB TO PREVENT SHEARING.
8. CONDUITS PASSING UNDER THE BUILDING PERIMETER SHALL BE ENCASED IN LIGHTWEIGHT CONCRETE OR WATER-IMPERVIOUS CLAY TO PREVENT WATER INFILTRATION. SEE ELECTRICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. PREFERRED CONDUIT SWEEP RADIUS BETWEEN VAULTS IS 25 FEET. UNDER NO CIRCUMSTANCES SHALL THE CONDUIT SWEEP RADIUS BE LESS THAN 12.5 FEET. MAXIMUM OF 90 DEGREES PER SWEEP AND LIMITED TO NO MORE THAN (2) 90 DEGREE SWEEPS BETWEEN VAULTS.
10. VAULTS/MH's/PB's ARE TO BE EQUIPPED WITH RACKING, GROUNDING LUGS, AND BOLT-DOWN LIDS UNLESS OTHERWISE NOTED.
11. VAULTS AND MH's TO BE EQUIPPED WITH ROUND COVERS, EXTENSION RINGS AS REQUIRED, LADDERS AND (3) SEGMENTS OF 6 FOOT HIGH CABLE RACKING PER EACH LONG WALL.
12. LABEL ALL NON-UTILITY COMMUNICATION VAULT/MH/PB COVERS WITH "COMMUNICATIONS" UNLESS OTHERWISE NOTED ON PLANS.
13. COORDINATE FINAL VAULT/MH/PB OPENING HEIGHT WITH G.C. PRIOR TO ROUGH-IN TO ENSURE FINAL GRADE DOES NOT SLOPE INTO VAULT/MH/PB OPENING.
14. CONTRACTOR TO PROVIDE A MINIMUM OF 8" DEEP COMPACTED 1/2" DIAMETER GRAVEL UNDER ALL VAULTS, MH's OR PB's TO ENSURE UNIFORM DISTRIBUTION OF SOIL PRESSURE ON THE FLOOR AND BE ABLE TO DISSIPATE WATER OUT OF THE VAULT, MH OR PB.
15. ALL VAULTS/MH's/PB's WITHOUT GROUNDING LUGS SHALL HAVE AN 8' x 3/4" COPPER GROUND ROD DRIVEN THRU THE FLOOR TO ALLOW GROUNDING OF ITEMS WITHIN.
16. ALL VAULTS/MH's/PB's SHALL BE PROVIDED WITH TRAFFIC RATED COVERS WHEN LOCATED IN PAVED AREAS UTILIZED FOR VEHICLE TRAFFIC.
17. IF THE WATER OR MOISTURE BARRIER ON OR NEAR THE FOUNDATION OF A BUILDING IS DISTURBED IN ANY MANNER BY EXCAVATION OR OTHER CONSTRUCTION WORK, THE MOISTURE BARRIER MUST BE REPAIRED FOLLOWING THE RECOMMENDATIONS OF THE MANUFACTURER OF THE ORIGINAL BARRIER PRODUCT.
18. THE CONTRACTOR SHALL INCLUDE IN BASE BID ALL COSTS TO COMPLY WITH ALL REQUIREMENTS FOR CONFINED SPACE ENTRY PER THE OSHA REQUIREMENTS 29 CFR-1910.146, 29 CFR-1910.268, ETC. DURING ANY CONFINED SPACE ENTRY.
19. ANY DUCTS LEAVING A VAULT, MH OR PB ROUTED INTO A FACILITY SHALL BE PLUGGED AT EACH END USING REMOVABLE MECHANICAL PLUGS DESIGNED TO PREVENT WATER AND GAS FROM ENTERING THE FACILITY.
20. SEE ELECTRICAL SPECIFICATIONS AND PLAN DETAILS FOR ADDITIONAL REQUIREMENTS REGARDING UNDERGROUND CONDUITS AND IN-GRADE VAULT/MH/PB/JUNCTION BOXES.
21. REFERENCE ALL ELECTRICAL DRAWINGS.
22. REFERENCE ALL ARCHITECTURAL DRAWINGS.
23. REFERENCE ALL ELECTRICAL (ALL 260000 NUMBERED SPECIFICATIONS).

COMMUNICATIONS PATHWAYS GENERAL NOTES:

1. CONDUITS SHALL (a) CONTAIN NO CONTINUOUS SECTIONS LONGER THAN 30M (98 FT.), AND (b) CONTAIN NO MORE THAN (2) 90° BENDS OR (1) REVERSE BEND WITHOUT INSTALLING A PULL BOX. SPLIT CONDUITS IN PLACE OF PULL BOXES ARE UNACCEPTABLE.
2. CONDUITS SHALL CONTAIN PLASTIC OR NYLON PULL TAPE RATED AT 200 LBS. WITH A MINIMUM OF 5 FEET OF EXTRA PULL TAPE COILED AT EACH END.
3. CONDUIT BEND RADIUS SHALL BE (a) A MINIMUM OF 6 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS 2-INCHES IN DIAMETER OR LESS, AND (b) 10 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS MORE THAN 2-INCHES IN DIAMETER.
4. TERMINATE CONDUIT STUBS AND SLEEVES THAT PROTRUDE THROUGH STRUCTURAL FLOORS 2-INCHEST TO 3-INCHES ABOVE THE FLOOR SURFACE.
5. INSTALL BUSHINGS OR BELL ENDS AS REQUIRED ON ALL CONDUITS.
6. FLEX CONDUIT IS UNACCEPTABLE FOR USE AS A COMMUNICATIONS CONDUIT EXCEPT AT SEISMIC JOINTS AND/OR IF APPROVED IN WRITING BY THE ENGINEER.
7. ALL UNDER SLAB OR IN-SLAB CONDUITS SHALL BE INSTALLED IN A MANNER THAT PREVENTS WATER INFILTRATION OF THE CONDUIT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROUND WATER, RAIN WATER OR CONSTRUCTION WATER IS PREVENTED FROM ENTERING AND/OR REMOVED FROM THE CONDUITS PRIOR TO PLACEMENT OF COMMUNICATIONS CABLES. SEE ELECTRICAL SPECIFICATIONS, DETAILS AND PLANS FOR ADDITIONAL CONDUIT SEALING REQUIREMENTS.
8. ALL PULL BOXES SHALL BE SIZED AND INSTALLED PER ANSI-TIA-569-C. PULL BOXES FOR IN/UNDER SLAB CONDUIT RUNS ARE NOT PERMITTED UNLESS OTHERWISE NOTED. PULL BOXES FOR OVERHEAD CONDUIT RUNS SHALL BE LOCATED ABOVE ACCESSIBLE CEILINGS WITHIN THE ACCESSIBLE CEILING SPACE AND SUPPORTED INDEPENDENTLY FROM THE STRUCTURE AND CONDUIT SUPPORTS. PULL BOXES FOR ROOF MOUNTED OR EXTERIOR ABOVE GRADE APPLICATIONS SHALL BE NEMA 3R RATED. PULL BOXES SHALL BE SIZED ACCORDING TO THE FOLLOWING:

CONDUIT SIZE	WIDTH	LENGTH	DEPTH	WIDTH INCREASE PER ADDITIONAL CONDUIT
1"	4"	16"	3"	2"
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FOR OTHER CONDUIT SIZES REFER TO ANSI/TIA-569-C TABLE 12. - LATEST PUBLISHED EDITION.

9. CONDUIT(S) SHALL EXIT A PULL BOX ON THE WALL OPPOSITE THE WALL ENTERED.
10. PROVIDE LABELING OF EACH CONDUIT PER GENERAL ELECTRICAL SPECIFICATIONS.
11. PROVIDE INTERNAL/EXTERNAL GAS AND WATER TIGHT MECHANICAL SEALING/PLUGGING OF EACH BUILDING ENTRY CONDUIT AS SPECIFIED ELSEWHERE IN THE DRAWINGS AND SPECIFICATIONS.

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REGISTERED PROFESSIONAL ENGINEER RAYMOND W. SUN No. E15610 EX. 12/31/2025 ELECTRICAL STATE OF CALIFORNIA

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A	ADDENDUM #1	06/20/2025

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SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
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AGENCY SUBMITTAL #3	03/27/2025
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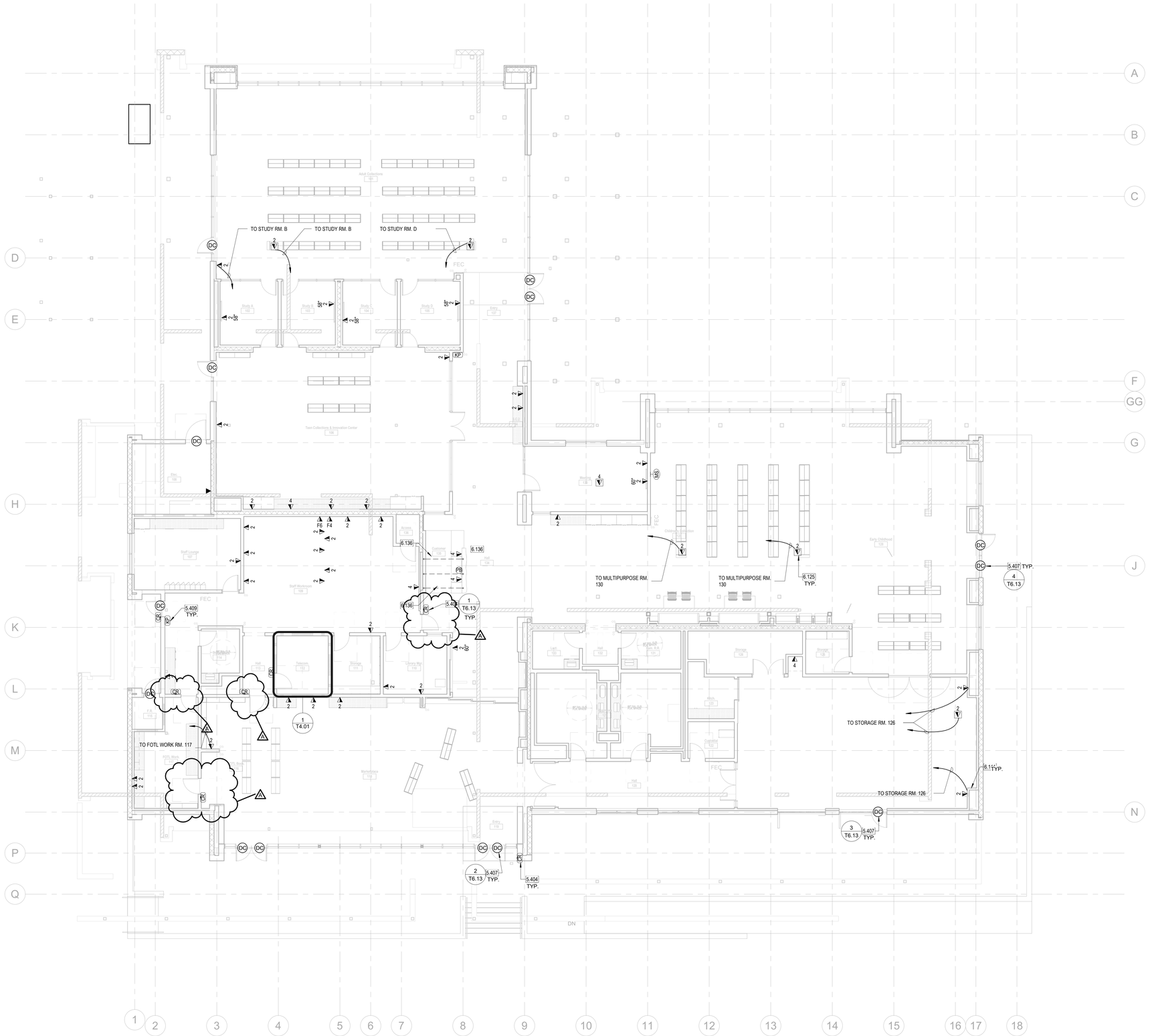
Scale	As indicated

TECHNOLOGY SITE PLAN

T1.00



KEYNOTES

5.404	ELECTRONIC LOCKING HARDWARE WITH CABLING TO ACCESS CONTROL SYSTEM. SEE SPECIFICATIONS, ARCHITECTS DRAWINGS, AND DOOR SCHEDULE FOR EXACT LOCATIONS.
5.407	INTRUSION ALARM DPDT DOOR POSITION SWITCH BY SECURITY VENDOR. INFRASTRUCTURE ROUGH-IN ONLY. E.C. TO PROVIDE 4S DEEP BOX WITH 3/4" CONDUIT TO MDF ROOM. COORDINATE WITH ARCHITECT DOOR HARDWARE SCHEDULE AND DOOR HARDWARE CONSULTANT.
5.409	INTRUSION ALARM KEYPAD. INFRASTRUCTURE ROUGH-IN ONLY. E.C. TO PROVIDE 4S DEEP BOX WITH 3/4" CONDUIT TO MDF ROOM. COORDINATE LOCATION WITH OWNER AND ARCHITECT.
6.111	TYPICAL VOICE/DATA WALL MOUNT OUTLET. PROVIDE 1" HOME RUN CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE OR MDF/IDF ROOM.
6.125	TYPICAL FLOOR BOX MOUNTED VOICE/DATA OUTLET. "#" REPRESENTS QUANTITY OF UTP STATION CONNECTORS IN FACEPLATE. PROVIDE MIN. 1-1/4" CONDUIT TO NEAREST ACCESSIBLE CEILING. REFER TO ELECTRICAL DRAWINGS FLOOR BOX DETAIL FOR MORE INFORMATION.
6.136	1" IN-SLAB CONDUIT TO STUB-OUT INTO NEAREST ACCESSIBLE CEILING SPACE.

COMMUNICATIONS PATHWAYS GENERAL NOTES:

1. CONDUITS SHALL (a) CONTAIN NO CONTINUOUS SECTIONS LONGER THAN 30M (98 FT.), AND (b) CONTAIN NO MORE THAN (2) 90° BENDS OR (1) REVERSE BEND WITHOUT INSTALLING A PULL BOX. SPLIT CONDUITS IN PLACE OF PULL BOXES ARE UNACCEPTABLE.
2. CONDUITS SHALL CONTAIN PLASTIC OR NYLON PULL TAPE RATED AT 200 LBS. WITH A MINIMUM OF 5 FEET OF EXTRA PULL TAPE COILED AT EACH END.
3. CONDUIT BEND RADIUS SHALL BE (a) A MINIMUM OF 6 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS 2-INCHES IN DIAMETER OR LESS, AND (b) 10 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS MORE THAN 2-INCHES IN DIAMETER.
4. TERMINATE CONDUIT STUBS AND SLEEVES THAT PROTRUDE THROUGH STRUCTURAL FLOORS 2-INCHEST TO 3-INCHES ABOVE THE FLOOR SURFACE.
5. INSTALL BUSHINGS OR BELL ENDS AS REQUIRED ON ALL CONDUITS.
6. FLEX CONDUIT IS UNACCEPTABLE FOR USE AS A COMMUNICATIONS CONDUIT EXCEPT AT SEISMIC JOINTS AND/OR IF APPROVED IN WRITING BY THE ENGINEER.
7. ALL UNDER SLAB OR IN-SLAB CONDUITS SHALL BE INSTALLED IN A MANNER THAT PREVENTS WATER INFILTRATION OF THE CONDUIT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROUND WATER, RAIN WATER OR CONSTRUCTION WATER IS PREVENTED FROM ENTERING AND/OR REMOVED FROM THE CONDUITS PRIOR TO PLACEMENT OF COMMUNICATIONS CABLES. SEE ELECTRICAL SPECIFICATIONS, DETAILS AND PLANS FOR ADDITIONAL CONDUIT SEALING REQUIREMENTS.
8. ALL PULL BOXES SHALL BE SIZED AND INSTALLED PER ANSI-TIA-569-C. PULL BOXES FOR IN/UNDER SLAB CONDUIT RUNS ARE NOT PERMITTED UNLESS OTHERWISE NOTED. PULL BOXES FOR OVERHEAD CONDUIT RUNS SHALL BE LOCATED ABOVE ACCESSIBLE CEILINGS WITHIN THE ACCESSIBLE CEILING SPACE AND SUPPORTED INDEPENDENTLY FROM THE STRUCTURE AND CONDUIT SUPPORTS. PULL BOXES FOR ROOF MOUNTED OR EXTERIOR ABOVE GRADE APPLICATIONS SHALL BE NEMA 3R RATED. PULL BOXES SHALL BE SIZED ACCORDING TO THE FOLLOWING:

CONDUIT SIZE	WIDTH	LENGTH	DEPTH	WIDTH INCREASE PER ADDITIONAL CONDUIT
1"	4"	16"	3"	2"
2"	8"	36"	4"	5"
3"	12"	48"	5"	6"
4"	15"	60"	8"	8"

FOR OTHER CONDUIT SIZES REFER TO ANSI/TIA-569-C TABLE 12. - LATEST PUBLISHED EDITION.

9. CONDUIT(S) SHALL EXIT A PULL BOX ON THE WALL OPPOSITE THE WALL ENTERED.
10. PROVIDE LABELING OF EACH CONDUIT PER GENERAL ELECTRICAL SPECIFICATIONS.
11. PROVIDE INTERNAL/EXTERNAL GAS AND WATER TIGHT MECHANICAL SEALING/PLUGGING OF EACH BUILDING ENTRY CONDUIT AS SPECIFIED ELSEWHERE IN THE DRAWINGS AND SPECIFICATIONS.

