

## **ADDENDUM NO. 1**

### **STADIUM LIGHTING**

LITTLE JOB #612-12353-01

DSA: A# 03-120336 File #56-H4

#### **Adolfo Camarillo High School**

4660 Mission Oaks Blvd.

Camarillo, CA 93012

August 07, 2020

**LITTLE**

1300 Dove Street, Suite 100  
Newport Beach, CA 92660



Architect- Jay R. Tittle, C- 12955

## **1. PART 1 - GENERAL**

- 1.1. The following revisions and/or clarifications shall be made to the Bidding Requirements and Contract Documents. Revise and amend the Documents for the above named project in accordance with this Addendum. The bid shall reflect these addendum changes and each bidder shall make reference in their bid to this addendum.
- 1.2. All Bidding Requirements and Contract Documents shall apply to this addendum as originally indicated in the applicable portions of the contract documents, unless otherwise modified by this addendum.
  - 1.2.1. No Previous Addendum issued.
- 1.3. GENERAL CLARIFICATIONS
  - 1.3.1. None.

## **2. PART 2 - PROJECT MANUAL**

- 2.1. CHANGES TO PROJECT MANUAL SEAL PAGE
  - 2.1.1. Division 00 01 07, SEAL PAGE (New Section)



**2.1.1.1.** Add new Section 00 01 07 (attached).

**2.2. CHANGES TO PROJECT MANUAL TABLE OF CONTENTS**

**2.2.1.** Division 00 01 10, TABLE OF CONTENTS (New Section)

**2.2.1.1.** Add new Section 00 01 10 (attached).

**2.3. SPECIFICATIONS ISSUED**

**2.3.1.** Section 26 56 68, Exterior Athletic Lighting – Add new Section 26 56 68 (attached).

**2.3.2.** Section 27 41 16, Integrated Audio Systems and Equipment - Add new Section 27 41 16 (attached).

**3. PART 3 - DRAWINGS**

**3.1. GENERAL DRAWINGS ISSUED**

**3.1.1.** Narrative changes to General Drawings are issued as follows:

**3.1.1.1.** Drawing G0.1.1 - Modify as follows:

**3.1.1.1.1.** Scope of Work:

**3.1.1.1.1.1.** Modify Scope of work item #1 to read as:  
“RETROFIT (6) EXISTING STADIUM LIGHTS  
(MUSCO LIGHT FIXTURES ONLY &  
RELATED COMPONENTS)”

**3.1.1.1.1.2.** Add Scope of work item #2 to read as:  
“CONSTRUCTION OF (2) NEW MUSCO  
STADIUM LIGHT POLES.”

**3.1.1.1.1.3.** Add Scope of work item #3 to read as: “NEW  
STADIUM SOUND SYSTEM.”

**3.1.1.1.2.** Sheet Index – Musco Stadium Lighting; Add the following  
sheets:

**3.1.1.1.2.1.** MT2 NEW FOUNDATION DETAIL

**3.1.1.1.2.2.** MS2 POLE DETAIL

**3.1.1.1.2.3.** MD1 ATTACHMENT DETAILS

**3.1.1.1.2.4.** MD2 ATTACHMENT DETAILS

**3.1.1.1.2.5.** MD3 ATTACHMENT DETAILS

**3.1.1.1.3.** Sheet Index – Audio Visual; Add the following sheets:

**3.1.1.1.3.1.** AV0.1 GENERAL NOTES AND SHEET INDEX



<b>3.1.1.1.3.2.</b>	AV0.2 ABBREVIATIONS NOTES AND SYMBOLS
<b>3.1.1.1.3.3.</b>	AV1.1 ENLARGED AV SITE PLAN
<b>3.1.1.1.3.4.</b>	AV1.2 AV SPEAKER COVERAGE PLAN
<b>3.1.1.1.3.5.</b>	AV1.5 AV ENLARGED LAYOUTS
<b>3.1.1.1.3.6.</b>	AV2.1 AV ENLARGED PLANS
<b>3.1.1.1.3.7.</b>	AV2.2 AV ENLARGED PLANS
<b>3.1.1.1.3.8.</b>	AV3.1 AV RISER DIAGRAM
<b>3.1.1.1.3.9.</b>	AV4.0 WIRING SCHEME AND SYMBOL KEY
<b>3.1.1.1.3.10.</b>	AV4.1 AV ONELINE DIAGRAM
<b>3.1.1.1.3.11.</b>	AV5.0 AV TYPICAL SEISMIC AND GROUNDING DETAILS
<b>3.1.1.1.3.12.</b>	AV6.1 AV DETAILS
<b>3.1.1.1.3.13.</b>	AV6.2 AV DETAILS
<b>3.1.1.1.3.14.</b>	AV6.3 AV DETAILS