TECHNOLOGY FLOOR PLAN | 1/8" = 1'-0" | 1

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CITY OF MOORPARK

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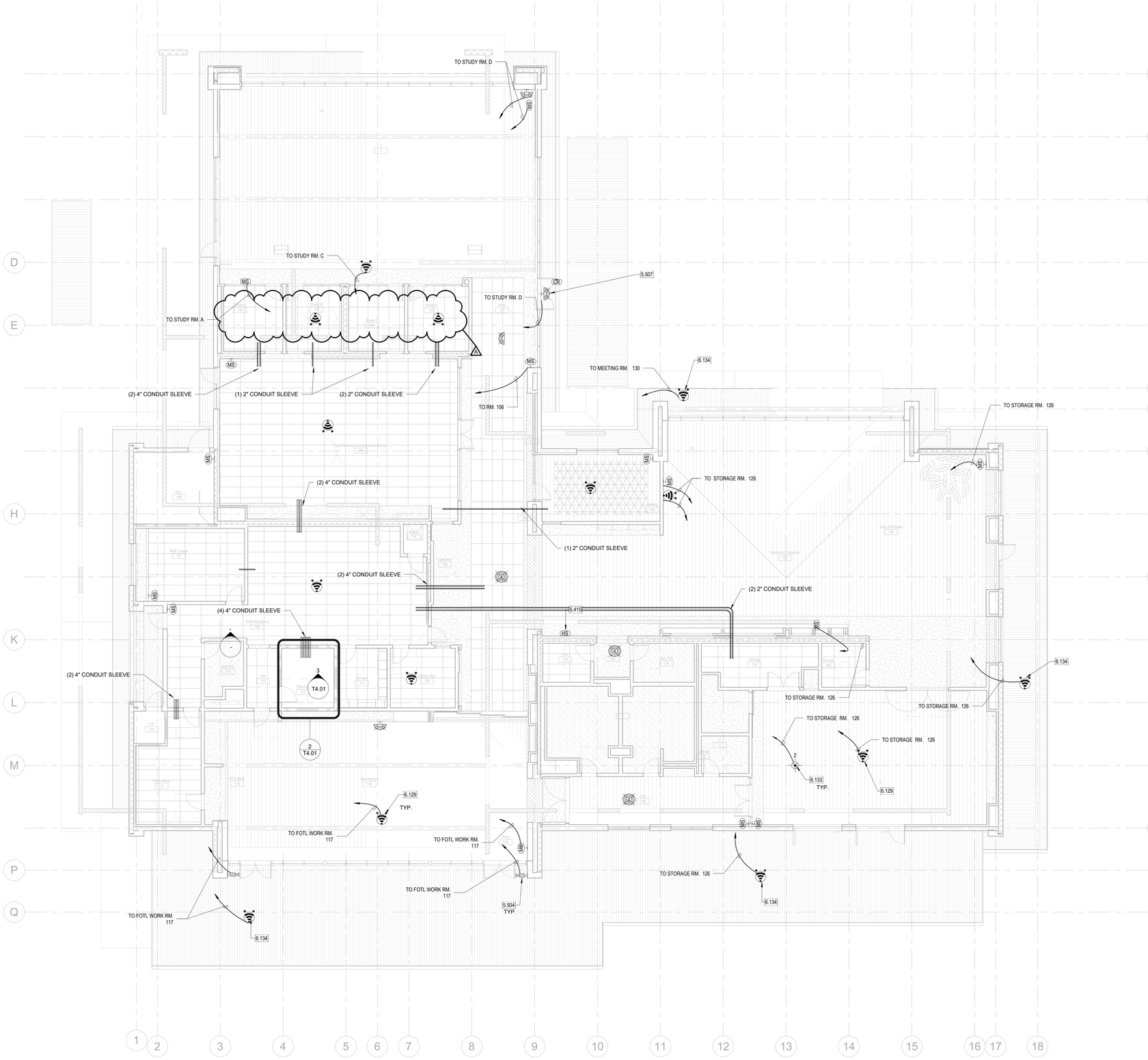
TECHNOLOGY
FIRST FLOOR PLAN

T2.01



KEYNOTES

5.410 INTRUSION ALARM HORN STROBE. INFRASTRUCTURE ROUGH-IN ONLY. E.C. TO PROVIDE 4S DEEP BOX WITH 3/4" CONDUIT TO MDF ROOM. COORDINATE LOCATION WITH OWNER AND ARCHITECT.

5.504 EXTERIOR WALL MOUNT, VANDAL PROOF, SINGLE-SENSOR, IP-CCTV DOME CAMERA. PROVIDE AND INSTALL FLUSH MOUNTED 5S DEEP J-BOX WITH 1" CONDUIT TO NEAREST MDF. PROVIDE (1) CAT-6A CABLE TO EQUIPMENT PATCH PANEL IN MDF ROOM.

5.507 EXTERIOR PENDANT WALL MOUNT, MULTI-SENSOR, IP-CCTV DOME CAMERA. PROVIDE AND INSTALL FLUSH MOUNTED 5S DEEP J-BOX WITH 1" CONDUIT TO NEAREST MDF. PROVIDE (1) CAT-6A CABLE TO EQUIPMENT PATCH PANEL IN MDF. SEE DETAIL 4/T6.16.

6.129 INDOOR CEILING MOUNTED WIRELESS ACCESS POINT. CONTRACTOR FURNISHED CONTRACTOR INSTALLED PNF FORTINET FAP-243K. PROVIDE 1" CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE OR MDF/IDF. PROVIDE (2) CAT-6A CABLES FROM ACCESS POINT TO EQUIPMENT PATCH PANEL FOR WAP PORTS IN MDF/IDF ROOM.

6.133 TYPICAL CEILING MOUNTED DATA OUTLET. "#" REPRESENTS QUANTITY OF UTP STATION CONNECTORS IN FACEPLATE. PROVIDE MIN. 1-1/4" CONDUIT TO NEAREST ACCESSIBLE CEILING.

6.134 INDOOR MOUNTED MOUNTED WIRELESS ACCESS POINT WITH EXTERNAL MOUNTED ANTENNA. CONTRACTOR FURNISHED CONTRACTOR INSTALLED PNF FORTINET FAP-243K WITH FANT-04ABGN-0606. PROVIDE 1" CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE OR MDF/IDF. PROVIDE (2) CAT-6A CABLES FROM ACCESS POINT TO EQUIPMENT PATCH PANEL FOR WAP PORTS IN MDF/IDF ROOM.

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8. ALL PULL BOXES SHALL BE SIZED AND INSTALLED PER ANSI-TIA-569-C. PULL BOXES FOR IN/UNDER SLAB CONDUIT RUNS ARE NOT PERMITTED UNLESS OTHERWISE NOTED. PULL BOXES FOR OVERHEAD CONDUIT RUNS SHALL BE LOCATED ABOVE ACCESSIBLE CEILINGS WITHIN THE ACCESSIBLE CEILING SPACE AND SUPPORTED INDEPENDENTLY FROM THE STRUCTURE AND CONDUIT SUPPORTS. PULL BOXES FOR ROOF MOUNTED OR EXTERIOR ABOVE GRADE APPLICATIONS SHALL BE NEMA 3R RATED. PULL BOXES SHALL BE SIZED ACCORDING TO THE FOLLOWING:

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11. PROVIDE INTERNAL/EXTERNAL GAS AND WATER TIGHT MECHANICAL SEALING/PLUGGING OF EACH BUILDING ENTRY CONDUIT AS SPECIFIED ELSEWHERE IN THE DRAWINGS AND SPECIFICATIONS.

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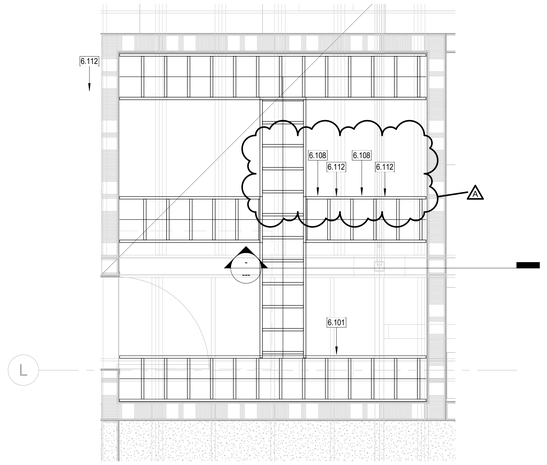
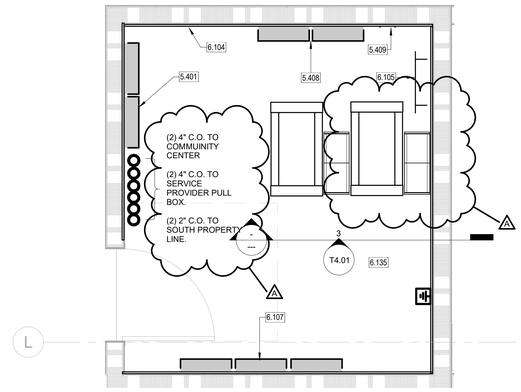
TECHNOLOGY REFLECTED CEILING PLAN

T2.31



ENLARGED TECHNOLOGY ROOM LADDER TRAY LAYOUT | 1/2" = 1'-0" | 2



ENLARGED TECHNOLOGY EQUIPMENT ROOM | 1/2" = 1'-0" | 1

KEYNOTES

5.401 WALL MOUNT ACCESS CONTROL SYSTEM TERMINAL CABINETS AND POWER SUPPLIES (48"HX48"WX4"D). E.C. TO PROVIDE DEDICATED 120V/20A CIRCUIT.

5.408 WALL MOUNT INTRUSION ALARM SYSTEM TERMINAL CABINETS AND POWER SUPPLIES (48"HX48"WX4"D). E.C. TO PROVIDE DEDICATED 120V/20A CIRCUIT.

5.409 INTRUSION ALARM KEYPAD. INFRASTRUCTURE ROUGH-IN ONLY. E.C. TO PROVIDE 4S DEEP BOX WITH 3/4" CONDUIT TO MDF ROOM. COORDINATE LOCATION WITH OWNER AND ARCHITECT.

6.101 LADDER TRAY. SIZE PER PLAN. SEE LADDER TRAY SYSTEM DETAILS FOR MORE INFORMATION. SEE SHEET T6.11 FOR MOUNTING DETAILS.

6.104 TELECOMMUNICATIONS BACKBOARD BY E.C., CONSISTING OF FIRE-RATED, A/C GRADE, DOUGLAS FIR PLYWOOD SHEETING FINISHED ONE SIDE. PRIME COAT PAINTED ON ALL SURFACES WITH A FINISH COAT OF FIRE RETARDANT WHITE ENAMEL PAINT. LEAVE ONE (1) FIRE MARSHAL STAMP UNPAINTED FOR INSPECTION ON EACH PLYWOOD SHEET. UNLESS OTHERWISE INDICATED, USE 8'-0" HIGH X 3/4" THICK PLYWOOD AND COVER FULL LENGTH OF ALL FOUR WALLS. PLYWOOD SHALL BE RAISED 12" AFF.

6.105 ANSI-J-STD 607A COMPLIANT U.L.-LISTED TELECOMMUNICATIONS MAIN GROUND BUSBAR (TMGB) CHATSWORTH #40153-020 OR EQUAL BY HARGER. MOUNT 12"A.F.F. PROVIDE 1/8" BRASS ENGRAVED NAMEPLATE WITH ABBREVIATION "T.M.G.B." AND ATTACH TO BUS BAR. PROVIDE #6 GROUND CONDUCTOR WITH GREEN INSULATION TO EACH DATA EQUIPMENT RACK/CABINET, OVERHEAD LADDER TRAY/LADDER RACK, ETC. AS REQUIRED. CONNECTIONS SHALL BE MADE WITH 2 HOLE COMPRESSION CONNECTORS. CONNECTIONS SHALL BE BARE METAL TO BARE METAL, USING APPROPRIATE ANTIOXIDANT COMPOUND. PROVIDE ALL OTHER GROUNDING REQUIREMENTS AS DETAILED IN THE PATHWAYS & GROUNDING RISER DIAGRAM. ELECTRICAL CONTRACTOR SHALL PROVIDE 1/2"C. WITH #6AWG WITH GREEN INSULATION FROM TMGB TO GROUND BUSBAR LOCATED INSIDE MPOE ROOM ELECTRICAL PANEL. ELECTRICAL CONTRACTOR SHALL PROVIDE TELECOMMUNICATIONS BONDING CONDUCTOR (TBC) CONSISTING OF (1) 1"C., W/ #1AWG (U.O.N.) WITH GREEN INSULATION CONNECTING MAIN BUILDING GROUND BUS BAR LOCATED IN MAIN ELECTRICAL ROOM TO THE TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB) UTILIZING 2-HOLE COMPRESSION CONNECTORS. LABEL EACH END OF TBC WITH A GROUND WARNING TAG (PANDUIT #PT-BGRND OR EQUAL).

6.107 FIRE ALARM SYSTEM PANEL (24"HX14"W). REFER TO FIRE ALARM CONTRACTOR'S DRAWINGS FOR EXACT REQUIREMENTS. E.C. TOPROVIDE DEDICATED 120V/20A CIRCUIT.

6.108 DEDICATED, UPS NEMA L5-30R RECEPTACLE MOUNTED TO LADDER RACK, BY ELECTRICAL CONTRACTOR. SEE DETAIL 5/T6.11

6.112 DEDICATED QUAD NEMA 5-20R RECEPTACLE MOUNTED TO LADDER RACK, BY ELECTRICAL CONTRACTOR. SEE DETAIL 5/T6.11

7.001 CFCI APC SMART-UPS ON-LINE, 3KVA, RACKMOUNT 2U, 120V, 8X 5-20R+1X L5-30R NEMA OUTLETS, NETWORK CARD, EXTENDED RUNTIME, W/ RAIL KIT APC PN#SRT3000RMXLA-NC. INCLUDE (1) ADDITIONAL BATTERY PACK PER UPS APC PN#SRT96RMBPUS

7.002 CFCI VERTICAL MANAGED PDU CHATSWORTH PN3 EA-4002C. PRIOR TO INSTALLATION, PROVIDE (2) PDUS PER RACK. CONFIRM WITH OWNER THE DESIRED MOUNTING LOCATION WITHIN EACH RACK.

7.003 48-PORT CATEGORY-6A MODULAR PATCH PANEL PER LOADED WITH 48 CATEGORY-6A RJ45 JACKS - FOR STATION CABLES. QUANTITY OF PATCH PANELS AS REQUIRED TO TERMINATE ALL CAT-6A CABLES. PROVIDE MINIMUM OF 12 VACANT PORTS ON LAST PATCH PANEL IN RACK FOR FUTURE GROWTH.

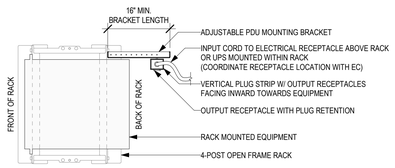
7.004 1U HORIZONTAL FRONT-ONLY PATCH CORD WIRE MANAGER, PER SPECIFICATIONS. PROVIDE 2U MANAGER BELOW EACH PATCH PANEL.

7.005 1U RACK MOUNTED FIBER DISTRIBUTION ENCLOSURE PER SPECIFICATIONS. QUANTITY AS REQUIRED TO TERMINATE ALL FIBER OPTIC CABLES AND STRANDS. PROVIDE COMPLETE WITH DUPLEX PANELS, COUPLERS, CONNECTORS, FAN OUT KITS, ETCETERA PER SPECIFICATIONS.

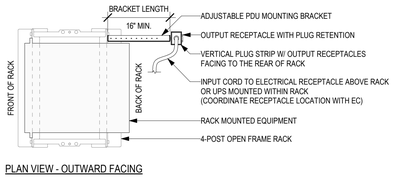
7.009 10-INCH WIDE X 7-FOOT HIGH DOUBLE SIDED VERTICAL CABLE MANAGER WITH HINGED COVER.

7.010 24-PORT CATEGORY-6A MODULAR PATCH PANEL LOADED WITH 24 CATEGORY-6A RJ45 JACKS - FOR CCTV DEVICES. QUANTITY OF PATCH PANELS AS REQUIRED TO TERMINATE ALL CAT-6A CABLES. PROVIDE MINIMUM OF 12 VACANT PORTS ON LAST PATCH PANEL IN RACK FOR FUTURE GROWTH.

7.011 48-PORT CATEGORY-6A MODULAR PATCH PANEL LOADED WITH 48 CATEGORY-6A RJ45 JACKS - FOR WIRELESS ACCESS POINT CABLES. QUANTITY OF PATCH PANELS AS REQUIRED TO TERMINATE ALL CAT-6A CABLES. PROVIDE MINIMUM OF 12 VACANT PORTS ON LAST PATCH PANEL IN RACK FOR FUTURE GROWTH.



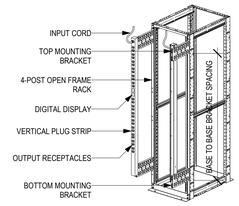
PLAN VIEW - INWARD FACING



PLAN VIEW - OUTWARD FACING

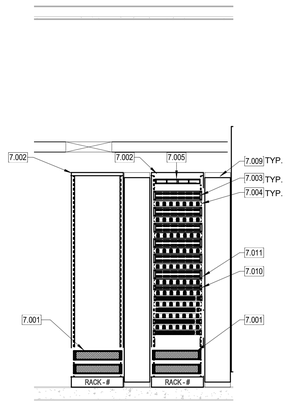
GENERAL NOTES:
1. DETAIL REPRESENTS GENERAL REQUIREMENTS FOR VERTICAL PDU MOUNTING. EXACT PARTS MAY VARY AND TO BE COORDINATED WITH PDU AND ENCLOSURE MANUFACTURERS.
2. REFER TO TECHNOLOGY ROOM DRAWINGS FOR PDU LOCATION AND ORIENTATION WITHIN ENCLOSURE.

BRACKET SPACING NOTES:
1. SPACING FOR LONG PDU'S SHOULD BE 35RU MIN. AND 39RU MAX.
2. SPACING FOR SHORT PDU'S SHOULD BE 19RU MIN. AND 23RU MAX.
3. COORDINATE EXACT LOCATION WITH MOUNTING HARDWARE ON PDU.



ISO VIEW

4-POST RACK VERTICAL PDU MOUNTING - EXTENDED1 | 1" = 1'-0" | 4



Elevation 6 - a | 1/2" = 1'-0" | 3

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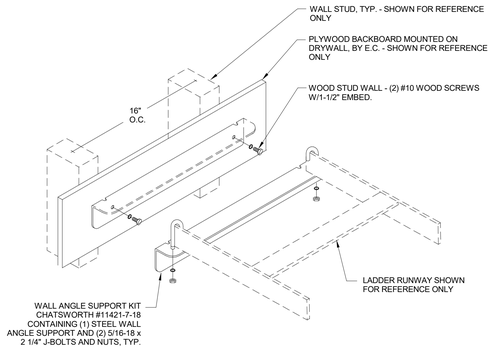
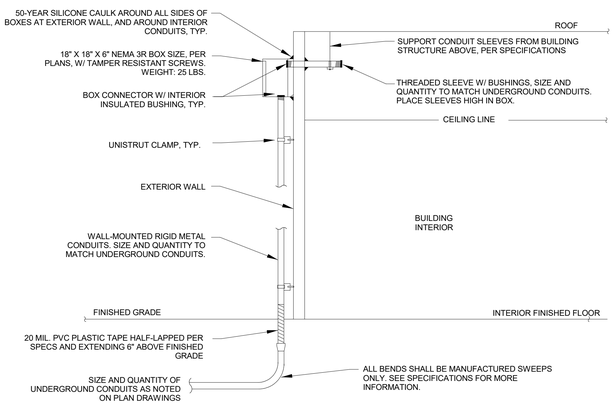
TECHNOLOGY ENLARGED MDF ROOM LAYOUT

T4.01



WALL ANGLE SUPPORT DETAIL 6

SCALE: N.T.S.



NOTES:

1. ALL BOXES/PLYWOOD TO BE SECURED TO BUILDING STRUCTURE USING MIN. ¼" X 3" LAG SCREW INTO 4X BLOCKING, MINIMUM.
2. 50-YEAR SILICONE CAULK AROUND ALL PENETRATIONS, BOXES AND ALL THREADS AS REQUIRED.
3. SEAL ALL UNDERGROUND CONDUITS PER COMMUNICATION PATHWAY NOTES, GENERAL PROJECT NOTES, AND PROJECT SPECIFICATIONS.

EXTERIOR JUNCTION BOX DETAIL 7

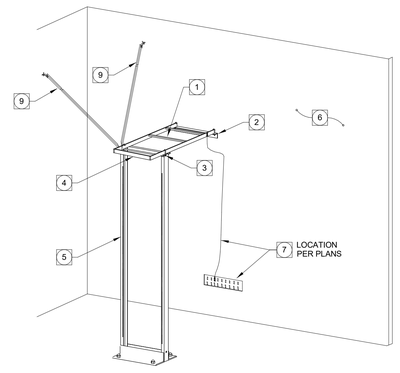
SCALE: N.T.S.

LADDER RUNWAY SCHEDULE

CABLE TRAY STYLE	TRAY WIDTH	SIDE RAIL HEIGHT	RUNG SPACING	LOAD DEPTH	RADIUS FITTINGS INSIDE BEND RADIUS	TRAY COVER	TRAY COLOR	REMARKS
LADDER RUNWAY	18"	1-1/2"	9"	NA	NA	NO	BLACK	LENGTH PER PLANS

LADDER TRAY SPECIFICATION:

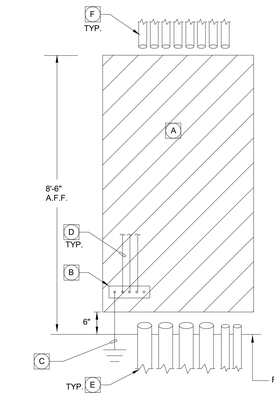
1. CABLE RUNWAY DESIGN
   UL-LISTED LADDER RUNWAY SYSTEM SHALL BE MADE OF STRAIGHT SECTIONS, FITTINGS, AND ALL ACCESSORIES. STANDARD LADDER RUNWAY SHALL BE UL CLASSIFIED AS EQUIPMENT GROUNDING CONDUCTORS.
2. CABLE RUNWAY MATERIALS
   STRAIGHT SECTIONS SHALL BE CONSTRUCTED OF 3/8" X 1-1/2" X .085 WALL RECTANGULAR STEEL TUBING. CROSS MEMBERS SHALL BE CONSTRUCTED OF 1/2" X 1" X .065" RECTANGULAR STEEL TUBING AND WELDED AT 9" INTERVALS.
3. CABLE RUNWAY SEISMIC BRACING REQUIREMENTS
   LADDER RUNWAY SYSTEM LOCATED IN ANY SEISMIC RISK ZONE OF THE CALIFORNIA BUILDING CODE SEISMIC RISK MAP SHALL BE PROTECTED FROM EARTHQUAKES IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE AND, AS APPLICABLE, THE STATE AND LOCAL BUILDING CODES AND REGULATIONS. REFER TO SEISMIC BRACING DETAIL 7/T9.02.
4. LADDER RUNWAY FITTINGS AND ACCESSORIES
   ALL FITTINGS ACCESSORIES SHALL BE FURNISHED AS REQUIRED TO PROTECT, SUPPORT AND INSTALL A COMPLETE LADDER TRAY SYSTEM.
5. LADDER RUNWAY ROUTING REQUIREMENTS
   LADDER RUNWAY SHALL BE ROUTED AROUND OBSTRUCTIONS AS REQUIRED, BUT IN NO CASE SHALL TRAY PREVENT REMOVAL OF CEILING TILES OR PANELS, NOR BLOCK ACCESS TO ELECTRICAL, PLUMBING OR MECHANICAL EQUIPMENT.
6. LADDER RUNWAY SEPARATION REQUIREMENTS
   RUNWAY USED FOR SUPPORTING COMMUNICATION CABLING SHALL BE SEPARATED FROM ANY ELECTRICAL BRANCH CIRCUIT BY 3" AND ANY ELECTRICAL FEEDER BY 18".
7. THIS DETAIL IS GENERIC IN NATURE AND IS INTENDED TO DEPICT A VARIETY OF LADDER RUNWAY INSTALLATION SCENARIOS-NOT ALL OF WHICH APPLY TO A GIVEN PROJECT. IT IS THE CONTRACTORS RESPONSIBILITY TO EXAMINE ALL PROJECT PLANS AND PROVIDE A LADDER RUNWAY INSTALLATION APPROPRIATE TO THE SITUATION, UTILIZING PORTIONS OF THIS DETAIL AS APPLICABLE, THAT RESULT IN NEAT WORKMANSHIP AND COMPLY WITH ANSI / EIA / TIA STANDARDS.
8. FIRE STOPPING REQUIREMENTS
   FIRE STOPPING OF THRU PENETRATIONS WHERE THE RUNWAY OR ITS CONTENTS PENETRATE A FIRE RATED WALL, FLOOR, ETC., SHALL BE ACCOMPLISHED BY THE E.C. UTILIZING U.L. LISTED FIRE STOPPING METHODS. E.C. SHALL VERIFY TYPES/QUANTITIES OF CABLES TO BE UTILIZED BY THE OWNER AT EACH THRU PENETRATION CONDITION AND PROVIDE A SUITABLE RE-ENTERABLE FIRESTOP SYSTEM LISTED FOR EACH FIRESTOP CONDITION.
9. RADIUS CABLE DROPS
   PROVIDE RADIUS CABLE DROP OUT(S) MEETING EIA/TIA CABLE BENDING CRITERIA AT RUNWAY STOPPING POINT WITHIN A TELECOMMUNICATIONS CLOSET OR ANY DISCONTINUITY IN RUNWAY PATH. PROVIDE CABLE DROPOUTS WHEREVER CABLES ENTER OR LEAVE LADDER TRAY, PROVIDE 2 PER RACK (CHATSWORTH #12100-718)
10. LADDER RUNWAY COORDINATION REQUIREMENTS
    CONTRACTOR SHALL COORDINATE RUNWAY SYSTEM INSTALLATION WITH ALL TRADES PRIOR TO ORDERING AND AGAIN PRIOR TO INSTALLING TRAY SYSTEM.
11. LADDER RUNWAY LOADING CAPACITIES
    INSTALLED LADDER RUNWAY SHALL SUPPORT 40 LB/FT WITH MINIMAL DEFLECTION.
12. LADDER RUNWAY MANUFACTURERS
    LADDER RUNWAY PRODUCTS ARE SPECIFIED AS CHATSWORTH OR APPROVED EQUAL BY COOPER/B-LINE.



1. LADDER RUNWAY. SIZE AND LENGTH PER PLANS. (CHATSWORTH #11275-718)
2. WALL ANGLE SUPPORT (CHATSWORTH #11421-7-18). SEE DETAIL 6 THIS SHEET.
3. 3" LADDER RACK-TO-RUNWAY MOUNTING PLATE KIT, BLACK (CHATSWORTH #10595-718).
4. END CLOSING KIT. LADDER RUNWAY TERMINATIONS NOT ADJACENT TO A WALL OR JUNCTION SHALL BE COVERED BY AN END CLOSING KIT OR PROTECTIVE GROMMETS. (CHATSWORTH #11700)
5. 2-POST RACK PER SPECIFICATIONS, FLOOR MOUNTED PER DETAIL 2 THIS SHEET. SEE FLOOR PLANS FOR QUANTITY AND LOCATIONS.
6. PLYWOOD BACKBOARD BY E.C., SHOWN FOR REFERENCE ONLY.
7. LADDER RUNWAY SHALL BE BONDED TO TELECOM BUSBAR WITH #6 AWG SOLID WIRE WITH GREEN INSULATION AND 2 HOLE GROUNDING LUGS ON BOTH ENDS. REFER TO TELECOM BACKBOARD AND GROUND BUS DETAIL FOR ADDITIONAL REQUIREMENTS.
8. LADDER RUNWAY SHALL BE BONDED TO TELECOM BUSBAR WITH #6 AWG SOLID WIRE WITH GREEN INSULATION AND 2 HOLE GROUNDING LUGS ON BOTH ENDS. REFER TO TELECOM BACKBOARD AND GROUND BUS DETAIL FOR ADDITIONAL REQUIREMENTS.
9. SEISMIC SUPPORTS. REFER TO DETAIL 7 ON SHEET T9.01 FOR TRANSVERSE AND LONGITUDINAL BRACING INFORMATION.

LADDER RUNWAY SYSTEM DETAIL 4

SCALE: NTS



TELECOM BACKBOARD AND GROUNDING DETAIL NOTES:

A. WHITE ENAMEL PAINTED A/C GRADE FIRE RATED PLYWOOD TELECOM BACKBOARD, (8' HIGH x 3/4" THICK x WIDTH PER PLANS) BY E.C.. LEAVE ONE FIRE MARSHAL STAMP UNPAINTED ON EACH SHEET. MOUNT 6" ABOVE FINISHED FLOOR.
   - ANCHOR TO METAL STUD WALL WITH #12 SMS SCREWS AT 16" ON CENTER.
   - ANCHOR TO CMU WALL WITH 1/4" x 1-5/8" EMBED HILTI KWIK HUS EZ SCREW ANCHOR (ICC ESR 3056).
   - RECESS ALL SCREWS / BOLTS.

B. U.L. LISTED TELECOMMUNICATIONS GROUND BUS BAR (TMGB AND TGB). IN IDF ROOM PROVIDE TGB, CHATSWORTH #40153-012.

C. CONNECT TGB'S TO ELECTRICAL PANEL GROUND BUS WITH 3/4"C. AND #6AWG GROUND CONDUCTOR, BY E.C.. ALL CONNECTIONS SHALL BE WITH 2-HOLE COMPRESSION LUGS.

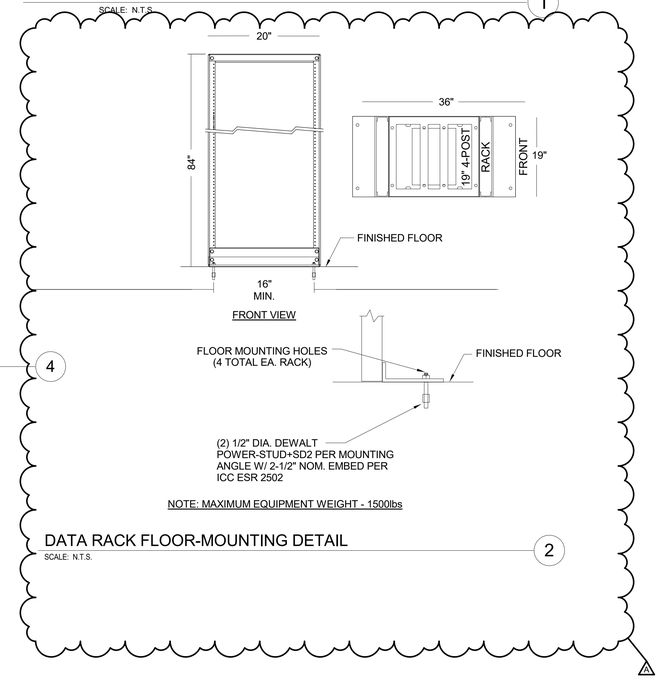
D. INDIVIDUAL #6AWG GROUND CONDUCTORS TO EACH CABINET, RACK, LADDER TRAY, CONDUIT, ETC. BY SCS CONTRACTOR. CONNECT TO EQUIPMENT AND TO GROUND BUS BAR VIA 2-HOLE COMPRESSION LUGS ONLY. DAISY-CHAINING OF GROUND CONDUCTOR TO MORE THAN ONE PIECE OF EQUIPMENT IS PROHIBITED.

E. INCOMING FEED CONDUITS AND INNER-BUILDING CONDUITS. QUANTITY AND SIZE PER PLANS.

F. INNER-BUILDING CONDUITS AND SLEEVES. QUANTITY AND SIZE PER PLANS.

TELECOM BACKBOARD AND GROUND BUS BAR 1

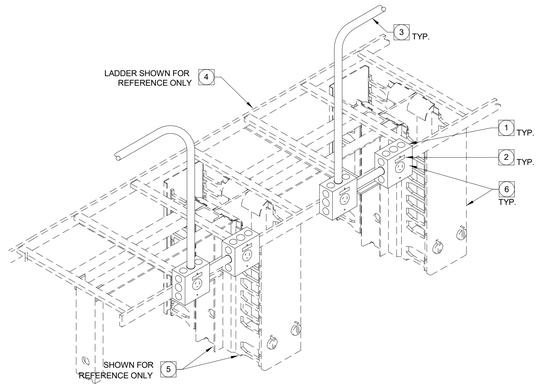
SCALE: N.T.S.



NOTE: MAXIMUM EQUIPMENT WEIGHT - 1500lbs

DATA RACK FLOOR-MOUNTING DETAIL 2

SCALE: N.T.S.

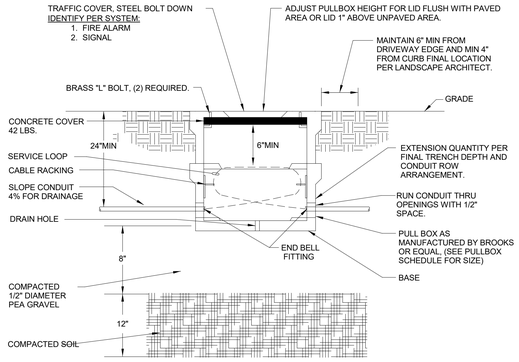


RECEPTACLE MOUNTING KEY NOTES:

1. 4S DEEP NEMA JUNCTION BOX WITH RECEPTACLES PER PLAN ATTACHED SECURELY TO LADDER RUNWAY. VERIFY CORRECT SIDE OF LADDER RUNWAY/EXACT MOUNTING LOCATION ON LADDER RUNWAY WITH OWNER AND SCS CONTRACTOR PRIOR TO ROUGH-IN. E.C. TO INSTALL JUNCTION BOX ON SIDE OF LADDER RUNWAY ONLY WITH RECEPTACLE PERPENDICULAR TO FLOOR. JUNCTION BOX SHALL NOT BE INSTALLED ON TOP OR BOTTOM OF LADDER RUNWAY.
2. PERMANENT LABELS INDICATING PANEL ID, CIRCUIT NUMBER(S) AND NEMA/IEC RECEPTACLE TYPE. PROVIDE LABELS ON FACE OF BOX.
3. CONDUIT AND BRANCH CIRCUIT PER PLAN. ROUTE CONDUITS TO PANEL(S) ABOVE ACCESSIBLE CEILING-IF PROVIDED ON PROJECT. IN NO CASE, SHALL CONDUITS BE ROUTED THROUGH/WITHIN LADDER RUNWAY VERTICAL WIRE MANAGERS OR OTHERWISE OBSTRUCT USE OF RACKS BY COMMUNICATIONS EQUIPMENT OR CABLING.
4. LADDER RUNWAY SYSTEM SHOWN HERE FOR REFERENCE ONLY. SEE LADDER RUNWAY SYSTEM DETAIL ON THIS SHEET FOR LADDER RUNWAY REQUIREMENTS.
5. EQUIPMENT RACK AND VERTICAL WIRE MANAGER BY SCS CONTRACTOR. SHOWN FOR REFERENCE ONLY. EXACT EQUIPMENT CONFIGURATION MAY VARY.
6. JUNCTION BOX SHALL NOT OBSTRUCT VERTICAL WIRE MANAGERS OR EQUIPMENT RACK MOUNTING PLATES.