## **3.2. ARCHITECTURAL DRAWINGS ISSUED**

**3.2.1.** The following Addendum ("AD") Drawings, marked Delta 1, are issued:

**3.2.1.1.** Add Drawing AD1-A1: issue Drawing AD1-A1 (New Sheet).

**3.2.1.2.** Drawing A1.1: Revise currently issued Drawing per AD1-A2.

## **3.3. MUSCO STADIUM LIGHTING DRAWINGS ISSUED**

**3.3.1.** The following Addendum ("AD") Drawings, marked Delta 1, are issued:

**3.3.1.1.** Drawing MT1: Replace with Drawing AD1-MT1.

**3.3.1.2.** Drawing (MT2) AD1-MT2: New Sheet.

**3.3.1.3.** Drawing MS1: Replace with Drawing AD1-MS1.

**3.3.1.4.** Drawing (MS2) AD1-MS2: New Sheet.

**3.3.1.5.** Drawing (MD1) AD1-MD1: New Sheet.

**3.3.1.6.** Drawing (MD2) AD1-MD2: New Sheet.

**3.3.1.7.** Drawing (MD3) AD1-MD3: New Sheet.



**3.4. ELECTRICAL DRAWINGS ISSUED**

**3.4.1.** The following Addendum ("AD") Drawings, marked Delta 1, are issued:

**3.4.1.1.** Drawing E-200: Revise currently issued Drawing per AD1-E1.

**3.5. AUDIO VISUAL DRAWINGS ISSUED**

**3.5.1.** The following Addendum ("AD") Drawings, marked Delta 1, are issued:

**3.5.1.1.** Drawing (AV0.1) AD1-AV1: New Sheet.

**3.5.1.2.** Drawing (AV0.2) AD1-AV2: New Sheet.

**3.5.1.3.** Drawing (AV1.1) AD1-AV3: New Sheet.

**3.5.1.4.** Drawing (AV1.2) AD1-AV4: New Sheet.

**3.5.1.5.** Drawing (AV1.5) AD1-AV5: New Sheet.

**3.5.1.6.** Drawing (AV2.1) AD1-AV6: New Sheet.

**3.5.1.7.** Drawing (AV2.2) AD1-AV7: New Sheet.

**3.5.1.8.** Drawing (AV3.1) AD1-AV8: New Sheet.

**3.5.1.9.** Drawing (AV4.0) AD1-AV9: New Sheet.

**3.5.1.10.** Drawing (AV4.1) AD1-AV10: New Sheet.

**3.5.1.11.** Drawing (AV5.0) AD1-AV11: New Sheet.

**3.5.1.12.** Drawing (AV6.1) AD1-AV12: New Sheet.

**3.5.1.13.** Drawing (AV6.2) AD1-AV13: New Sheet.

**3.5.1.14.** Drawing (AV6.3) AD1-AV14: New Sheet

**END OF ADDENDUM #1**



**Enclosures:**

- I) New Project Manual Documents Issued:
  - a) Section 00 01 07
  - b) Section 00 01 10
  - c) Section 26 56 68
  - d) Section 27 41 16
- II) New full-size Drawings Issued:
  - a) Drawings AD1-MT1 and AD1-MT2, Delta 1.
  - b) Drawings AD1-MS1 and AD1-MS2, Delta 1.
  - c) Drawings AD1-MD1 through AD1-MD3, Delta 1.
  - d) Drawings AD1-AV1 through AD1-AV14, Delta 1.
- III) New 11 x 17 Drawings Issued:
  - a) Drawings AD1-A1 and AD1-A2, Delta 1.
  - b) Drawings AD1-E1, Delta 1.



# **Adolfo Camarillo High School Stadium Lighting**

Oxnard Union High School District

Addendum No. 1  
August 2020

DSA 03-120336  
Project No.:612-12353-01





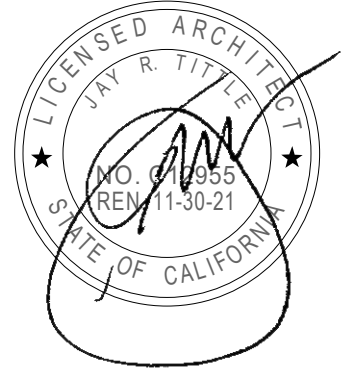
**SECTION 00 01 07**  
**SEALS PAGE**

**ARCHITECT**

**LITTLE DIVERSIFIED ARCHITECTURAL CONSULTING**

1300 Dove Street, Suite 100, Newport Beach CA 92660

Architect of Record (AOR) Jay R. Tittle C-12955



**ELECTRICAL ENGINEER**

**ENGINEOUS GROUP, INC.**

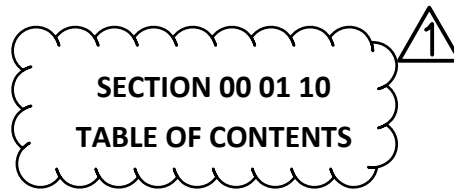
751 N. Fair Oaks, Suite 201, Pasadena CA 91103

Electrical Engineer of Record (EEOR) Artin Oshian E-21460



**END OF SEALS PAGE**





**DIVISION 00 --**

00 01 07 - Seals Page

00 01 10 - Table of Contents

**SPECIFICATIONS**

**DIVISION 26 -- ELECTRICAL**

26 56 68 - Exterior Athletic Lighting

27 41 16 - Integrated Audio Systems and Equipment

**END OF SECTION**



## **SECTION 26 56 68 – EXTERIOR ATHLETIC LIGHTING**

### **Lighting System with LED Light Source**

#### **PART 1 – GENERAL**

##### **1.1 SUMMARY**

- A. Work covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.
- B. The purpose of these specifications is to define the lighting system performance and design standards for Adolfo Camarillo High School using an LED Lighting source. The manufacturer / contractor shall supply lighting equipment to meet or exceed the standards set forth in these specifications.
- C. The sports lighting will be for the following venues:
  - 1. Football
  - 2. Track
- D. The primary goals of this sports lighting project are:
  - 1. **Guaranteed Light Levels:** Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore, light levels are guaranteed to not drop below specified target values for a period of 10 years.
  - 2. **Environmental Light Control:** It is the primary goal of this project to minimize spill light to adjoining properties and glare to the players, spectators and neighbors.
  - 3. **Cost of Ownership:** In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated for the duration of the warranty.
  - 4. **Control and Monitoring:** To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Fields should be proactively monitored to detect luminaire outages over a 10-year life cycle. All communication and monitoring costs for 10-year period shall be included in the bid.

##### **1.2 LIGHTING PERFORMANCE**

- A. **Illumination Levels and Design Factors:** Playing surfaces shall be lit to an average target illumination level and uniformity as specified in the chart below. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Appropriate light loss factors shall be applied and submitted for the basis of design. Average illumination level shall be measured in accordance with the IESNA LM-5-04 (IESNA Guide for Photometric Measurements of Area and Sports Lighting Installations). Illumination levels shall not to drop below desired target values in accordance to IES RP-6-15, Page 2, Maintained Average Illuminance and shall be guaranteed for the full warranty period.



Area of Lighting	Average Target Illumination Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football	55 fc	3:1	72	30' x 30'
Track	21 fc	36:1	45	30' x 30'

- B. Color: The lighting system shall have a minimum color temperature of 5700K and a CRI of 75.
- C. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, minimum mounting heights shall be as described below. Higher mounting heights may be required based on photometric report and ability to ensure the top of the field angle is a minimum of 10 degrees below horizontal.

# of Poles	Pole Designation	Pole Height
6 Existing	F1, F4-F8	70'
2 New	F2-F3	70'

### 1.3 **ENVIRONMENTAL LIGHT CONTROL**

- A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.
- B. Spill Light and Glare Control: To minimize impact on adjacent properties, spill light and candela values must not exceed the following levels taken at 3 feet above grade.