IDF ROOM LADDER TRAY RECEPTACLE MOUNTING DETAIL 5

SCALE: NTS



FLUSH IN-GRADE VAULT/PULL BOX DETAIL 3

SCALE: N.T.S.

PULL BOX NOTES

1. ALL BOXES SHALL BE SET ON A MINIMUM 6" GRAVEL BASE WITH 1/2" DIAMETER PEA GRAVEL.
2. ALL INCIDENTAL CONCRETE SHALL BE REMOVED FROM BOXES.
3. PROVIDE WATERTIGHT SPLICES AND CAPS FOR POWER CONDUCTORS.
4. PROVIDE SEALING GEL IN ALL POWER CONDUITS (BOTH W/ CONDUCTORS AND IN EMPTY SPARE CONDUITS). THE GEL SHALL BE INSERTED IN THE CONDUIT TO A DEPTH OF 6" AND FLUSH W/ THE END OF THE CONDUIT. THE GEL SHALL BE MANUFACTURED BY 3M #4442 RE-ENTERABLE ENCAPSULANT.
5. PROVIDE MECHANICAL DUCT PLUGS IN ALL FIRE AND SIGNAL CONDUITS (BOTH W/ CONDUCTORS AND IN EMPTY SPARE CONDUITS.)
6. PROVIDE CABLE RACK HARDWARE ON SIDE WALLS OF ALL VAULTS/MHS AND PB'S. SECURE FIRE AND SIGNAL CABLES TO CABLE RACK HOOKS IN A NEAT WORKMANLIKE MANNER.
7. FIRE AND SIGNAL CABLE SERVICE/SLACK LOOP SHALL MAKE ONE COMPLETE LOOP AROUND THE BOX CIRCUMFERENCE.
8. PROVIDE IDENTIFYING TAGS ON ALL POWER AND COMMUNICATION CONDUCTORS IN PULLBOXES.
9. CONTRACTOR RESPONSIBLE TO SIZE ALL VAULTS/MHS/PB'S PER CEC REQUIREMENTS.

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Scale	12" = 1'-0"

TECHNOLOGY MOUNTING DETAILS

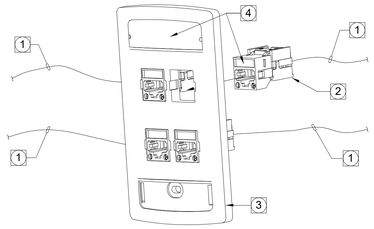
T6.11

FACEPLATE DETAIL KEY NOTES:

1. PROVIDE (1) CAT-6A, 4 PAIR UTP CABLE(S). COLOR OF CABLE(S) SHALL BE BLUE. TERMINATE STATION END(S) IN STATION CONNECTOR(S) PER SPECIFICATIONS. TERMINATE RACK END(S) CAT-6A PATCH PANEL(S) AT IDF RACK / CABINET PER SPECIFICATIONS.
2. PROVIDE CAT-6A STATION CONNECTOR PER SPECIFICATIONS. COLOR PER SPECIFICATIONS.
3. PROVIDE FACEPLATE PER SPECIFICATIONS. FACEPLATE MATERIAL AND FINISH SHALL MATCH ADJACENT / NEARBY POWER FACEPLATES. PROVIDE FLOOR BOX, POWER POLE & MODULAR FURNITURE DEVICE BRACKETS / CUSTOM ADAPTERS AS REQUIRED FOR A COMPLETE INSTALLATION. INCLUDE ALL COSTS IN BASE BID.
4. PROVIDE FACEPLATE LABELING PER SPECIFICATIONS. SEE SPECIFICATIONS FOR ALL OTHER LABELING REQUIREMENTS.
5. BLANK INSERT. ALL UNUSED OPENINGS SHALL BE COVERED WITH A BLANK INSERT MATCHING THE COLOR OF THE FACEPLATE.
6. DUAL PORT, SURFACE MOUNTED BOX (AMP #1116698-1 OR EQUAL) WITH CAT6APATCH CORD.
7. 4-SQUARE DEEP BOX AND WEATHERPROOF BLANK FACEPLATE, FLUSH TO EXTERIOR OR INTERIOR WALL OR CEILING, WITH CONDUIT AND CONDUCTORS TO NEAREST IDF DATA ROOM.

WHERE THE FOLLOWING SYMBOLS ARE INDICATED ON THE ELECTRICAL DRAWINGS ARCHITECTURAL DRAWINGS AND / OR STRUCTURED CABLING SYSTEM DRAWINGS:

THE FOLLOWING SHALL BE PROVIDED, AS DEPICTED IN THE FOLLOWING DIAGRAMMATIC CONNECTIVITY DETAIL.



VOICE/DATA DEVICE - 4 PORT 4

SCALE: N.T.S.

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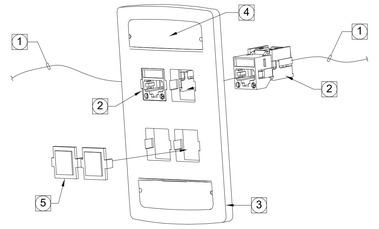
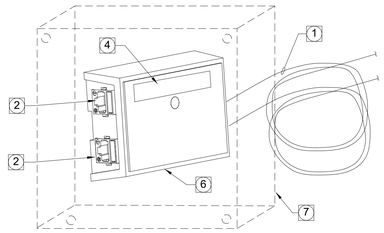


VOICE/DATA DEVICE - 2 PORT 1

SCALE: N.T.S.

WHERE THE FOLLOWING SYMBOLS ARE INDICATED ON THE ELECTRICAL DRAWINGS ARCHITECTURAL DRAWINGS AND / OR STRUCTURED CABLING SYSTEM DRAWINGS:

THE FOLLOWING SHALL BE PROVIDED, AS DEPICTED IN THE FOLLOWING DIAGRAMMATIC CONNECTIVITY DETAIL.



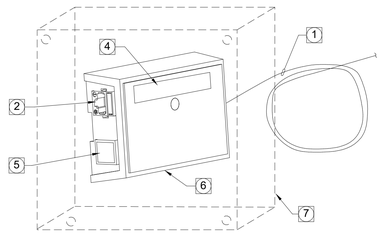
NOTE - WIRELESS ACCESS POINT ELECTRONICS ARE CFCI.
PROVIDE FORTINET FORTIAP-431G (INTERIOR) OR FORINET FORTIAP 234 COMPLETE.

WIRELESS ACCESS POINT DEVICE 2

SCALE: N.T.S.

WHERE THE FOLLOWING SYMBOLS ARE INDICATED ON THE ELECTRICAL DRAWINGS ARCHITECTURAL DRAWINGS AND / OR STRUCTURED CABLING SYSTEM DRAWINGS:

THE FOLLOWING SHALL BE PROVIDED, AS DEPICTED IN THE FOLLOWING DIAGRAMMATIC CONNECTIVITY DETAIL.



SURVEILLANCE DEVICE 3

SCALE: N.T.S.

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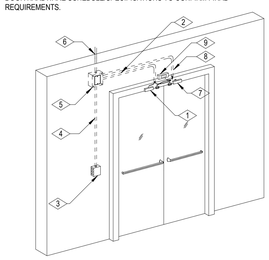
Scale	

TECHNOLOGY FACEPLATE DETAILS

T6.12

GENERAL NOTES:

1. DOOR DETAIL INDICATES DOOR HANDLE OR CRASHBAR ON SECURED SIDE OF DOOR FOR REFERENCE ONLY. REFER TO DOOR HARDWARE DIVISION SPECIFICATIONS FOR ACTUAL HARDWARE INFORMATION
2. LOCK POWER WILL VARY DEPENDING ON LOCK TYPE AND DOOR HARDWARE. REFER TO SECURITY SCHEDULES FOR COORDINATED POWER REQUIREMENTS. CONTRACTOR SHALL CROSS REFERENCE WITH OFFICIAL DOOR HARDWARE SCHEDULE/SPECIFICATIONS TO CONFIRM FINAL REQUIREMENTS.



CARD-IN WITH CONTACT, FREE EXIT, ELECTRIC STRIKE, PIR MOTION REX

KEYNOTES:

1. DOOR MONITOR: FLUSH MOUNTED DOOR STATUS MONITOR.
2. DOOR MONITOR CONDUIT: 3/4"C (19mm) FROM DOOR FRAME TO J-BOX.
3. READER/KEYPAD: 4"X4"X2-1/8" (100mmX100mmX54mm) BACK-BOX AND SINGLE GANG MUD RING MOUNTED ON NON-SECURED SIDE OF DOOR AT 42" AFF.
4. READER/KEYPAD CONDUIT: PROVIDE 3/4"C (19mm) TO J-BOX.
5. SECURITY J-BOX: 8"X8"X4" (200mmX200mmX100mm) J-BOX FLUSH MOUNTED ABOVE FINISHED ACCESSIBLE CEILING ON SECURED SIDE OF DOOR.
6. SECURITY J-BOX CONDUIT: 1"C (25mm) TO NEAREST ACCESSIBLE COMM ROOM.
7. ELECTRIC STRIKE: ELECTRIFIED STRIKE SHOWN FOR REFERENCE ONLY. (REFER TO DOOR HARDWARE SPECIFICATIONS)
8. LOCKING HARDWARE CONDUIT: 3/4"C (19mm) FROM DOOR FRAME TO J-BOX. COORDINATE FRAME TIE-IN LOCATION WITH DOOR HARDWARE SPECIFICATIONS.
9. PIR MOTION REX: MOTION REX DEVICE CENTERED AND MOUNTED TO TOP OF DOOR FRAME. ROUTE CABLING INTO DOOR FRAME AND UP TO J-BOX.

2 CARD ACCESS - DOUBLE GLASS DOOR

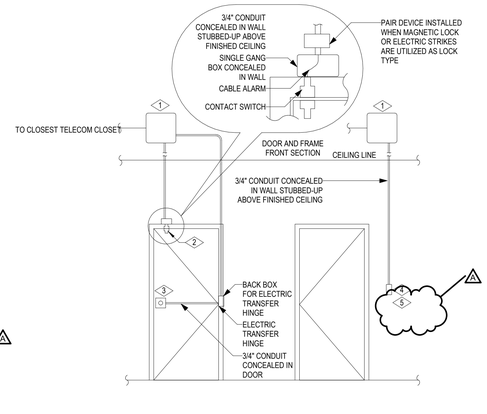
SCALE: NOT TO SCALE

NOTES:

1. COORDINATE ALL DOOR HARDWARE WITH ARCHITECTURAL DOOR HARDWARE SCHEDULE.
2. ALL ACCESSIBLE JUNCTION BOXES TO HAVE TAMPER SWITCHES.

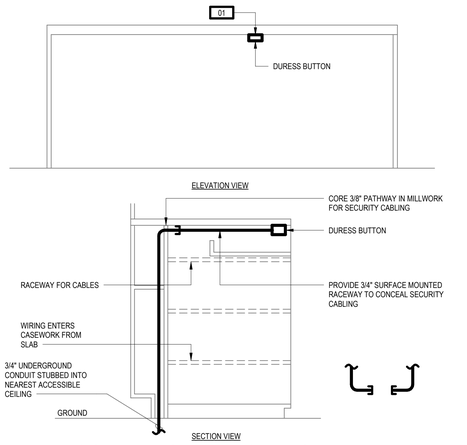
DIAMOND NOTES:

1. PROVIDE JUNCTION BOX RECESSED MOUNTED ABOVE DOOR ABOVE ACCESSIBLE CEILING ON SECURE SIDE OF DOOR. 6" L x 6" W x 4" D
2. STUB CONDUIT INTO HEAD OF DOOR FRAME FOR CONCEALED DOOR POSITION SWITCH. SEE DETAIL 1 ON THIS SHEET.
3. REQUEST TO EXIT INSTALLED WITHIN ELECTRIC MORTISE LOCK SET.
4. PROVIDE 4" L x 4" W x 1 7/8" DEEP BOX WITH SINGLE GANG DEVICE RING FLUSH MOUNTED 42" AFF FOR CARD READER. SEE ARCHITECTURAL DRAWINGS FOR EXACT MOUNTING HEIGHT.
5. CARD READER SHALL BE MOUNTED WITHIN 24" OF DOOR FRAME, ON LATCH HANDLE SIDE OF THE DOOR U.O.N.



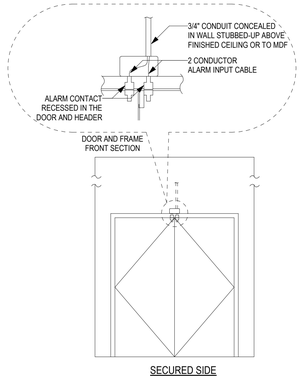
1 SINGLE DOOR WITH ELECTRIC LOCK AND ACCESS CONTROL EQUIPMENT

SCALE: NOT TO SCALE



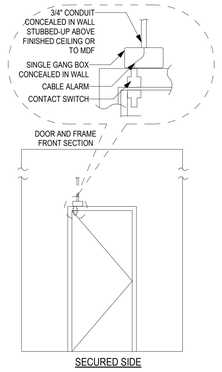
5 DURESS BUTTON - DESK MOUNT

SCALE: NONE



4 DOUBLE DOOR ALARM CONTACT

SCALE: 3/32" = 1'-0"



3 SINGLE DOOR ALARM CONTACT

SCALE: 3/32" = 1'-0"

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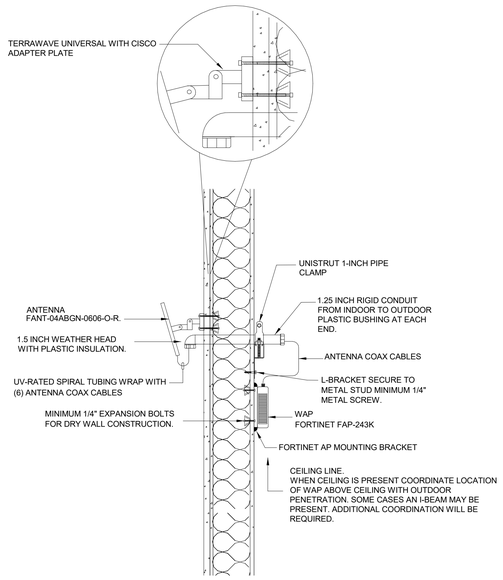
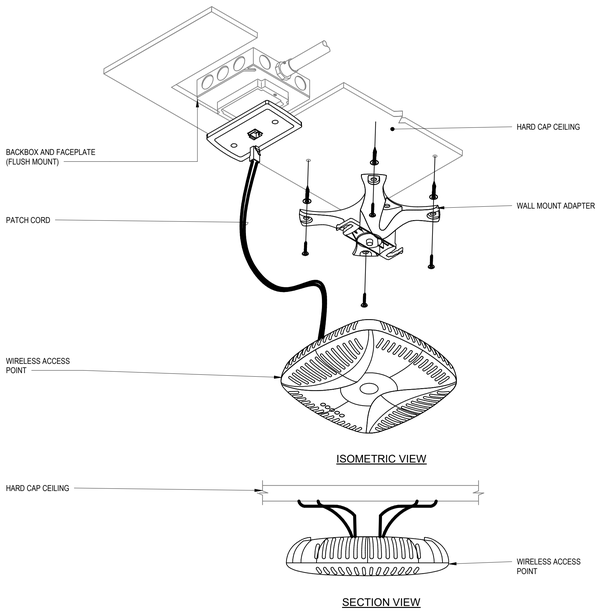
TECHNOLOGY SECURITY DETAILS

T6.13



4 WIFI DETAIL

SCALE: 12" = 1'-0"



3 WAP MOUNTING - HARD CAP CEILNG

NONE

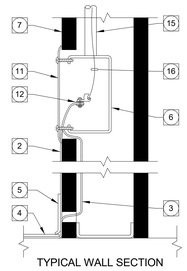
GENERAL NOTES:

1. IN IDF/BDF/MDF CLOSETS, LABS, AND SERVER ROOMS, ELECTRO-STATIC DISCHARGE (ESD) FLOOR GROUNDING FOIL SHALL BE ROUTED BEHIND THE WALL BASE, FIXED TO THE WALL SURFACE AND TERMINATED BEHIND RECEPTACLE COVER PLATE AT RECEPTACLE.
2. WHERE RECEPTACLES ARE UNAVAILABLE OR TOO FEW IN QUANTITY, PROVIDE J-BOXES WITH BLANK COVER PLATES TO CONNECT ESD FLOOR GROUNDING FOIL CONNECTION TO #12 CONDUCTOR SHOWN IN THE J-BOX LOCATION DETAIL. CONDUCTOR TERMINATIONS AT GROUNDING BUS BARS SHALL UTILIZE 2-HOLE COMPRESSION LUGS. CONDUCTOR TERMINATIONS TO BUILDING STEEL SHALL UTILIZE IRREVERSIBLE COMPRESSION CLAMPS OR EXOTHERMIC WELDS.