	Maximum
Property Line Horizontal Footcandles	5 fc
Property Line Max Vertical Footcandles	5 fc
Property Line Max Candela	1,000 cd

- C. Spill Scans: Spill scans must be submitted indicating the amount of horizontal and vertical footcandles along the specified lines. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights. Illumination level shall be measured in accordance with the IESNA LM-5-04 after 1 hour warm up.
- D. The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the capability of achieving the specified performance. Reports shall be certified by a qualified testing laboratory with a minimum of five years experience or by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

### 1.4 **Cost of Ownership**



- A. Manufacturer shall submit a 10 year Cost of Ownership summary that includes energy consumption, anticipated maintenance costs, and control costs. All costs associated with faulty luminaire replacement - equipment rentals, removal and installation labor, and shipping - are to be included in the maintenance costs.

## **PART 2 – PRODUCT**

### **2.2 SPORTS LIGHTING SYSTEM CONSTRUCTION**

- A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, drivers and other enclosures shall be factory assembled, aimed, wired and tested.
- B. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.
- C. System Description: Lighting system shall consist of the following:
  - 1. Galvanized steel poles and cross-arm assembly.
  - 2. Non-approved pole technology:
    - a. Direct bury steel poles which utilize the extended portion of the steel shaft for their foundation will not be accepted due to potential for internal and external corrosive reaction to the soils and long term performance concerns.
  - 3. Lighting systems shall use concrete foundations. See Section 2.4 for details.
    - a. For a foundation using a pre-stressed concrete base embedded in concrete backfill the concrete shall be air-entrained and have a minimum compressive design strength at 28 days of 3,000 PSI. 3,000 PSI concrete specified for early pole erection, actual required minimum allowable concrete strength is 1,000 PSI. All piers and concrete backfill must bear on and against firm undisturbed soil.
    - b. For anchor bolt foundations or foundations using a pre-stressed concrete base in a suspended pier or re-inforced pier design pole erection may occur after 7 days. Or after a concrete sample from the same batch achieves a certain strength.
  - 4. Manufacturer will supply all drivers and supporting electrical equipment
    - a. Remote drivers and supporting electrical equipment shall be mounted approximately 10 feet above grade in aluminum enclosures. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure. Integral drivers are not allowed. If allowed, integral drivers are mounted at the



top of the pole will require a pole mounted enclosure approximately 10 feet above grade. The enclosure shall include a disconnect per circuit, individual luminaire fusing, and surge protection. The pole shall include steps, cables, and platforms for luminaire maintenance, if owner responsible for removal of faulty luminaires.

- b. Manufacturer shall provide surge protection at the pole equal to or greater than 40 kA for each line to ground (Common Mode) as recommended by IEEE C62.41.2\_2002.
- 5. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.
- 6. All luminaires, visors, and cross-arm assemblies shall withstand 150 mi/h winds and maintain luminaire aiming alignment.
- 7. Control cabinet to provide remote on-off control, and monitoring of the lighting system. See Section 2.3 for further details.
- 8. Contactor cabinet to provide on-off control.
- 9. Manufacturer shall provide lightning grounding as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.
  - a. Integrated grounding via concrete encased electrode grounding system.
  - b. If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780. The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.
- D. Safety: All system components shall be UL listed for the appropriate application.

## **2.2 ELECTRICAL**

- A. Electric Power Requirements for the Sports Lighting Equipment:
  - 1. Electric power: 480 Volt, 3 Phase
  - 2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.
- B. Energy Consumption: The kW consumption for the field lighting system shall be 58.48 kW.

## **2.3 CONTROL**

- A. Instant On/Off Capabilities: System shall provide for instant on/off of luminaires.
- B. Lighting contactor cabinet(s) constructed of NEMA Type 4 aluminum, designed for easy installation with contactors, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.
- C. Dimming: System shall provide for 3-stage dimming (high-medium-low). Dimming will be set via



scheduling options (Website, app, phone, fax, email).

- D. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute "early off" commands by phone. Scheduling tool shall be capable of setting curfew limits.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

- E. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The controller shall determine switch position (manual or auto) and contactor status (open or closed).
- F. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of luminaire outages, control operation and service. Mobile application will be provided suitable for IOS, Android and Blackberry devices.

Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.

1. Cumulative hours: shall be tracked to show the total hours used by the facility
2. Report hours saved by using early off and push buttons by users.

- G. Communication Costs: Manufacturer shall include communication costs for operating the control and monitoring system for a period of 10 years.
- H. Communication with luminaire drivers: Control system shall interface with drivers in electrical components enclosures by means of powerline communication.

## **2.4 STRUCTURAL PARAMETERS**

- A. Wind Loads: Wind loads shall be based on the 2019 California Building Code. Wind loads to be calculated using ASCE 7-10, a design wind speed of 110, exposure category C and wind importance factor of 1.0.
- B. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to 2009 AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (LTS-5).
- C. Foundation Design: The foundation design shall be based on soil parameters as outlined in the geotechnical report produced by Earth Systems Pacific on Aug. 28, 2019.
- C. Foundation Drawings: Project specific foundation drawings stamped by a registered engineer in the state where the project is located are required. The foundation drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole. These drawings



must be submitted at time of bid to allow for accurate pricing.

### **PART 3 – EXECUTION**

#### **3.1 SOIL QUALITY CONTROL**

- A. It shall be the Contractor's responsibility to notify the Owner if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner's approval / payment for additional costs associated with:
  - 1. Providing engineered foundation embedment design by a registered engineer in the State of California for soils other than specified soil conditions;
  - 2. Additional materials required to achieve alternate foundation;
  - 3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

#### **3.2 DELIVERY TIMING**

- A. Delivery Timing Equipment On-Site: The equipment must be on-site 6-8 weeks (up to 12 weeks if seam-weld inspections required) from receipt of approved submittals and receipt of complete order information.

#### **3.3 FIELD QUALITY CONTROL**

- A. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA LM-5-04.
- B. Field Light Level Accountability
  - 1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period of 10 years. These levels will be specifically stated as "guaranteed" on the illumination summary provided by the manufacturer.
  - 2. The contractor/manufacturer shall be responsible for conducting initial light level testing and an additional inspection of the system, in the presence of the owner, one year from the date of commissioning of the lighting.
  - 3. The contractor/manufacturer will be held responsible for any and all changes needed to bring these fields back to compliance for light levels and uniformities. Contractor/Manufacturer will be held responsible for any damage to the fields during these repairs.
- C. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles and uniformity ratios are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be required to make adjustments to meet specifications and satisfy Owner.

#### **3.4 WARRANTY AND GUARANTEE**

- A. 10-Year Warranty: Each manufacturer shall supply a signed warranty covering the entire system for 10 years from the date of shipment. Warranty shall guarantee specified light levels. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty does not cover weather conditions events such as lightning or hail damage, improper installation, vandalism or abuse, unauthorized repairs or alterations, or product made by



other manufacturers.