   WHERE J-BOXES ARE LOCATED IN UN-RATED AND/OR UN-INSULATED WALLS, MUD RINGS MAY REPLACE J-BOXES/CONDUITS.
3. IN OPEN OFFICE AREAS, PRIVATE OFFICES, CONFERENCE ROOMS OR OTHER ROOMS NOT LISTED IN NOTE 1 ABOVE, AND WHERE NOT LOCATED IN RATED WALLS, UTILIZE J-BOX INSTALLATION DETAIL WITH ESD FLOOR GROUNDING FOIL ROUTED CONCEALED BEHIND THE GYP BOARD OR WALL SURFACE IN LIEU OF BEING EXPOSED. COORDINATE INSTALLATION WITH ALL NECESSARY TRADES PRIOR TO INSTALLATION OF WALLS, WALL COVERINGS AND ESD FLOORING.
4. THE CONTRACTOR SHALL VALIDATE ALL ESD FLOOR GROUNDING FOIL CONNECTIONS ACHIEVE A RESISTANCE TO GROUND MEASUREMENT OF LESS THAN 1.0 OHMS. RESULTS SHALL BE DOCUMENTED IN THE FORM OF A CLOSEOUT SUBMITTAL TO THE ENGINEER. ANY CONNECTIONS THAT EXCEED 1.0 OHMS SHALL BE REPAIRED AND RETESTED UNTIL ACCEPTABLE /REPEATABLE MEASUREMENTS ARE ACHIEVED AND DOCUMENTED.

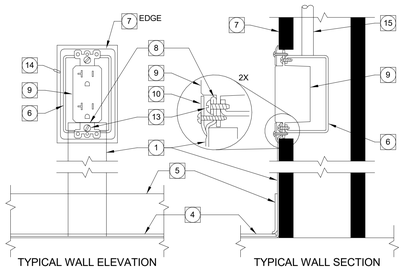
KEY NOTES:

1. ESD FLOOR GROUNDING FOIL.
2. EXPOSED ESD FLOOR GROUNDING FOIL - IDFS, BDFS, MDFS, LABS AND SERVER ROOMS.
3. CONCEALED ESD FLOOR GROUNDING FOIL - OPEN OFFICE, PRIVATE OFFICES, CONFERENCE ROOMS - SEE GENERAL NOTES FOR ADDITIONAL REQUIREMENTS.
4. ESD FLOORING.
5. BASE COVE WHERE OCCURS.
6. J-BOX WHERE REQUIRED - SEE GENERAL NOTES FOR ADDITIONAL REQUIREMENTS.
7. GYPBOARD OR OTHER WALL SURFACE.
8. UTILIZE RECEPTACLE MOUNTING TAB SCREW TO SECURE FOIL TO RECEPTACLE/J-BOX BY FOLDING FOIL ON ITSELF AND PLACING SCREW THROUGH THE FOIL. TRIM EXCESS FOLDED FOIL AS NECESSARY FOR CLEAN APPEARANCE WHEN RECEPTACLE COVER PLATE IS IN PLACE.
9. RECEPTACLE.
10. RECEPTACLE COVER PLATE.
11. BLANK COVER PLATE - COLOR/MATERIAL TO MATCH NEARBY DEVICE COVER PLATES.
12. COPPER LUG CONNECTOR FOR ESD FOIL TO CONDUCTOR TRANSITION (THOMAS AND BETTS #CULL414-14TP OR EQUAL). PROVIDE #10-32x1" LONG PAN HEAD MACHINE SCREW WITH 1" DIAMETER FENDER WASHER ON BOTH SIDES OF FOIL, LOCK WASHER AND NUT FOR EACH CONDUCTOR. SEE NEC OR CEC WHERE ADOPTED, ART. 250.8 FOR ADDITIONAL REQUIREMENTS.
13. RECEPTACLE MOUNTING SCREW. SEE NEC OR CEC WHERE ADOPTED, ART. 250.8 FOR ADDITIONAL REQUIREMENTS.
14. RECEPTACLE COVER PLATE REMOVED FOR CLARITY.
15. 1/2" CONDUIT TO ACCESSIBLE CEILING.
16. #12 CONDUCTOR WITH GREEN INSULATION TO NEAREST GROUNDING BUS BAR, IF PROVIDED ON PROJECT, ELSE ROUTE TO NEAREST EFFECTIVELY GROUNDED BUILDING STEEL. SEE GENERAL NOTES FOR ADDITIONAL REQUIREMENTS.



TYPICAL WALL SECTION

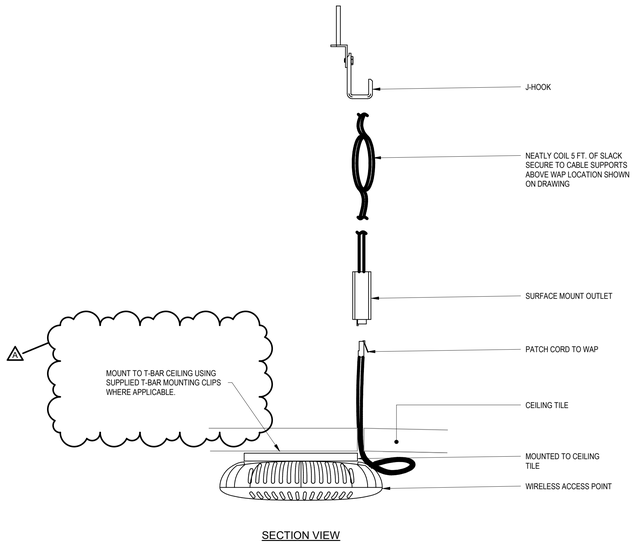
ESD GROUNDING FOIL CONNECTION AT J-BOX LOCATIONS



ESD GROUNDING FOIL CONNECTION AT RECEPTACLE LOCATIONS

1 ESD STATIC TILE GROUNDING DETAIL

12" = 1'-0"



2 WAP MOUNTING - CEILING TILE

NONE

LPA

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REGISTERED PROFESSIONAL ENGINEER RAYMOND W. SUN No. E15610 EX. 12/31/2025 ELECTRICAL STATE OF CALIFORNIA

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CITY OF MOORPARK

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A ADDENDUM #1	06/20/2025

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TECHNOLOGY DETAILS

T6.15

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REGISTERED PROFESSIONAL ENGINEER
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No. E15610
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ELECTRICAL
STATE OF CALIFORNIA

COMMUNICATIONS PATHWAYS

1. CONDUITS SHALL (a) CONTAIN NO CONTINUOUS SECTIONS LONGER THAN 30M (98 FT.), AND (b) CONTAIN NO MORE THAN (2) 90°
2. BENDS OR (1) REVERSE BEND WITHOUT INSTALLING A PULL BOX. SPLIT CONDUITS IN PLACE OF PULL BOXES ARE UNACCEPTABLE.
3. CONDUITS SHALL CONTAIN PLASTIC OR NYLON PULL TAPE RATED AT 200 LBS. WITH A MINIMUM OF 5 FEET OF EXTRA PULL TAPE COILED AT EACH END. CONDUIT BEND RADIUS SHALL BE (a) A MINIMUM OF 6 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS 2-INCHES IN DIAMETER OR
4. LESS, AND (b) 10 TIMES THE INTERNAL CONDUIT DIAMETER FOR CONDUITS MORE THAN 2-INCHES IN DIAMETER.
5. TERMINATE CONDUIT STUBS AND SLEEVES THAT PROTRUDE THROUGH STRUCTURAL FLOORS 2-INCHES TO 3-INCHES ABOVE THE FLOOR SURFACE. INSTALL BUSHINGS OR BELL ENDS AS REQUIRED ON ALL CONDUITS.
6. FLEX CONDUIT IS UNACCEPTABLE FOR USE AS A COMMUNICATIONS CONDUIT EXCEPT AT SEISMIC JOINTS AND/OR IF APPROVED IN WRITING
7. BY THE ENGINEER. ALL UNDER SLAB OR IN-SLAB CONDUITS SHALL BE INSTALLED IN A MANNER THAT PREVENTS WATER INFILTRATION OF THE CONDUIT. IT IS
8. THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROUND WATER, RAIN WATER OR CONSTRUCTION WATER IS PREVENTED FROM ENTERING AND/OR REMOVED FROM THE CONDUITS PRIOR TO PLACEMENT OF COMMUNICATIONS CABLES. SEE ELECTRICAL SPECIFICATIONS, DETAILS AND PLANS FOR ADDITIONAL CONDUIT SEALING REQUIREMENTS.

9 ALL PULL BOXES SHALL BE SIZED AND INSTALLED PER ANSI-TIA-569-C. PULL BOXES FOR IN/UNDER SLAB CONDUIT RUNS ARE NOT PERMITTED UNLESS OTHERWISE NOTED. PULL BOXES FOR OVERHEAD CONDUIT RUNS SHALL BE LOCATED ABOVE ACCESSIBLE CEILINGS WITHIN THE ACCESSIBLE CEILING SPACE AND SUPPORTED INDEPENDENTLY FROM THE STRUCTURE AND CONDUIT SUPPORTS. PULL BOXES FOR ROOF MOUNTED OR EXTERIOR ABOVE GRADE APPLICATIONS SHALL BE NEMA 3R RATED.

ASSISTIVE LISTENING SYSTEM NOTE:

1. PROVIDE PORTABLE OR PERMANENT ASSISTIVE LISTENING SYSTEMS BY LISTEN TECHNOLOGIES OR EQUIVALENT AS SPECIFIED HEREIN.
2. SEE SPECIFICATION SECTION XXXXXXX FOR MORE INFORMATION.
3. ALS SYSTEM SHALL PROVIDE AMPLIFICATION WITHIN A ROOM FOR INDIVIDUALS WITH NORMAL HEARING AND FOR THOSE WITH MINIMUM TO MILD HEARING LOSS IN 10 TO 25 dB RANGE.
4. THE RECEIVERS SHALL BE ABLE TO AMPLIFY THE SPEAKER'S VOICE 20 dB ABOVE ROOM NOISE. THEY SHALL HAVE AN AUXILIARY INPUT JACK TO BROADCAST EXTERNAL SOUNDS FROM AN AUDIBLE DEVICE OR TELEVISION. THE RECEIVERS SHALL HAVE AN AUXILIARY VOLUME CONTROL TO CONTROL THE SOUND LEVEL OF INPUT RECEIVED FROM EXTERNAL SOURCES. THE UNITS SHALL HAVE AN FM VOLUME CONTROL TO ALLOW FOR ADJUSTMENT OF THE SOUND LEVEL OF THE FM SIGNAL RECEIVED FROM THE WIRELESS TRANSMITTER. THE RECEIVER MUST HAVE A TONE CONTROL TO ADJUST THE FREQUENCY RESPONSE FOR A VARIETY OF USERS AND LISTENING ENVIRONMENTS. THEY SHALL HAVE COLOR-CODED SPEAKER OUTPUT TERMINALS AND MUST BE CAPABLE OF RECEIVING ANY OF 40 FCC AND INDUSTRY CANADA APPROVED NARROW BAND CHANNEL IN THE 72 TO 76 MHz RANGE.
5. PROVIDE TRANSMITTERS AND RECEIVERS WITH RECHARGEABLE BATTERIES.
6. LISTENING ACCESSORIES AND CHARGING UNITS EQUAL TO 4% OF THE TOTAL SEATING OF ALL CLASSROOMS BUT NO LESS THAN A QUANTITY OF TWO PER CLASSROOM, LA-323 OR LA-325 AS REQUIRED. 25% OF ALL RECEIVERS TO BE HEARING AID COMPATIBLE. REFER TO ARCHITECTURAL FLOOR PLANS FOR MINIMUM OCCUPANCY SEATING. NUMBER OF TRANSMITTERS SHALL ACCOMMODATE REQUIRED NUMBER OF RECEIVERS.

DRAWING REFERENCES

GENERAL NOTES:

1. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONDUIT. JUNCTION BOXES, CABLE TRAYS, COVER PLATES, PULL STRING, ENCLOSURES, FLOOR BOXES, POWER RECEPTACLES AND POWER CONNECTIONS IDENTIFIED IN THESE DRAWINGS AND SPECIFICATIONS. UNLESS OTHERWISE NOTED.
2. ALL JUNCTION BOXES IN WALLS AND CEILINGS SHALL BE FLUSH MOUNTED. CONDUITS SHALL BE CONCEALED UNLESS OTHERWISE NOTED.
3. ALL AUDIO-VISUAL CONDUIT RUNS SHALL BE CONTINUOUS FROM END TO END. NO CONDUIT RUNS SHALL EXCEED 100 FEET. ALL CONDUIT RUNS EXCEEDING 100 FEET MUST HAVE LARGE RADIUS BENDS. TOTAL BENDS PER RUN IS 360 DEGREES.
4. GENERAL CONTRACTOR SHALL PROVIDE STRUCTURAL SUPPORT FOR MOUNTING OF AUDIO-VISUAL EQUIPMENT PROVIDED BY OTHERS AT LOCATIONS DESIGNATED IN THESE DRAWINGS. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, BLOCKING FOR WALL MOUNTED DEVICES AND OVERHEAD SUPPORT FOR CEILING MOUNTED PROJECTORS AND PROJECTION SCREENS.
5. REFER TO ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS FOR SUPPORT DETAILS AND REQUIREMENTS.
6. DIMENSIONS ARE INDICATED ON AUDIOVISUAL DRAWINGS WHERE CRITICAL TO THE INSTALLATION AND PERFORMANCE OF THE AUDIOVISUAL DEVICES. WHERE INFORMATION AND REQUIREMENTS CONFLICT WITH SPECIFICATIONS AND DESIGNS DELINEATED ELSEWHERE, THE GENERAL CONTRACTOR SHALL IMMEDIATELY BRING SUCH CONFLICTS TO THE ATTENTION OF THE ARCHITECT.
7. THE ARCHITECTURAL, FURNITURE AND FINISH CONFIGURATIONS ILLUSTRATED ON THE AUDIOVISUAL DRAWINGS ARE FOR REFERENCE ONLY. REFER TO THE ARCHITECTURAL DRAWINGS FOR SPECIFICATIONS AND REQUIREMENTS.
8. ALL EQUIPMENT INSTALLATION AND MOUNTING DETAILS PROVIDED IN THE AUDIO-VISUAL DRAWINGS ARE FOR REFERENCE ONLY. REFER TO ARCHITECTURAL AND ENGINEERING DRAWINGS FOR SPECIFIC REQUIREMENTS.
9. DATA/COMMUNICATION OUTLETS AND POWER OUTLETS ARE SHOWN FOR REFERENCE ONLY. REFER TO THE TELECOMMUNICATION DRAWINGS FOR EXACT LOCATION OF THE DATA/COMMUNICATION OUTLETS AND TO THE ELECTRICAL DRAWINGS FOR THE EXACT LOCATION OF THE POWER RECEPTACLES.
10. CEILING MOUNTED SPEAKER ENCLOSURES SHALL BE SUPPORTED FROM OVERHEAD STRUCTURE. DO NOT HANG SPEAKER ENCLOSURES FROM FINISHED CEILING.
11. GENERAL CONTRACTOR SHALL PROVIDE PULL STRINGS IN ALL CONDUIT SPECIFIED IN AUDIO-VISUAL DRAWINGS. GENERAL CONTRACTOR SHALL LABEL ALL AUDIO-VISUAL JUNCTION BOXES WITH DESIGNATED BOX ID NUMBER (E.G., AV100).
12. GENERAL CONTRACTOR SHALL PROVIDE BLANK COVER PLATES AT ALL AUDIO-VISUAL JUNCTION BOXES. VERIFY ALL DEVICE PLATE FINISHES WITH ARCHITECT. COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF ALL AUDIOVISUAL JUNCTION BOXES AND DEVICES WITH ARCHITECT.
13. SOME JUNCTION BOXES AND ENCLOSURES SPECIFIED IN AUDIO-VISUAL DRAWINGS MAY BE DEEPER THAN STANDARD WALL DEPTH. COORDINATE WITH MANUFACTURER AND/OR ARCHITECT TO VERIFY INSTALLATION REQUIREMENTS AND DETAILING.
14. WHERE SPECIFIED, LOW VOLTAGE CONTROL INTERFACE ELECTRONICS SHALL BE PROVIDED TO ENABLE OPERATION OF LINE VOLTAGE DEVICES (E.G., PROJECTION SCREENS, LIGHTING, WINDOW COVERINGS) VIA THE AUDIO=VISUAL CONTROL SYSTEM. PROVIDE SERIAL DIGITAL (E.G., RS232) INTERFACE CONTROL WHERE AVAILABLE WHERE MORE THAN ONE CONDUIT TERMINATES IN A JUNCTION BOX THE ELECTRICAL CONTRACTOR SHALL LABEL EACH CONDUIT IN A MANNER ALLOWING IDENTIFICATION OF CONDUITS AFTER WALL FINISHES ARE APPLIED.
15. AUDIO-VISUAL INFRASTRUCTURE DIAGRAM IDENTIFY SIGNAL CABLE CONTAINMENT REQUIREMENTS ONLY. AUDIOVISUAL CABLING AND SPECIALTY CONNECTOR PLATES ARE BY AUDIO-VISUAL CONTRACTOR.
16. ALL CONDUITS SPECIFIED SHALL BE EMT OR RIGID TYPE. FLEXIBLE CONDUITS MAY BE USED IN RUNS OF 72" OR LESS. FLEXIBLE CONDUITS SHALL NOT BE ALLOWED WHERE ACCESS CANNOT BE PROVIDED TO THE FULL LENGTH OF THE CONDUIT RUN.
17. GENERAL CONTRACTOR TO INSTALL PROJECTION SCREEN HOUSING FOR ALL FUTURE PROJECTION SCREEN LOCATIONS. U.O.N.
18. DEVICE MOUNTING HEIGHT IS TO THE CENTER, UON.
19. POWER RECEPTACLES ARE SHOWN FOR COORDINATION ONLY. REFER TO THE ELECTRICAL DRAWINGS FOR COMPLETE POWER LAYOUT AND CIRCUITING.
20. WHERE SHOWN A TECHNICAL GROUND IS REQUIRED (TGS). PROVIDE AN INSULATED GROUND CONDUCTOR ISOLATED FROM THE BACK BOX/CONDUIT SYSTEM. THIS GROUND CONDUCTOR WILL ONLY BE TERMINATED AT THE ELECTRICAL PANEL'S DEDICATED TGS GROUND BUSS. NO OTHER GROUNDS SHALL BE TERMINATED AT THIS TGS GROUND BUSS. LABEL TGS RECEPTACLE WITH THE TGS DESIGNATION AND CIRCUIT NUMBER.