- B. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and luminaire outage for 10 years from the date of equipment shipment. Parts and labor shall be covered such that individual luminaire outages will be repaired when the usage of any field is materially impacted. Manufacturer is responsible for removal and replacement of failed luminaires, including all parts, labor, shipping, and equipment rental associated with maintenance. Owner agrees to check fuses in the event of a luminaire outage.

#### **PART 4 – DESIGN APPROVAL**

##### **4.0 PRE-BID SUBMITTAL REQUIREMENTS (Non-Musco)**

- A. Design Approval: The owner / engineer will review pre-bid submittals per section 4.0.B from all the manufacturers to ensure compliance to the specification 10 days prior to bid. If the design meets the design requirements of the specifications, a letter and/or addendum will be issued to the manufacturer indicating approval for the specific design submitted.
- B. Approved Product: Musco's Light-Structure System™ with TLC for LED™ is the approved product. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid. Special manufacturing to meet the standards of this specification may be required. An addendum will be issued prior to bid listing any other approved lighting manufacturers and designs.
- C. All listed manufacturers not pre-approved shall submit the information at the end of this section at least 10 days prior to bid. An addendum will be issued prior to bid; listing approved lighting manufacturers and the design method to be used.
- D. Bidders are required to bid only products that have been approved by this specification or addendum by the owner or owner's representative. Bids received that do not utilize an approved system/design, will be rejected.



**REQUIRED SUBMITTAL INFORMATION FOR ALL MANUFACTURERS (NOT PRE-APPROVED) 10 DAYS PRIOR TO  
BID**

*All items listed below are mandatory, shall comply with the specification and be submitted according to pre-bid submittal requirements. Complete the Yes/No column to indicate compliance (Y) or noncompliance (N) for each item. **Submit checklist below with submittal.***

<b>Yes / No</b>	<b>Tab</b>	<b>Item</b>	<b>Description</b>
	<b>A</b>	Letter/ Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
	<b>B</b>	Equipment Layout	Drawing(s) showing field layouts with pole locations
	<b>C</b>	On Field Lighting Design	Lighting design drawing(s) showing: <ul style="list-style-type: none"> <li>a. Field Name, date, file number, prepared by</li> <li>b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x &amp; y), Illuminance levels at grid spacing specified</li> <li>c. Pole height, number of fixtures per pole, horizontal and vertical aiming angles, as well as luminaire information including wattage, lumens and optics</li> <li>d. Height of light test meter above field surface.</li> <li>e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance (CV), coefficient of utilization (CU) uniformity gradient; number of luminaires, total kilowatts, average tilt factor; light loss factor.</li> </ul>
	<b>D</b>	Off Field Lighting Design	Lighting design drawing showing initial spill light levels along the boundary line (defined on bid drawings) in footcandles. Lighting design showing glare along the boundary line in candela. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights.
	<b>E</b>	Photometric Report	Provide first page of photometric report for all luminaire types being proposed showing candela tabulations as defined by IESNA Publication LM-35-02. Photometric data shall be certified by laboratory with current National Voluntary Laboratory Accreditation Program or an independent testing facility with over 5 years experience.
	<b>F</b>	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the owner. Light levels must be guaranteed to not fall below target levels for warranty period.
	<b>G</b>	Structural Calculations	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of California, if required by owner.
	<b>H</b>	Control & Monitoring System	Manufacturer of the control and monitoring system shall provide written definition and schematics for automated control system. They will also provide ten (10) references of customers currently using proposed system in the state of California.



	<b>I</b>	Electrical Distribution Plans	Manufacturer bidding an alternate product must include a revised electrical distribution plan including changes to service entrance, panels and wire sizing, signed by a licensed Electrical Engineer in the state of California.
	<b>J</b>	Warranty	Provide written warranty information including all terms and conditions. Provide ten (10) references of customers currently under specified warranty in the state of California.
	<b>K</b>	Project References	Manufacturer to provide a list of ten (10) projects where the technology and specific fixture proposed for this project has been installed in the state of California. Reference list will include project name, project city, installation date, and if requested, contact name and contact phone number.
	<b>L</b>	Product Information	Complete bill of material and current brochures/cut sheets for all product being provided.
	<b>M</b>	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
	<b>N</b>	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications. If in full compliance, tab may be omitted.
	<b>O</b>	Cost of Ownership	Document cost of ownership as defined in the specification. Identify energy costs for operating the luminaires. Maintenance cost for the system must be included. All costs should be based on 10 Years

The information supplied herein shall be used for the purpose of complying with the specifications for Adolfo Camarillo High School. By signing below I agree that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting specifications and not listed in the Non-Compliance section.

**Manufacturer:** \_\_\_\_\_ **Signature:** \_\_\_\_\_

**Contact Name:** \_\_\_\_\_ **Date:** \_\_\_\_/\_\_\_\_/\_\_\_\_

**Contractor:** \_\_\_\_\_ **Signature:** \_\_\_\_\_



1

**SECTION 27 41 16**  
**INTEGRATED AUDIO SYSTEMS AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 Summary**

- A. Provisions of Division 1 apply to this section.
- B. Section Includes
  - 1. Provide all labor, materials, transportation and equipment to complete the furnishing, installation, assembly, set up, and testing of the Audio and Control Systems work indicated on the drawings and specified herein. Notwithstanding any detailed information in this Section, provide complete, working systems. General design intent for this project is shown on the drawings and described in the specification.
  - 2. All equipment requiring coordination with other trades must be tested and verified for proper operation. Contractor is fully responsible for the coordination and must resolve all conflicts with AV equipment that connect or interact with other systems.
  - 3. Design, engineer and provide complete means of support, suspension, attachment, fastening, bracing, and seismic restraints (hereinafter "support") of the Work of this Section, including future installed equipment, in accordance with local building codes and regulations. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction. Contractor shall obtain the services of an engineer licensed to perform this work within the state or jurisdiction it is to be performed.
  - 4. The Contractor shall include all costs associated with structural engineering required by code for work in this section.
  - 5. Use skilled mechanics that can return surfaces to the appearance of new work when modifying millwork.
  - 6. Conduit and common back boxes including four square, pull boxes, junction boxes, etc. are supplied and installed by Division 26 Electrical Contractor. Connection panels that install in these boxes are supplied by AV Contractor.
  - 7. Provide all cable and wire associated with this specification section and related documents.
  - 8. All systems shall be completely installed with all the necessary interconnection, power supplies, patch cords, snakes, portable equipment cables and wiring to provide a fully functioning system.
  - 9. The governing overall requirement for this project is a complete and functional system.
  - 10. Include work not usually shown or specified, but necessary for proper installation and operation of the system or piece of equipment.
- C. Products Supplied But Not Installed Under This Section



1. Loose equipment or products supplied but not installed shall be turned-over to the Owner immediately upon delivery. Contractor is to supply a signed statement of transfer of this equipment to the consultant for record. Client must sign this statement acknowledging receipt of this equipment.
  2. Specialty back boxes including but not limited to FSR, Steel City and speaker back boxes shall be provided to the General Contractor for installation.
- D. Related Sections
1. Division 1.
  2. Division 9.
  3. Division 10.
  4. Division 11.
  5. Division 26.
- E. Allowances
1. Refer to section 2.1.E for related requirements.
  2. *Ensure that the statements used complement Division 1, Section 01210-Allowances.*
- F. Measurement Procedures
1. Product quantity is as required. If a quantity is given, the Contractor will provide at least the given amount. Some products listed under this section may not be required to fulfill the obligations of the work.

## 1.02 References

- A. Comply with all applicable governing codes.
- B. Comply with the following applicable organizations and standards:
1. AES                      Audio Engineering Society
  2. ANSI                    American National Standards Institute
  3. ASTM                   American Society for Testing and Materials
  4. BICSI                    Building Industry Consulting Service International, Inc.
  5. BTSC                    Broadcast Television Stereo Committee
  6. CBC                     California Building Code
  7. CEDIA                  Custom Electronic Design and Installation Association
  8. EIA   Electronic Industries Alliance
    - a. RS-310-C: (ANSI C83.9) Racks, Panels, and Associated Equipment
    - b. RS-453: Dimensional, Mechanical, and Electrical Characteristics Defining Phone Plugs and Jacks
  9. ETL                      Electrical Testing Laboratories, Inc.
  10. FCC                     Federal Communications Commission
  11. ICIA                     International Communications Industries Association
  12. IEC                      International Electrotechnical Commission
  13. IEEE                    Institute of Electrical and Electronic Engineers



14.	INCITS	International Committee for Information Technology Standards
15.	ISO	International Organization for Standardization
16.	ITU	International Telecommunications Union
17.	NAB	National Association of Broadcasters
18.	NCTA	National Cable and Telecommunications Association
19.	NEC	National Electrical Code
20.	NEMA	National Electrical Manufacturers Association
21.	NFPA	National Fire Protection Association
22.	NSCA	National Systems Contractors Association
23.	OSHA	Occupational Safety and Health Administration
24.	SMPTE	Society of Motion Picture and Television Engineers
25.	TIA	Telecommunications Industry Association
26.	UL	Underwriters Laboratories Inc.

### 1.03 Definitions

- A. Definitions of Terms: The following definitions and conditions apply to each of the respective parameters and the measurements of those parameters, unless specifically stated otherwise:
1. Frequency Response: The minimum acceptable frequency band over which the amplitude response is within 3 dB (or any specified range), or the specified limits of the response relative to the reference frequency (1 kHz for audio) under design load conditions, at any operating level up to and including the specified maximum output while fully in compliance with all other performance specifications.
  2. Maximum Output Level: The minimum acceptable maximum signal output level (voltage, current or power) attained under design load conditions attained while fully in compliance with all other performance specifications.
  3. Harmonic Distortion: The maximum acceptable harmonic distortion measured at any operating level, up to and including the specified maximum output, with an applied sine wave signal of any frequency in the range of the specified frequency response.
  4. Audio Intermodulation Distortion: The maximum acceptable intermodulation distortion resulting from the introduction of 60 Hz and 7 kHz signals in a ratio of 4:1 under design load conditions at any operating level up to and including the specified maximum output level.
  5. Signal to Noise Ratio: The minimum acceptable ratio of signal to noise levels derived from broadband measurements under design load at maximum output over the entire range of the specified frequency response.
  6. Clipping Level: The minimum acceptable maximum level of signal applied to the device under design load conditions while fully in compliance with all other performance specifications.



7. Sensitivity: The maximum acceptable level of input signal applied to the device that is necessary to provide the maximum output under design load conditions.
  8. Design Load: The load (in ohms) specified by usage of the particular device input or output.
- B. Signal Levels: The following voltage levels shall be considered the standard operating levels for the particular circuitry, unless specifically noted otherwise (0.775 Volt = 0 dBu = 0 dBm for a 600 ohms terminated circuit):
1. Microphone Circuits: -30 dBu or less.
  2. Audio Line Level Circuits: -30 dBu to +24 dBu; equivalent to -30 dBm to +24 dBm for a 600 ohms terminated circuit.
  3. Loudspeaker Level Circuits: More than +24 dBu.
- C. Characteristic Impedances: The following operating impedances shall be considered to be the standard operating impedances for the particular circuitry, unless specifically noted otherwise:
1. Microphone Circuits: 50-250 ohms source, 150-1500 ohms terminating, electrostatically and electromagnetically balanced to ground.
  2. Audio Line Level Circuits: 600 ohms maximum source, 600 ohms minimum. terminating, line to line, electrostatically and electromagnetically balanced to ground.

#### **1.04 System Description**

- A. Design Requirements
1. General
    - a. All audio processing functions for the system shall be implemented with Digital Signal Processing equipment (DSP). Functions provided by this system include but are not limited level control, equalization, delay, routing, dynamics, filters, processors, presets, etc.
  2. Stadium Seating Area
    - a. General
      - 1) The system shall provide audio reinforcement for announcements and sporting events.
      - 2) The system shall allow for local control of functions, including but not limited to volume adjustment and source selection.
      - 3) A wall mounted keyed controller shall be provided in the Press Box to control the startup and shutdown of the Public Address system.
    - b. Sound Reinforcement System
      - 1) The sound system shall utilize a distributed network of pole mounted loudspeakers.
      - 2) A facility panel shall be provided for the connectivity of microphone and line level inputs.
      - 3) Both a push-to-talk & a handheld wireless microphones shall be provided for voice reinforcement.
    - c. Assistive Listening