WIRE TYPE AUDIO, VIDEO, CONTROL CABLES SCHEDULE

1. LOUDSPEAKER SPEAKER CABLE, 70-VOLT DISTRIBUTION, PLENUM RATED 2-CONDUCTOR, 16 AWG, UNSHIELDED PAIR: WEST PENN, BELDEN OR EQUAL.
2. STADIUM LOUD SPEAKER CABLE SHALL BE 8/2 AWG OR 10/2 AWG RATED FOR WATER IMMERSION OR AS SPECIFIED : WEST PENN, BELDEN OR EQUAL
3. LOUDSPEAKER CABLE, PLENUM RATED 2-CONDUCTOR, 12 AWG, UNSHIELDED PAIR: WEST PENN, BELDEN OR EQUAL.
4. LOUDSPEAKER CABLE, PLENUM RATED 2-CONDUCTOR, 14 AWG, UNSHIELDED PAIR: WEST PENN, BELDEN OR EQUAL.
5. ANALOG MICROPHONE/LINE LEVEL INSTALLATION CABLE, 22 AWG CONDUCTOR, JACKETED, SHIELDED, TWISTED-PAIR, PLENUM RATED: WEST PENN, BELDEN OR EQUAL.
6. PRE-TERMINATED HDMI, DVI DISPLAY PORT CABLES: EXTRON, OR EQUAL. (NOTE, CABLES MUST BE RATED FOR HDMI 2.0 SPECIFICATIONS OR BETTER, CAPABLE OF PASSING UHD AND 4K RESOLUTION AT DISTANCES LESS THAN 35' WITHOUT AN ACTIVE EQUALIZER.)
7. DIGITAL VIDEO SWITCHER, EXTRON XTP/DTP 24, OR CRESTRON ULTRA SHIELDED TWISTED PAIR CABLE. . WITH EXTRON OR CRESTRON ONLY SHIELDED RJ-45 CONNECTORS.
8. CONTROL SYSTEM DEVICE CONTROL (RS232, RELAY OR CONTACT CLOSURE): (DUAL 22 AWG SHIELDED TWISTED PAIRS WITH INDIVIDUAL DRAIN WIRES, EACH PAIR IS COLOR-CODED RED/BLACK AND GREEN/WHITE TO SIMPLIFY IDENTIFICATION.) PLENUM RATED: WEST PENN, BELDEN OR EQUIVALENT.
9. DATA NETWORK: PLENUM-RATED CATEGORY 6A, SEE STRUCTURED CABLING SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. (A)
10. SERIAL DIGITAL INTERFACE CABLE RG6, 75 OHM COAXIAL CABLE BELDEN 4694R OR EQUAL.
11. FIBER, OM4. MM, 50 MICRON WITH LC CONNECTIONS PER EXTRON OR CRESTRON SPECIFICATIONS. FIBER, SINGLE MODE. PROVIDE CONNECTORS AS SHOWN. PROVIDE PLENUM RATED CABLE FOR ALL CABLE WHERE REQUIRED BY CODE. PROVIDE CABLE RATED FOR WATER IMMERSION AS REQUIRED OR AS SPECIFIED
12. ANY CABLE CHANGES OR SUBSTITUTIONS MUST BE SUBMITTED AND APPROVED PRIOR TO INSTALLATION. NON-COMPLIANT CABLE THAT HAS BEEN INSTALLED WITHOUT APPROVAL SHALL BE REPLACED AT THE CONTRACTOR EXPENSE.

ANNOTATIONS

Symbol	Description
x / x-x	DETAIL CALLOUT, "x" INDICATES DETAIL NUMBER "AVx-xx" INDICATES SHEET NUMBER.
(2)	PLAN NOTE REFERENCE, REFER TO NOTES ON SHEET, OR AS DIRECTED.
4.XXX	PLAN NOTE REFERENCE, REFER TO NOTES ON SHEET, OR AS DIRECTED.
4 (triangle)	REVISION REFERENCE.

AV SYMBOLS

Symbol	Description
TP	TOUCH PANEL AV CONTROL. 2 GANG BACK-BOX.
AL	ASSISTIVE LISTENING.
RK	AV RACK.
SP	ROOM SCHEDULING PANEL.
CAM	WALL MOUNTED CAMERA.
DIS	DISPLAY. COORDINATE WITH ARCHITECTURAL DRAWINGS.
S	WALL MOUNTED SPEAKER.
SO	SPEAKER OUT-BELOW DESKTOP.
I/O	AV I/O PANEL. 6 GANG BACK-BOX. +18". 1 1/4" CO TO ACCESSIBLE CEILING SPACE.
SS	VIDEO SCREEN UP/DN 2 GANG J-BOX. COORDINATE WITH SCREEN LOCATION. PROVIDE SCREEN POWER 120V.
SB	SOUND BAR - UNDER DISPLAY - OPTIONS: INTERNAL MICROPHONE AND/OR CAMERA
J	J-BOX
C	CEILING MOUNTED CAMERA.
M	CEILING MOUNTED MICROPHONE.
S	CEILING MOUNTED SPEAKER.
PJ	CEILING MOUNTED PROJECTOR. PROVIDE (1) 20 A 120V RECEPTACLE.
	CHASE/CONDUIT TO CEILING SPACE ABOVE SIZE AS SHOWN
	XXXXXX-FLOOR BOX, POWER-DATA-AV
	XXXXXXX-FLOOR BOXES. POWER-DATA-AV

MOORPARK CITY LIBRARY

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A	ADDENDUM #1	06/20/2025

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DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
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AGENGY SUBMITTAL #1	08/15/2024
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Job Number	30647
Date Published	10/27/2022
Checked By	Checker
Scale	1/8" = 1'-0"

AV LEAD SHEET

AV0.01

FIRE ALARM PLAN REQUIREMENTS

1. ALL WALL-MOUNTED VISUAL SIGNALING APPLIANCES AND COMBINATION AUDIBLE/VISUAL SIGNALING APPLIANCES SHALL BE MOUNTED SUCH THAT THE ENTIRE LENS IS NOT LESS THEN 80 INCHES AND NO GREATER THEN 96 INCHES ABOVE THE FINISHED FLOOR. ALL WALL MOUNTED AUDIBLE SIGNALING APPLIANCES SHALL HAVE THEIR TOPS ABOVE FINISHED FLOOR AT HEIGHTS NOT LESS THEN 90 INCHES AND BELOW FINISHED CEILING ON NOT LESS THEN 6 INCHES (WHICHEVER IS LOWER).
2. ALL EQUIPMENT SHALL BE U.L. AND C.S.F.M. LISTED.
3. ALL WIRING SHALL BE IN ACCORDANCE WITH THE C.E.C. AND AUTHORITIES HAVING JURISDICTION.
4. ALL JUNCTION BOXES AND CONDUITS SHALL BE SIZED IN ACCORDANCE WITH THE C.E.C. AND SHALL BE PAINTED RED WHERE APPLICABLE.
5. ELECTRICAL CONTRACTOR SHALL FURNISH ACCESS PANELS TO AREAS THAT REQUIRE SERVICING, TROUBLE SHOOTING, ETC.
6. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM ELECTRICAL ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC., THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
7. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW, NOR CLOSER THEN 3 FEET (915mm) FROM AN AIR SUPPLY DIFFUSER.
8. ALL FAN SHUTDOWN FUNCTIONS, DAMPER CLOSURES AND ASSOCIATED MECHANICAL SYSTEM FIRE ALARM INTERFACE SHALL BE BY MECHANICAL CONTRACTOR, AND SHALL BE COORDINATED WITH FIRE ALARM SYSTEM.
9. ALL DUCT SMOKE DETECTORS SHALL BE MOUNTED BY THE MECHANICAL CONTRACTOR. DUCT SMOKE DETECTORS EXPOSED TO THE WEATHER SHALL BE C.S.F.M. LISTED FOR OUTDOOR INSTALLATION, AND WEATHER PROTECTED BY THE MECHANICAL CONTRACTOR. ALL AIR VELOCITY TESTING SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR.
10. ALL 120VAC POWER REQUIREMENTS FOR THE FIRE ALARM SYSTEM SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR AND SHALL MEET ALL REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION.
11. ALL FIRE ALARM DEVICE BACKBOXES, FIRE ALARM TERMINAL CABINETS, GUTTERS, JUNCTION BOXES, AND ASSOCIATED CONDUITS SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED. REFER TO FIRE ALARM SYMBOL LIST AND/OR MOUNTING DETAILS FOR ADDITIONAL INFORMATION. SYSTEM SUPPLIER PROVIDED BACKBOXES SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED. FIRE ALARM PANEL, REMOTES AND COMPONENTS SHALL BE SECURED TO MOUNTING SURFACES PER MANUFACTURER'S SPECIFICATIONS. NO SINGLE DEVICE SHALL EXCEED THE WEIGHT OF 20 LBS. WITHOUT SPECIAL MOUNTING DETAILS.
12. SMOKE DETECTOR TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH NFPA 72, ALL APPLICABLE CODES AND THE MANUFACTURER'S INSTRUCTIONS.
13. ALL WIRING, INITIATING DEVICES AND ANNUNCIATOR PANEL SHALL BE SUPERVISED TO THE PRINCIPAL POINT OF ANNUNCIATION. THE FIRE ALARM CONTROL PANEL TO SUPERVISE THE ANNUNCIATOR PANEL, ALL INITIATING AND INDICATING DEVICE CIRCUITS.
14. ALL WIRING SHALL BE CUT FOR IN AND OUT. WIRING SHALL NOT BE LOOPED THROUGH DEVICES PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EACH JUNCTION BOX AND CONNECTED DIRECTLY TO EACH FIRE DEVICE. DO NOT SPLICE THE WIRE. THERE MUST BE AT LEAST 6' OF LEAD WIRE FROM THE BOX TO THE DEVICE.
15. POINT AND COMMON ANNUNCIATION IS PROHIBITED. SLC MAY BE T-TAPED ONLY AT BUILDING FATC IF NECESSARY. INSTALL SLC LOOPED WITHIN ALL BUILDINGS AS SHOWN ON THE FLOOR PLANS.
16. PROVIDE 3/4" CONDUIT FROM FIRE ALARM CONTROL PANEL TO TELEPHONE BACKBOARD FOR OWNER PROVIDED CENTRAL STATION MONITORING.
17. CONTRACTOR TO FIELD VERIFY AND PROVIDE DECIBEL METER FOR TESTING OF AMBIENT NOISE LEVELS (MINIMUM 15db ABOVE AVERAGE AMBIENT NOISE LEVEL BUT NOT LESS 75 DBA AT 10 FEET OR MORE THAN 110 DBA AT THE MINIMUM HEARING DISTANCE - SEE NFPA 72 APPENDIX A.7.4.2.1.) INSTALL ADDITIONAL AUDIBLE DEVICES AS NEEDED TO ATTAIN REQUIRED NOISE LEVELS IN ALL REQUIRED AREAS. PROVIDE UPDATED PLANS AND CALCULATIONS THROUGH THE "CHANGE ORDER" PROCESS WHEN INSTALLING ADDITIONAL DEVICES. INSPECTOR OF RECORD (IOR) TO WITNESS FINAL TEST OF SYSTEM. CONTRACTOR(S) TO PROVIDE FINAL TEST RESULT AND "RECORD OF COMPLETION" TO ARCHITECT OF RECORD, OWNER, DIVISION OF THE STATE ARCHITECT, IOR AND LOCAL FIRE AUTHORITY.
18. ALL CONDUITS ARE MINIMUM 3/4" U.O.N. ALL FIRE ALARM CIRCUITS SHALL BE IN CONDUIT, SURFACE RACEWAY OR OPEN RUN ABOVE CEILINGS, UNDER FLOORS AND IN WALLS IN A NEAT AND PROTECTED MANOR AS INDICATED ON DESIGN DOCUMENTS. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.
19. ALL FLOW SWITCHES SHALL BE 2 WIRE WITH NON-ELECTRONIC RETARD TYPE SIMILAR TO THE SYSTEM SENSOR MODEL "WFD SERIES" ONLY.
20. ALL DEVICES IN THE ALARM SYSTEM SHALL BE COMPATIBLE AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
21. SYSTEM SHALL BE FURNISHED AND INSTALLED BY A MANUFACTURER'S AFFILIATE AND AUTHORIZED DISTRIBUTOR. FIRE ALARM SYSTEM INSTALLATION COMPANY SHALL BE UL LISTED (UUJS). INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 901.6.2. SUPERVISORY MONITORING SHALL BE TESTED AND VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST. OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.
22. DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER THE CONSTRUCTION CLEAN-UP OF ALL TRADES IS COMPETE AND FINAL. DETECTORS THAT HAVE BEEN INSTALLED PRIOR TO FINAL CLEAN-UP BY ALL TRADES SHALL BE CLEANED OR REPLACED IN ACCORDANCE WITH CHAPTER 7. CLEANING OR REPLACEMENT OF DEVICES THAT WERE MOUNTED AT THE REQUEST OF THE CONTRACTOR WILL NOT BE PERFORMED WITHOUT WRITTEN AUTHORIZATION THAT ASSUMES FINANCIAL RESPONSIBILITY FOR COSTS INCURRED. SEE THE LATEST VERSION OF NFPA 72.
23. PER CBC 2022, SECTION 11B-309, CONTROLS AND OPERATING MECHANISMS AT INITIATING DEVICE "SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5lbf (22.2N)." OPERABLE PARTS SHALL BE PLACED WITHIN THE REACH RANGES SPECIFIED IN SECTION 11B-308.
24. FIRE ALARM SYSTEM CONTROL PANEL SHALL HAVE A MEANS FOR TURNING OFF ACTIVATED ALARM NOTIFICATION APPLIANCES, WHEN OCCUPANT NOTIFICATION ALARM SIGNAL DEACTIVATION IS ACTUATED, BOTH AUDIBLE AND VISIBLE NOTIFICATION APPLIANCES SHALL BE SIMULTANEOUSLY DEACTIVATED. THE DEACTIVATION MEANS SHALL BE KEY-OPERATED.
25. THE SYSTEM SHALL CONFORM TO CALIFORNIA CODE OF REGULATIONS (CCR) TITLES 19 AND 24 AS APPLICABLE TO THIS PROJECT.
26. AUDIBLE COVERAGE SHALL COMPLY WITH NFPA 72 AND 2022 CBC.
27. ALL FIRE ALARM SYSTEM VISUAL SIGNAL BE SYNCHRONIZED THROUGHOUT THE SITE.
28. WHERE NOTIFICATION APPLAINCES OCCUR AT WHITEBOARDS, LOCATE DEVICE(S) +4" ABOVE TOP OF WHITEBOARD, NOT TO EXCEED 96" TO TOP OF LENS.
29. PROVIDE A LABEL WITHIN THE FACP AND EACH POWER SUPPLY WITH THE PANEL NUMBER AND CIRCUIT NUMBER OF THE 120 VOLT POWER SOURCE.
30. WHERE A DETECTOR IS INSTALLED ABOVE THE CEILING, THE DETECTOR SHALL BE EASILY ACCESSIBLE AND THE LOCATION OF THE DETECTOR SHALL BE CLEARLY MARKED. FOR DUCT SMOKE DETECTORS A REMOTE TEST STATION SHALL BE PROVIDED.
31. TEMPERATURE SETTINGS OF HEAT DETECTOR DEVICES ARE TO BE SET AT A MINIMUM OF 20°F. ABOVE THE MAXIMUM EXPECTED TEMPERATURE OF THE SPACE INSTALLED PER NFPA 72, 2-23.
32. MECHANICAL UNIT (HVAC) SHUT DOWN SHALL UTILIZE DUCT SMOKE DETECTOR TO TRIGGER RELAY FOR HVAC UNIT SHUT DOWN (PER CMC 609).
33. UPON COMPLETION OF SYSTEM INSTALLATION, THE SYSTEM SHALL BE TESTED IN THE PRESENCE OF AND IN A MANNER ACCEPTABLE TO DSA/I.O.R. CONTRACTOR SHALL SUPPLY NECESSARY TESTING EQUIPMENT, INCLUDING A "SOUND LEVEL METER" TO CHECK ACCEPTABLE NOISE LEVELS OF AUDIBLE DEVICES. PROVIDE TEST RESULTS PER NFPA 72 TO ARCHITECT, D.S.A., I.O.R. AND TO LOCAL FIRE AUTHORITY. THE INSTALLING CONTRACTOR SHALL PROVIDE A RECORD OF COMPLETION PER NFPA72, FIGURE 7.8.2(a) THRU. 7.8.2(f).
34. THE "END OF LINE RESISTANCE" OF EACH CIRCUIT SHALL BE TESTED IN THE PRESENCE OF THE I.O.R. AND SHALL NOT EXCEED A MAXIMUM OF 10% VOLTAGE DROP, OR LISTED MANUFACTURER'S MINIMUM OPERATING VOLTAGE.
35. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS SHEET FOR EXTERIOR NOTIFICATION APPLIANCE MOUNTING.
36. ALL WIRING USED IN UNDERGROUND CONDUIT SHALL BE LISTED FOR WET AREA APPLICATION, IN ACCORDANCE WITH CEC 760.
37. ALL UNDERGROUND FIRE ALARM SYSTEM CONDUCTORS SHALL BE CONTINUOUS FROM END TO END. NO UNDERGROUND SPLICES WILL BE PERMITTED, NOR ACCEPTABLE.
38. FIRE ALARM SYSTEM IS FULLY AUTOMATIC SYSTEM.
39. APPLICABLE STANDARD 2022 NFPA 72.
40. INSTALLATION OF THE SYSTEM SHALL NOT BE STARTED UNTIL DETAILED DESIGN DOCUMENTS AND SPECIFICATION, INCLUDING STATE FIRE MARSHAL LISTING NUMBERS FOR EACH COMPONENT OF THE SYSTEM HAS BEEN APPROVED BY DSA.
41. A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE AND USED FOR INSTALLATION.
42. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA AND THE ARCHITECT/ENGINEER OF THE PROJECT.
43. DSA, ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL INSPECTION AND/OR TESTING.
44. ALL PENETRATIONS THROUGH RATED ASSEMBLIES, REQUIRING OPENING PROTECTION SHALL BE PROVIDED WITH A PENETRATION FIRE STOP SYSTEM AS IDENTIFIED IN CBC CHAPTER 7, UL OR OTHER LAB TESTING CRITERIA. APPROVED TYPE OF MATERIALS SHALL BE IDENTIFIED WITHIN THE SPECIFICATION WITHIN THE FIRE ALARM SECTION.
45. PROVIDE ALL COMPONENTS, DEVICES AND PANELS FOR A COMPLETE FUNCTIONAL FIRE ALARM SYSTEM.
46. THE CONTRACTOR SHALL ADJUST/INSTALL ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS.
47. VISUAL DEVICES SHOULD NOT EXCEED 2 FLASHES PER SECOND AND SHOULD NOT BE SLOWER THAN 1 FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELLA. VISUAL DEVICES WITHIN 55' FROM EACH OTHER SHALL BE SYNCHRONIZED.
48. UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATERTIGHT FITTINGS AND WIRE TO BE APPROVED FOR WET LOCATIONS.
49. ALL FIRE ALARM WIRING SHALL BE FLP OR FPLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE THHN OR THWN.
50. ALL LED REMOTE INDICATORS FOR DUCT DETECTORS AND FIRE/SMOKE DAMPERS REQUIRED BY THE LOCAL AHJ SHALL BE LOCATED IN CEILINGS IN COORDINATION WITH ARCHITECT PRIOR TO ANY ROUGH-IN.