- 1) An assistive listening system shall be provided per ADA requirements. The system will consist of an RF transmitter, remote antennas and headsets to allow personal monitoring of the audio program.
- B. Digital Signal Processor (DSP) Programming
1. DSP programming outlined below:
    - a. All audio processing functions for the system shall be implemented with Digital Signal Processing equipment (DSP). Functions provided by this system include but are not limited to level control, equalization, delay, routing, dynamics, filters, processors, presets, etc.
    - b. Sensitivity and gain controls must be applied to each input to allow level balancing.
    - c. The mixer shall allow for the level control of each input and routed to each output's composite mix.
    - d. The DSP system shall include password protection for system operation and maintenance privileges.
    - e. The Contractor shall allot 2 hours for on-site digital signal processor programming with the client's representative.
- C. System Performance Standards and Requirements (meet or exceed)
1. Audio Systems:
    - a. Electrical Performance; Source Input to Power Amplifier Output:
      - 1) Frequency Response (Equalizer flat): +/- 0.2 dB 20 Hz to 20 kHz.
      - 2) Total Harmonic Distortion (THD): Less than 0.05%, 20 Hz to 20 kHz, 4 ohms.
      - 3) Noise: At least -105 dB, 20 Hz to 20 kHz, referenced to input of +4 dBm.
      - 4) Crosstalk: At least -60 dB, 20 Hz to 20 kHz.
      - 5) Damping Factor: Greater than 500 (below 1 kHz)
    - b. Electro/Acoustic Performance; Distributed Systems: 103 dB Consistent with devices specified herein.
      - 1) Equipment: Specified individually.
      - 2) Audio signal paths: Shall not degrade performance of connected equipment.
    - c. NEC - Article 640: Audio Signal Processing, Amplification and Reproduction Equipment.
  2. Data and Communications Systems:
    - a. TIA/EIA 568-C series: Commercial Building Telecommunications Cabling Standard.
    - b. ANSI J-STD-607-A: Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

## 1.05 Submittals



A. General

1. In addition to the requirements of Division 1, submit all materials for review arranged in the same order as the Specification, individually referenced to the Specification paragraph and Contract Drawing number. Submit 8 1/2" x 11" items bound in volumes and drawings in edge-bound sets. Submit all drawings on sheets of the same size.
2. The Contractor is to provide two copies of each hardcopy submittal and an electronic format copy (Shop drawings must be submitted as .DWF. All other submittals shall be provided as .PDF). All submittals must be original files or documents, scanned copies will not be accepted.
3. Make each specified submittal as a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.
4. Should the Contractor proceed with the Work of this Section in the absence of submittals for such work submitted and returned with action "No Exception Taken" or "Make Corrections As Noted", the Contractor proceeds at the Contractor's sole risk.
5. If the Contractor deviates from the design shown on the Contract Documents when preparing their shop drawings, the Contractor shall indicate with architectural style clouding, those deviations. The Contractor shall also submit with the Shop Drawings, a list of those deviations and substitutions, including the following:
  - a. The deviation item number which shall also correspond to a number designation applied to each cloud on the shop drawings.
  - b. Section of the specification that applies to these changes.
  - c. The applicable shop drawing sheet number for each item.
  - d. The corresponding audio-visual Contract Document sheet number for each item.
  - e. A clear description of the deviation.
  - f. The Contractor's rational for the deviation (i.e. what benefit the deviation provides, why it is required, any cost impact, etc.).

B. Infrastructure

1. Provide drawings indicating boxes conforming and non-conforming to Consultant's AV drawings.

C. Product Data

1. Manufacturer's Product Data
  - a. Contractor is to submit submittal in electronic format (i.e. PDF)
  - b. List of materials (i.e. Table of Contents) categorized by room type: For each item specified in PART 2, include:
    - 1) Drawing device ID code.
    - 2) Manufacturer.
    - 3) Model number.
    - 4) Listing: UL or other lab.



- 5) Quantity.
  - c. In sequence of List of Materials, provide a data sheet for each item, including all accessories marked for the proposed product.
- D. Shop Drawings
- 1. Field (Installation) Drawings: Collate in sequence:
    - a. Contractor is to submit shop drawings in .DWF format.
    - b. Drawing index/symbol sheet.
    - c. Floor plans. At scale of Contract Documents. Show:
      - 1) Device rough-in boxes with ID number.
      - 2) Mounting height.
      - 3) Conduit size.
      - 4) Wire type.
      - 5) Wire fill.
    - d. Sections/Elevations. At scale of Contract Documents:
      - 1) Mounting location reference to nearest gridline.
        - a) Provide sections for each room containing AV equipment.
        - b) Provide elevations for each wall in rooms containing AV equipment.
        - c) Show all equipment, including speakers, monitors, projectors, podium, floor boxes, facility boxes, etc.
        - d) Provide vertical dimensions referenced above finished floor to each piece of equipment.
        - e) Provide horizontal dimensions reference to gridlines.
    - e. Enlarged Plans. At scale of Contract Documents or larger as required for trade coordination. Show:
      - 1) Items indicated in "floor plans" above.
      - 2) Architectural features.
      - 3) Rack cabinets.
        - a) Ventilation details.
        - b) Power distribution detail.
      - 4) System furniture.
      - 5) Clearances required by applicable Code.
    - f. System Conduit Riser Drawing, Show:
      - 1) Terminal cabinets.
      - 2) Coordination with floor plans.
      - 3) Wire runs not shown on floor plans.
      - 4) Wire type.
      - 5) Wire fill.
    - g. Mounting details:



- 1) Stamped and signed by an Engineer licensed in the Project jurisdiction for work of this type, where required by code.
    - 2) Show loads, type and strength of connections, sizes, dimensions, materials, etc.
    - 3) Show calculations on drawings or in bound volume for review by Authorities having jurisdiction.
    - 4) Provide details for:
      - a) Equipment rack anchorage.
      - b) Loudspeaker mounts.
      - c) Attachment to building structure.
  - h. Installation details as required:
    - 1) Terminal cabinets: Terminations.
    - 2) Audio-Visual panel details.
  - i. Wire run sheets. Show:
    - 1) Wire number.
    - 2) Source.
    - 3) Designation.
    - 4) Signal type.
    - 5) Wire type.
    - 6) Operating level or voltage.
    - 7) Timing reference, where applicable.
    - 8) Physical length.
2. Shop (Fabrication) Drawings: Collate in sequence:
- a. Contractor is to submit shop drawings in .DWF format.
  - b. Drawing index/symbol sheet (if separate set from Field Drawings).
  - c. System functional drawings. Submit separate drawings for each system/subsystem. Show at least:
    - 1) Equipment:
      - a) Function, make, model.
      - b) Rack number, module frame and slot number.
    - 2) Field device information
      - a) Terminal cabinets.
      - b) Pull boxes.
      - c) Audio-visual panel connector designations.
    - 3) Wiring
      - a) Wire number.
      - b) Wire type.
    - 4) Shield condition at both ends (float, ground, location of ground).



- 5) Connector wiring details, each type.
  - 6) Audio: Nominal operating level, Polarity. Note deliberate polarity inversions where required to maintain absolute polarity.
  - 7) Twisted pair, transmit and received devices: Transmission range at 60 Hz., cable length and signal quality.
  - d. Provide drawings for the following systems, if applicable:
    - 1) Audio.
    - 2) Data transmission.
    - 3) Coordinated grounding scheme.
  - e. Equipment rack elevations: Show:
    - 1) All racks scaled at 1 1/2" equals 1 foot, or larger.
    - 2) Rack: Make, model.
    - 3) Equipment: Function, make, model.
  - f. Rack wiring drawings: For each rack, show:
    - 1) Power strip: Receptacles, circuiting.
    - 2) Sequencing power and surge suppression systems.
    - 3) Equipment.
    - 4) Grounding.
    - 5) Wiring, all systems.
    - 6) Wiring harness scheme.
    - 7) Ventilation detail.
  - g. Fabrication details: Submit for:
    - 1) Receptacles.
    - 2) Panels.
    - 3) Special mounting provisions.
  - h. Legends/engraving details. Half or full size:
    - 1) Receptacles.
    - 2) Audio-visual panels.
    - 3) Equipment designations.
- E. Samples
1. Of all finishes/materials that will be visible to the public, including but not limited to:
    - a. Receptacles and controls with associated trim plate.
    - b. Each type of loudspeaker baffle and/or grille.
    - c. All audio-visual panels.
    - d. Audio-visual devices in public areas.
- F. Shop and Project Site Test Reports
1. Contractor is to provide submittal in electronic format (i.e. PDF)



2. Schedule: Submit test reports in a timely manner relative to the Project schedule such that the representative of the Owner may conduct Verification of Submitted Test Data without delay of progress.
    - a. Shop test report: Submit prior to shipping completed equipment racks to Project Site.
    - b. Project Site test report: Submit project site test report for this section after system completion and prior to Acceptance Review and Testing.
  3. Content: Include at least:
    - a. Time and date of start of burn-in.
    - b. Time and date of test.
    - c. Personnel conducting test.
    - d. Test equipment, including serial and date of calibration.
    - e. Procedures used.
    - f. Results of test - numerical or graphical presentation.
- G. Close Out Submittal
1. Contractor is to provide submittals in electronic format (i.e. PDF)
  2. Operation and Maintenance Manuals
    - a. Index.
    - b. Systems operating instructions.
    - c. Reduced set of system Record Drawings.
    - d. Key schedule.
    - e. Maintenance and spare parts schedules.
    - f. Shop and Field Test Reports.
    - g. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, instruction and service manuals in color for each equipment item. Provide tabbed dividers between each product. Manuals provided by the Manufacturer in an individual binder may be submitted in that form.
  3. Framed Operating and Maintenance Instructions: Provide adjacent to each ensemble of equipment racks. Provide sturdy frame with clear glass or non-scratching plastic cover. Provide permanent, non-fading media. Blueprints shall not be acceptable. Include:
    - a. Sequence for system start-up and shutdown.
    - b. System Functional Diagrams.
    - c. Signal levels and impedance at accessible system signal and test ports, where applicable.
  4. Record Drawings



- a. As work progresses, maintain records of "as installed" conditions. Update the set at least weekly. After successful completion of Project Site testing specified herein, and after completion of Punch List corrections, copy all records of "as installed" conditions on to final Record Document drawings, as specified in Division 1.
  - b. Content: All drawings required under "Field and Shop Drawings". Show "as installed" condition. Where room designations according to Project permanent signage differ from construction designations in the Contract Documents, show both designations.
- 5. Provide four copies on SD card containing the "as built" drawings, all manuals, training manual and programming code.
  - a. Submit un-compiled programming code.
- 6. Training Submittal
  - a. Provide all training materials for review prior to scheduling training sessions.
    - 1) Training manual.
    - 2) Agenda for the training session.
    - 3) The final punch list, indicating that all equipment is fully functional.
  - b. See the section under Owner's Instructions for training manual requirements.
  - c. No training session will be scheduled until final punch list is completed and submitted.
- 7. Warranty Certificates
  - a. Comply with Division 1.

## **1.06 Quality Assurance**

### **A. Qualifications**

- 1. The bidder shall, prior to the bid, in accordance with the Instruction to Bidders, submit at least the following information to verify that the bidder has the necessary experience and qualifications to perform the specified work:
  - a. A detailed brochure describing the bidder's capabilities in terms of facilities, personnel (include a personnel organization chart followed by resumes), experience, background, examples of similar installations (at least two projects within the past two years), distribution arrangements with manufacturers and financial capability, including certificates of insurance and satisfaction of the project bonding requirements.
  - b. Contractor must, at the time of this bid submittal, have distribution or a dealership agreement with all manufactures whose products are specified in the bid documents. Contractor must also have completed manufactures training and certification before bids are submitted.
  - c. AIA Document A305 "Contractor's Qualification Statement".
  - d. Information identifying any and all local agents and/or subcontractors that will assist in the work and their role in the project.



- e. Identification of sources of labor for all fabrication and installation throughout the duration of the project.
  - f. Evidence that he has acquired all necessary licenses, certificates and approvals to perform the specified work within the state or jurisdiction the work is to be performed.
- 2. Projects that include Digital Signal Processing (DSP) equipment will require the Contractor to submit evidence of qualification from the manufacturer of said equipment. This would include completion of manufacturer's training courses, the name of the person or persons who completed said training and prior projects completed using DSP technology. If the Contractor is not approved for the DSP programming, they may hire a qualified programmer approved by the consultant.
  - 3. The Contractor shall provide information on how and by whom the requirements of the warranty period will be fulfilled.
  - 4. The submittal must justify, in the judgment of the Consultant, the Architect, and the Owner, that the Contractor has the capability to manage and install a project of this size and scope and that he is capable of the necessary business and technical arrangements for this installation and the pursuant warranty service. Contractor may be disqualified as a bidder if all of the submittal does not meet the approval of the Owner and his/her representative.
  - 5. Company: Work of this Section shall be performed by a Sound or Audio-Visual Systems Contractor who has at least five years direct experience with the devices, equipment and systems of the type and scope specified herein, and who has a fully staffed and equipped maintenance and repair facility, and who is licensed to perform work of this type in the Project jurisdiction.
  - 6. Personnel: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section. Supervisors shall have at least five years direct experience in similar work. Installation and maintenance personnel shall have at least three years direct experience in similar work.
  - 7. Designated Supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the Project Site during all phases of installation and testing of the Work of this Section. This supervisor shall be the same individual throughout the execution of the Work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.
  - 8. Staff Engineer: The Contractor shall have on his full-time payroll at least one staff engineer having five years minimum experience as an electronics engineer covering systems and projects comparable in substance and complexity to the project described herein. The staff engineer shall have NICET certification in Electrical/Electronics Engineering Technology and Audio Systems or equivalent. The signature of that engineer shall appear on all shop drawings and submittals.
  - 9. Coordination: Coordinate the Work of this Section with the Work of all other Separate Contracts. Comply with Division 1.
- B. Cutting and Patching