LIST OF APPLICABLE CODES AS

2022 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR*
2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
2022 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
2022 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR
2022 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
2022 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2022 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

APPLICABLE STANDARDS

FOR THE LIST OF APPLICABLE STANDARDS, INCLUDING CALIFORNIA AMENDMENTS TO THE NFPA STANDARD, REFER TO CBC CHAPTER 35 AND CFC CHAPTER 80.

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2022 CBC, SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTER 13, 29 AND 30.

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY OR MOVEABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/120V RECEPTACLES HAVING A FLEXIBLE CABLE.
3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTs SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BE ANCHORED IN ACCORDANCE WITH THE ABOVE REQUIREMENTS

PIPING, DUCTWORK AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTION 13.6.5, 13.6.6, 13.6.7, 13.6.8, AND 2022 CBC, SECTIONS 1617A.1.24, 1617A.1.25 AND 1617A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM AREA NOTED BELOW. WHEN BRACING AND ATTACHMENTS AREA BASED ON A PRE-APPROVED INSTALLATION GUIDE (E.G. OSHPD OPM FOR 2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP ☐ MD ☐ PP ☐ E ☐ OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.

MP ☐ MD ☐ PP ☐ E ■ OPTION 2: SHALL COMPLY WITH THE APPLICABLE PRE-APPROVAL (OPM #): MASON WEST 0043-13.

FIRE ALARM SHEET INDEX

SYMBOL LEGEND

SYMBOL	MODEL	MFGR	DESCRIPTION	C.S.F.M. #
FACP	6808	SILENT KNIGHT	FIRE ALARM CONTROL PANEL W/UL LISTED FOR PRE-ACTION RELEASING SYSTEM	7165-0559:0502
ANN	6860	SILENT KNIGHT	REMOTE LCD ANNUNCIATOR PANEL	7165-0559:0502
FAPS	5496	SILENT KNIGHT	FIRE ALARM REMOTE POWER SUPPLY PANEL	7300-0559:0171
	SK-PHOTO-W	SILENT KNIGHT	PHOTOELECTRIC SMOKE DETECTOR	7272-0559:0512
	B300-6	SYSTEM SENSOR	DETECTOR BASE	7300-1653:0109
	SK-HEAT-W	SILENT KNIGHT	ADDRESSABLE HEAT DETECTOR	7270-0559:0511
	B300-6	SYSTEM SENSOR	DETECOTR BASE	7300-1653:0109
	SK-RELAY	SILENT KNIGHT	ADDRESSABLE RELAY MODULE	7300-0559:0155
	SK-MONITOR	SILENT KNIGHT	ADDRESSABLE MONITOR MODULE	7300-0559:0155
	SK-PULL	SILENT KNIGHT	ADDRESSABLE PULL STATION	7150-0559:0161
	PC2WL	SYSTEM SENSOR	CEILING HORN/STROBE (MULTI-CANDELA)	7135-1653:0503
	P2WL	SYSTEM SENSOR	WALL HORN/STROBE (MULTI-CANDELA)	7135-1653:0503
	SCWL	SYSTEM SENSOR	CEILING STROBE (MULTI-CANDELA)	7125-1653:0504
	SWL	SYSTEM SENSOR	WALL STROBE (MULTI-CANDELA)	7125-1653:0504
WP	HWK	SYSTEM SENSOR	WEATHERPROOF HORN (EXTERIOR)	7135-1653:0189
	-------	-------	DUCT SMOKE DETECTORS (PROVIDED BY MECHANICAL CONTRACTOR)	-------
W	-------	--------	WATERFLOW SWITCH (PROVIDED BY SPRINKLER CONTRACTOR)	--------
	SK-MINIMON	SILENT KNIGHT	ADDRESSABLE MONITOR MODULE	7300-0559:0155
T	-------	--------	TAMPER SWITCH (PROVIDED BY SPRINKLER CONTRACTOR)	--------
	SK-MINIMON	SILENT KNIGHT	ADDRESSABLE MONITOR MODULE	7300-0559:0155
FADC	ACE-11	SPACE AGE	FIRE ALARM DOCUMENTS CABINET	7300-0553:0110
	-------	-------	120 VAC SPRINKLER BELL (PROVIDED BY SPRINKLER CONTRACTOR)	--------

WIRE LEGEND

CONDUCTOR DESIGNATION	WIRE IN CONDUIT	CONDUCTOR DESIGNATION	WIRE IN CONDUIT UNDERGROUND / WET LOCATION	CIRCUIT TYPE
Z	2 #16 UNSHIELDED (WEST PENN #D990)	ZU	2 #16 FPL UNSHIELDED (WEST PENN #AQ225)	INITIATING CIRCUIT (SLC)
N	2 #12 THHN STRANDED	NU	2 #12 THWN STRANDED	NOTIFICATION CIRCUIT
P	2 #12 THHN STRANDED	PU	2 #12 THWN STRANDED	POWER CIRCUIT
C	2 #16 UNSHIELDED (WEST PENN #D990)	CU	2 #16 FPL UNSHIELDED (WEST PENN #AQ225)	NETWORK CONTROL

EXAMPLE: NUMBER OF CONDUCTOR PAIRS / CONDUCTOR DESIGNATION — 2N

ABOVE EXAMPLE "2N" MEANS "2 PAIRS OF #12 WIRE"

NOTE:

1. ALL WIRE MODEL NUMBERS ARE WEST PENN. EQUIVALENT BY OTHER MANUFACTURER IS ACCEPTABLE.
2. COLOR CODE ALL FIRE ALARM CONDUCTORS PER DISTRICT STANDARDS. VERIFY COLOR SCHEMES PRIOR TO ORDERING FIRE ALARM CONDUCTORS.
3. ALL WIRING SHALL BE CLASS "B", U.O.N.
4. ALL WIRING SHALL BE IN MINIMUM 3/4" CONDUIT, U.O.N. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SLEEVES, LOCATION AND SIZE OF CONDUITS TO COMPLY WITH CODES AND STANDARDS.

FIRE ALARM SEQUENCE OF OPERATIONS

DEVICE \ ACTION	ACTIVATE ALL ALARM SIGNALS	ACTIVATE REMOTE ANNUNCIATOR	ACTIVATE TROUBLE OR SUPERVISORY SIGNAL	SEND SIGNAL TO UL LISTED CENTRAL STATION	ACTIVATE PRE-CATION SOLENOID VALVE	SHUT DOWN AH-UNIT	UNLOCK EGRESS DOORS / SHUT DOWN A/V SYSTEM
MANUAL PULL STATION	YES	YES	NO	YES	YES	YES	YES
SMOKE DETECTOR	YES	YES	NO	YES	YES	YES	YES
HEAT DETECTOR	YES	YES	NO	YES	YES	YES	YES
DUCT DETECTOR	NO	YES	YES	YES	NO	YES	NO
A/C POWER FAILURE	NO	YES	YES	YES	NO	NO	NO
WIRING FAULTS	NO	YES	YES	YES	NO	NO	NO
TAMPER / PIV	NO	YES	YES	YES	NO	NO	NO
WATERFLOW	YES	YES	NO	YES	YES	YES	YES
PRE-ACTION AIR COMPRESSOR SWITCH	NO	YES	YES	YES	NO	NO	NO

NOTE: PER CMC 606.8 WHEN THE AUTOMATIC ACTIVATION OF A SMOKE DAMPER OR A COMBINATION SMOKE-FIRE DAMPER OCCURS, THE HVAC SYSTEM SERVING SUCH DAMPERS SHALL IMMEDIATELY SHUT DOWN. THE HVAC SYSTEM SHALL NOT BE RESTARTED AGAIN UNITL ALL DAMPERS ARE RESET AND FULLY OPENED.

CENTRAL STATION INFORMATION

MONITORING COMPANY NAME
UL # TBD
STREET
CITY, CA 9XXXX
CUSTOMER ACCT. #: XXXXX
PHONE # 1-800-XXX-XXXX

FIRE ALARM SCOPE OF WORK

TO PROVIDE AND INSTALL A NEW ANALOG ADDRESSABLE, MANUAL/AUTOMATIC, POWER LIMITED 24V DC SUPERVISED FIRE ALARM SYSTEM WITHIN THE NEW LIBRARY BUILDING CONFORMING TO THE REQUIREMENTS OF THE LATEST CFC AND NFPA 72 STANDARDS AS INDICATED ON PLANS.

FIRE SPRINKLER SYSTEM INFORMATION

NEW LIBRARY BUILDING IS FULLY SPRINKLERED.

COMPLETE FIRE ALARM SUBMITTAL

MANUAL/AUTOMATIC FIRE ALARM SYSTEM

LPA
ARCHITECTURE ENGINEERING INTERIORS
LANDSCAPE ARCHITECTURE PLANNING

949-261-1001 Office
949-260-1190 Fax
LPADesignStudios.com
5301 California Avenue,
Suite 100
Irvine, California 92617

REGISTERED PROFESSIONAL ENGINEER — ALDO D'ORAZIO BAXTER — E22255 — 3/31/26 — ELECTRICAL — STATE OF CALIFORNIA

MOORPARK CITY LIBRARY

HIGH STREET

Developed for CITY OF MOORPARK

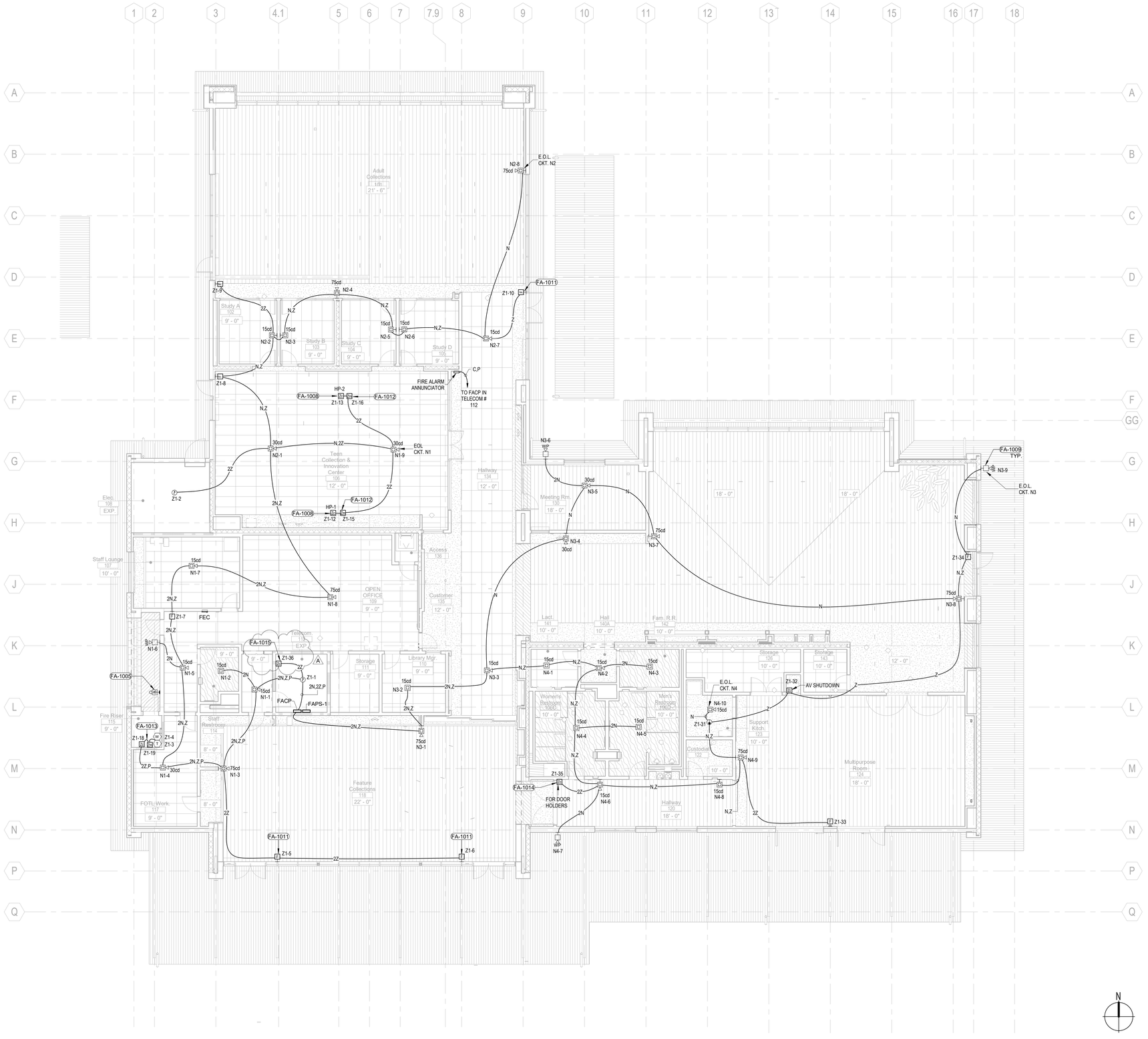
Revision		Date
A	ADDENDUM #1	08/20/2025

Submittal	Date
SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
90% CONSTRUCTION DOCS	02/02/2024
AGENCY SUBMITTAL #1	05/15/2024
AGENCY SUBMITTAL #2	10/31/2024
AGENCY SUBMITTAL #3	03/27/2025
BID DOCUMENTS	05/23/2025

Job Number	30647
Date Published	08/15/2024
Checked By	LPA
Scale	

FIRE ALARM LEAD SHEET

FA0.10



NEW LIBRARY - FIRE ALARM FLOOR PLAN | 1/8" = 1'-0" | 05

KEYNOTES

ITEM	DESCRIPTION
FA-1005	SPRINKLER BELL PROVIDED BY FIRE PROTECTION CONTRACTOR. PROVIDE 120VAC TO ENERGIZE SPRINKLER BELL. CONNECT BELL DIRECTLY TO WATER FLOW SWITCH.
FA-1008	PROVIDE FIRE ALARM RELAY MODULE WITH INTERPOSING RELAY FOR MECHANICAL EQUIPMENT AUTO SHUTDOWN (HVAC UNITS, FIRE SMOKE DAMPERS, HIGH VOLUME LOW SPEED FANS FROM WATERFLOW SIGNAL) VERIFY EXACT LOCATION AND QUANTITY ON MECHANICAL DRAWINGS.
FA-1009	INSTALL EXTERIOR HORNS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO THE PROPER DEVICE INSTALLATION INSTRUCTIONS FOR WEATHERPROOF BACKBOX REQUIREMENT.
FA-1011	PROVIDE STAINLESS STEEL MANUAL PULL STATION TO BE MOUNTED TO A STEEL FRAMED (MULLION) WITHIN 5' OF THE EXIST.
FA-1012	PROVIDE FIRE ALARM MONITOR MODULE TO MONITOR HVAC UNIT DUCT SMOKE DETECTOR, VERIFY EXACT LOCATION AND QUANTITY ON MECHANICAL DRAWINGS.
FA-1013	PROVIDE FIRE ALARM RELAY AND MONITOR MODULES TO RELEASE SOLENOID VALVE AND MONITOR AIR PRESSURE SWITCH, VERIFY EXACT LOCATION ON FIRE PROTECTION DRAWINGS.
FA-1014	PROVIDE FIRE ALARM RELAY MODULE WITH INTERPOSING RELAY TO RELEASE DOOR HOLDERS.
FA-1015	PROVIDE FIRE ALARM RELAY MODULE TO INTEGRATE WITH ACCESS CONTROL SYSTEM TO AUTO-UNLOCK CONTROLLED EGRESS DOORS IN THE EVENT OF FIRE ALARM.

LEGEND

- METAL STUD WALL CONSTRUCTION
- 1 HOUR RATED METAL STUD WALL CONSTRUCTION
- 2 HOUR RATED METAL STUD WALL CONSTRUCTION
- MASONRY WALL CONSTRUCTION

CL-1
2 X 4 SUSPENDED ACOUSTICAL CEILING TILE

OPEN TO STRUCTURE ABOVE

CL-2
ACOUSTICAL CEILING BAFFLES, ARKTURA SOFTGRID TRELLA,

MTL
CUSTOM BENT BREAKMETAL SOFFIT FASCIA.

CL-3
ACOUSTICAL CEILING CLOUD

WD-1
FINISH CARPENTRY - 1" OPEN SPACED 2"x6" STAINED WOOD PLANKING CEILING OVER FURRING WITH 1" THK.

WD-2
EXTERIOR STAINED TONGUE & GROVE CEILING FINISH

GYP-1
FRAMED GYPSUM BOARD CEILING

GYP-2
FRAMED GYPSUM BOARD, MOISTURE RESISTANT, SEMI-GLOSS PAINT (WET LOCATIONS).

GYP-3
FRAMED GYPSUM BOARD, 1" SHAFT LINER OVER CH STUD, SEMI-GLOSS PAINT (WET LOCATIONS).

PLS-1
PLASTER CEILING

GENERAL NOTES

1. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER/ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC. THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW , NOT CLOSER THAN 3 FEET FROM ANY SUPPLY DIFFUSER.
3. FIRE ALARM EVACUATION SIGNAL SHALL BE CLEARLY HEARD AND COMPLY WITH 2022 NFPA 72 18.4.3.1.
4. REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR PRECISE OUTLET LOCATIONS.
5. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED DEVICES.
6. IF SHIELDED WIRE IS USED, THE FOLLOWING MUST BE OBSERVED.
   A. METALLIC CONTINUITY OF THE SHIELD MUST BE MAINTAINED AND INSULATED THROUGHOUT THE ENTIRE LENGTH OF THE CABLE.
   B. THE ENTIRE LENGTH OF THE CABLE MUST HAVE A RESISTANCE GREATER THAN 1 MEGAOHM TO EARTH.
7. ALL PENETRATIONS THROUGH FIRE RATED WALL SHALL BE PROTECTED FROM THE SPREAD OF FIRE WITH AN APPROVED FIRE STOP SYSTEM EQUAL TO OR GREATER THAN THE FIRE RATING OF THE STRUCTURE / SURFACE BEING PENETRATED.
8. A SYSTEM GROUND MUST BE PROVIDED FOR EARTH DETECTION AND LIGHTING PROTECTION DEVICES. THIS CONNECTION SHALL BE MADE TO AN APPROVED DEDICATED EARTH CONNECTION PER CEC, ARTICLE 250.
9. WIRING IN DUCTS, PLENUMS AND OTHER AIR HANDLING SPACES MUST BE INSTALLED IN ACCORDANCE WITH CEC 2022.
10. UNDERGROUND WIRING MUST BE FREE OF ALL WATER.
11. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE RUN IN A DEDICATED FIRE ALARM CONDUIT SYSTEM.

LPA

ARCHITECTURE ENGINEERING INTERIORS
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REGISTERED PROFESSIONAL ENGINEER ALDO DINARDO BARTLETT E22255 3/31/26 ELECTRICAL STATE OF CALIFORNIA

MOORPARK CITY LIBRARY

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Scale	1/8" = 1'-0"

FIRE ALARM FLOOR PLAN

FA2.01

Panel Location: MOORPARK CITY LIBRARY - TELECOM ROOM #112

Panel: FACP

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
6808 CONTROL PANEL	1	X	0.190	=	0.190
6860 LCD Remote Annunciator	1	X	0.025	=	0.025
5496 Power Supply Expander	1	X	0.010	=	0.010
Pull Station	8	X	0.004	=	0.032
Smoke Detector	3	X	0.002	=	0.006
Heat Detector	1	X	0.002	=	0.002
Control Relay Module	5	X	0.0025	=	0.0125
Monitor Module	7	X	0.004	=	0.028
			STANDBY LOAD	=	**0.3055**

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
6808 CONTROL PANEL	1	X	0.250	=	0.250
6860 LCD Remote Annunciator	1	X	0.050	=	0.050
5496 Power Supply Expander	1	X	0.010	=	0.010
Pull Station	8	X	0.004	=	0.032
Smoke Detector	3	X	0.0045	=	0.0135
Heat Detector	1	X	0.0045	=	0.0045
Control Relay Module	5	X	0.0025	=	0.0125
Monitor Module	7	X	0.004	=	0.028
			ALARM LOAD	=	**0.401**

Battery Amp Hour Calculation

Standby Load Current (Amps)		Required Standby Time (Typically 24 or 60 *Hours*)		
0.3055	X	24	=	7.332 AH
Alarm Load Current (Amps)		Required Alarm Time (Typically 5 or 10 *Minutes*)		
0.4005	X	15	=	0.10 AH
Sub Total Standby / Alarm Amp Hours				7.43 AH
Multiply by the Derating Factor			X	1.2
Total Ampere Hours Required			**=**	**9 AH**

(2)-12AH Batteries Required

Panel Location: Moorpark City Library - Telecom Room 112

Panel Name: POWER SUPPLY PANEL - FAPS-1

Regulated Load in Standby

Device Type	Number of Circuits/Devices		Current (Amps)		Total Current (Amps)
5496 Main Circuit Board	1	X	0.040	=	0.040
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base)	0	X	0.0003	=	0
Notification Appliance Circuit					
City Library Bldg. NAC# N1	1	X	0.0004	=	0.0004
City Library Bldg. NAC# N2	1	X	0.0004	=	0.0004
City Library Bldg. NAC# N3	1	X	0.0004	=	0.0004
City Library Bldg. NAC# N4	1	X	0.0004	=	0.0004
			STANDBY LOAD	=	**0.0416**

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
5496 Main Circuit Board	1	X	0.160	=	0.160
Power Supervision Relay	0	X	0.025	=	0
Auxiliary Device (Sounder Base)	0	X	0.065	=	0
Notification Appliance Circuit					
City Library Bldg. NAC# N1	1	X	0.681	=	0.681
City Library Bldg. NAC# N2	1	X	0.542	=	0.542
City Library Bldg. NAC# N3	1	X	0.758	=	0.758
City Library Bldg. NAC# N4	1	X	0.573	=	0.573
			ALARM LOAD	=	**2.714**

Battery Amp Hour Calculation

Standby Load Current (Amps)		Required Standby Time (Typically 24 or 60 *Hours*)		
0.0416	X	24	=	0.9984 AH
Alarm Load Current (Amps)		Required Alarm Time (Typically 5 or 10 *Minutes*)		
2.714	X	15	=	0.68 AH
Sub Total Standby / Alarm Amp Hours				1.68 AH
Multiply by the Derating Factor			X	1.2
Total Ampere Hours Required			**=**	**3 AH**

(2)-7AH Batteries Required

Poject Name: Moorpark City Library
Panel Location: Telecom Room 112

Panel: FAPS-1

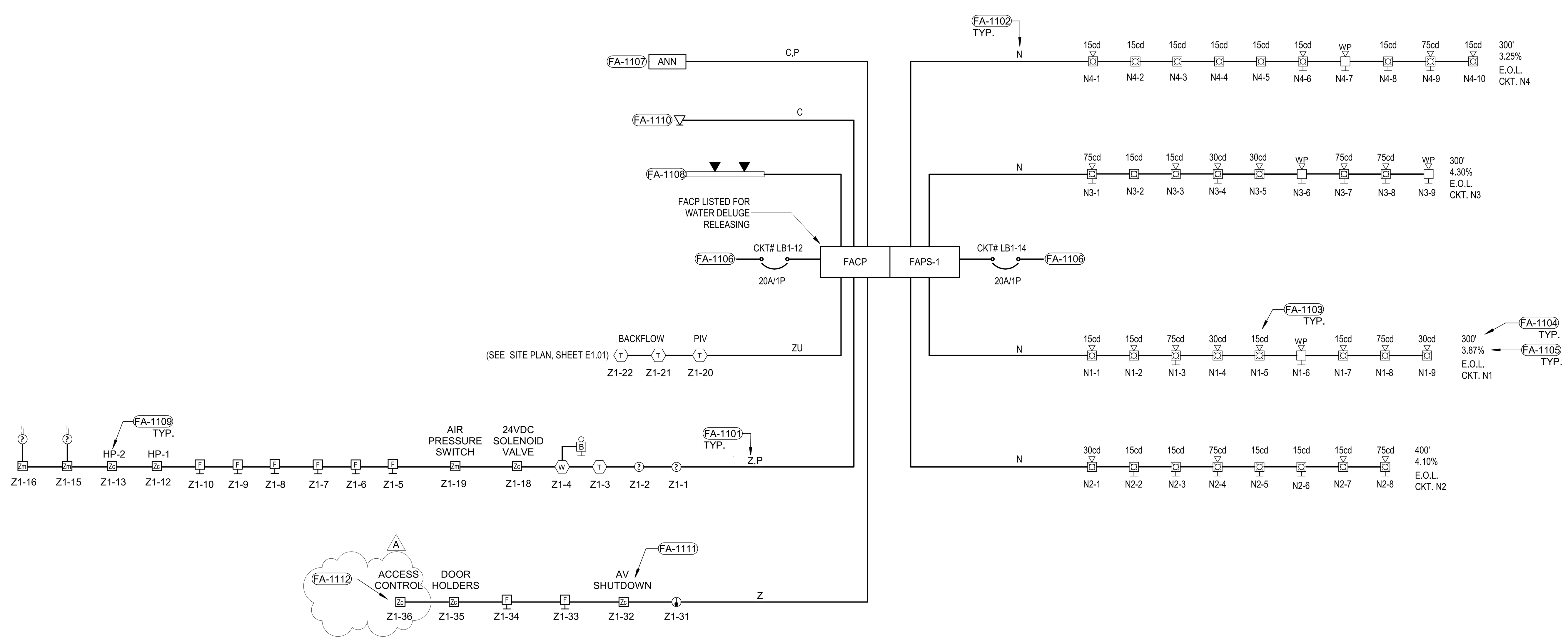
NAC SCHEDULE / VOLTAGE DROP CALCULATION
10 % MAXIMUM VOLTAGE DROP
CIRCUIT OUTPUT VOLTAGE = 20.4 (FOR CALCULATIONS)

CIRCUIT	DESCRIPTION	ESTIMATED CIRCUIT LENGTH	Strobe 15cd 0.043	Strobe 30cd 0.063	Strobe 75cd 0.107	Horn Strobe 15cd 0.054	Horn Strobe 30cd 0.074	Horn Strobe 75cd 0.121	Horn Strobe 110cd 0.162	Exterior Strobe WP 0.077	Exterior Horn WP 0.075	TOTAL CKT. LOAD (AMPS)	WIRE GAUGE (18, 16, 14, 12)	ACTUAL VOLTAGE DROP %	ACTUAL VOLTAGE DROP (VOLTS)	TOTAL CIRCUIT RESISTANCE	MAXIMUM ALLOWABLE CKT. LENGTH
#N1	CITY LIBRARY HORN/STROBE CKT.	300 ft.				4	2	2			1	0.681	12	3.87%	0.789	1.2 Ohms	776 ft.
#N2	CITY LIBRARY HORN/STROBE CKT.	400 ft.	4			1	1	2				0.542	12	4.10%	0.837	1.5 Ohms	975 ft.
#N3	CITY LIBRARY HORN/STROBE CKT.	300 ft.	1			1	2	3			2	0.758	12	4.30%	0.878	1.2 Ohms	697 ft.
#N4	CITY LIBRARY HORN/STROBE CKT.	300 ft.	5			3		1			1	0.573	12	3.25%	0.664	1.2 Ohms	922 ft.
	Appliance Summary		10	0	0	9	5	8	0	0	4						

(APPLIANCE QUANTITIES/CURRENT DRAW: Strobe through Exterior Horn WP columns; VOLTAGE DROP TOTALS: TOTAL CKT. LOAD through MAXIMUM ALLOWABLE CKT. LENGTH columns)

METHOD USED TO CALCULATE PERCENT OF VOLTAGE DROP:
[(CIRCUIT LENGTH IN FEET X 2) (AMPS X OHMS/FOOT)] X 100
20.4 VOLTS

BATTERY AND VOLTAGE DROP CALCULATIONS — N.T.S — 07



FIRE ALARM RISER DIAGRAM — N.T.S — 05

KEYNOTES

ITEM	DESCRIPTION
FA-1101	ZONEABLE/ADDRESSIBLE CIRCUIT. PROVIDE 2#16 TWISTED PAIR PER CIRCUIT, TYPICAL.
FA-1102	NOTIFICATION CIRCUIT, PROVIDE 2#12 PER CIRCUIT, TYPICAL.
FA-1103	CANDELA RATING OF STROBE DEVICES.
FA-1104	DISTANCE TO END OF LINE (EOL) DEVICE.
FA-1105	WORST-CASE VOLTAGE DROP PERCENTAGE.
FA-1106	PROVIDE 3/4"C. WITH 2#12 GRD. DEDICATED CIRCUIT FOR FIRE ALARM EQUIPMENT. THIS CIRCUIT SHALL BE ENERGIZED FROM THE COMMON USE AREA PANEL AND SHALL HAVE NO OTHER OUTLETS. PROVIDE 20 AMP, 1-POLE CIRCUIT BREAKER WITH APPROVED LOCK-ON DEVICE TO BLOCK THE HANDLE IN "ON" POSITION. PROVIDE RED INDICATOR IN PANELBOARD AND LABEL "FIRE ALARM CIRCUIT CONTROL" AS REQUIRED. CIRCUIT ID TO BE LABELED AT FIRE ALARM PANEL/EXTENDER. MATCH A.I.C. RATING OF DEVICES CURRENTLY USED. PROVIDE ALL REQUIRED MOUNTING HARDWARE.
FA-1107	FIRE ALARM ANNUNCIATOR PANEL. VERIFY WITH DISTRICT REPRESENTATIVE, A.H.J. AND ARCHITECT FOR EXACT LOCATION.
FA-1108	PROVIDE (2) DEDICATED PHONE LINES (LAND LINES) FOR FIRE ALARM SYSTEM MONITORING. CONTRACTOR TO SUPPLY UDACT (UNIVERSAL DIGITAL ALARM COMMUNICATOR TRANSMITTER) WHEN NOT SUPPLIED WITH CONTROL PANEL.
FA-1109	PROVIDE CONNECTION FOR ALL MECHANICAL A/C UNIT CONTROL AND FIRE/SMOKE DAMPERS. VERIFY LOCATION AND QUANTITY ON MECHANICAL DRAWINGS.
FA-1110	DATA DROP AND CONNECTION TO NEAREST IDF/MDF
FA-1111	PROVIDE FIRE ALARM RELAY MODULE WITH INTERPOSING RELAY FOR A/V EQUIPMENT SHUTDOWN.
FA-1112	PROVIDE FIRE ALARM RELAY MODULE WITH INTERPOSING RELAY FOR ACCESS CONTROL SYSTEM TO AUTO-UNLOCK EGRESS DOORS.

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GENERAL NOTES

1. NOTIFICATION DEVICES IN ROOMS CONTAINING (2) OR MORE AUDIBLE AND/OR (2) OR MORE VISUAL DEVICES SHALL BE SYNCHRONIZED PER N.F.P.A. 72, 2022 EDITION (WITH CALIFORNIA AMENDMENTS). THIS SHALL INCLUDE AUDIBLE AND VISUAL DEVICES LOCATED IN ADJACENT/ADJOINING SPACES.
2. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER/ENGINEER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC. THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
3. DETECTORS SHALL NOT BE LOCATED IN A DIRECT AIR-FLOW , NOT CLOSER THAN 3 FEET FROM ANY SUPPLY DIFFUSER.
4. FIRE ALARM SYSTEM AUDIBILITY SHALL NOT BE LESS THAN 15db ABOVE AMBIENT NOISE LEVELS AND MAINTAINING A MINIMUM OF 75db THROUGH OUT ALL AREAS OF ALARM.
5. FIRE ALARM SYSTEM AUDIBILITY SIGNAL SHALL MEET EMERGENCY EVACUATION SIGNAL AS DEFINED PER ANSI S3.41 (TEMPORAL PATTERN).
6. CONTROL PANELS, REMOTE ANNUNCIATORS SHALL BE INSTALLED 48" TO TOP OF DEVICE.

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MOORPARK CITY LIBRARY
HIGH STREET
Developed for
CITY OF MOORPARK

Revision		Date
A	ADDENDUM #1	06/20/2025

Submittal	Date
SCHEMATIC DESIGN	07/18/2022
DESIGN DEVELOPMENT	10/27/2022
50% CONSTRUCTION DOCS	12/22/2023
80% CONSTRUCTION DOCS	02/02/2024
AGENGY SUBMITTAL #1	08/15/2024
AGENGY SUBMITTAL #2	10/31/2024
AGENCY SUBMITTAL #3	03/27/2025
BID DOCUMENTS	05/23/2025

Job Number	30647
Date Published	08/15/2024
Checked By	LPA
Scale	

FIRE ALARM RISER DIAGRAMS AND CALCULATIONS

FA5.00