1. Cut, patch and extend existing work using skilled mechanics that are capable of matching existing quality of workmanship.
  2. Assign work of moving, removal, cutting and patching, to trades qualified to perform the work in a manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.
  3. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work. Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in a straight line at a natural point of division.
  4. When new work abuts or finishes flush with existing work, make a smooth and workmanlike transition. Patched work shall match existing adjacent work in texture and appearance so that the patch or transition is invisible.
  5. Protect existing finishes, equipment, and adjacent work that are scheduled to remain, from damage.
  6. Promptly repair damages caused to adjacent facilities by demolition operations, at no change in Contract Amount.
- C. Painting
1. Use skilled mechanics that are capable of painting audio-visual equipment and hardware to match architectural surroundings, where applicable.
- D. Regulatory Requirements
1. Regulations Applicable: including but not limited to those defined in Division 1.
  2. Comply with all applicable federal, state, and local labor regulations, and applicable local union and trade regulations.
  3. Installation practices shall be in accordance to industry-accepted standards (ANSI, Cal-OSHA, IEC, IEEE, FCC, NEC, NFPA, ICIA, NSCA, CEDIA, BICSI) or local acts, codes and standards enforced at the place of work, whichever is most stringent.
  4. Procure and pay for all necessary permits, licenses, inspections, and observe any requirements stipulated therein.
  5. Provide UL/ULC fire rated enclosures around all audio-visual floor and back boxes where required by code.
- E. Programming
1. User Group Interview:
    - a. Conduct interviews with the end-users to acquire programming requirements. Submit written results of the interview and the requirements set forth by the user group. Associate the user group requirements into the programming of each sub system. Submit to the Consultant a report that outlines the interviews conducted.
- F. Pre-installation Meetings
1. Attend a pre-installation meeting at the project site with the Owner and his representatives in order to coordinate related work and scheduling issues.
- G. Verification
1. Verify dimensions and conditions at the Project Site. Submit any conflicts in timely manner for resolution.



- H. Shop Fabrication and Testing
  - 1. Assemble and fully wire equipment racks at a fabrication shop off the Project Site. Burn-in for not less than 120 hours. Following burn-in, perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Submit verification of shop test in timely manner. Following verification of shop test and when installation locations are ready as specified herein, deliver equipment racks and equipment to the Project Site and install.
- I. Project Site Installation and Testing
  - 1. Install as specified herein.
    - a. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Request verification of Project Site test in timely manner.
- J. Verification of Submitted Test Data
  - 1. Re-test in presence of designated representative(s) of the Owner at reasonable mutual convenience. Provide services of the designated supervisor and an additional technician familiar with work of this Section. Provide all test equipment. Provide complete set of latest stamped submittals of record for reference. Provide complete set of Shop and Project Site Test Reports, as applies. Provide a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
- K. Reference/Project Record Documents
  - 1. At all times when the work is in progress, maintain at the workplace, fabrication shop or Project Site as applies, a complete set of the latest stamped, action submittals of record for reference. Also maintain a separate, clean, undamaged set for preparation of Project Record Documents. Also maintain at the workplace a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.

#### **1.07 Delivery, Storage and Handling**

- A. Packing, Shipping, Handling and Unloading
  - 1. Deliver materials in manufacturer's original undamaged packages or in bulk packing which provides equivalent protection from rough handling, dust and dirt.
  - 2. Deliver all assembled equipment racks in custom manufactured wood crates to avoid damage during shipping.
  - 3. All packing, shipping, insurance, handling and storage costs of equipment and materials shall be the responsibility of the Contractor.
  - 4. The Contractor shall be responsible for insuring all equipment and installation materials stored in their shop facilities until it is delivered to the Project Site and a delivery acknowledgement is received from the Owner or its authorized representative.
  - 5. Equipment unpacked for inspection but not ready for permanent installation must be returned into its protective packing.



6. The Contractor shall be responsible for furnishing a temporary substitute for equipment that could not be delivered in time for system operation. All costs associated for renting, shipping and handling temporary substitute equipment shall be the responsibility of the Contractor.
  7. In the event the equipment or installation material delivery is delayed, the Contractor must employ the fastest means of delivery service available to deliver the equipment on time. All costs for expediting the delivery of equipment shall be the responsibility of the Contractor.
  8. Store packaged materials off of the ground or slab in a manner to protect them from elements, especially moisture damage.
  9. Deliver completed, wired, tested equipment racks to associated equipment rooms at the Project Site when major work of all other separate contracts is complete, equipment room ventilation is operating with clean filters in place, the area is clean and free from airborne contaminants, and continuing work of other trades will not produce airborne contaminants or permit transport of such airborne contaminants to the equipment rooms.
- B. Acceptance at Site
1. All equipment and installation material delivered to the Owner shall be properly documented in the form of delivery receipts.
  2. Equipment delivered to the Project Site must include a delivery acknowledgement receipt signed by the Owner or its representative. Issue a signed copy of the delivery receipt to the Owner and file the signed copy for future reference.
  3. The Contractor shall be responsible for the insurance coverage and security of equipment delivered to the Project Site until it receives an acknowledgement of delivery from the Owner or its authorized representative.
- C. Storage and Protection
1. The Contractor shall provide a safe and secure storage location for all equipment and installation materials until they are delivered to the Project Site and it receives an acknowledgement of delivery from the Owner or its authorized representative.
  2. For equipment assembled and tested at the Contractor's shop facility and delivered to the Project Site, ensure that the equipment is properly protected from improper handling, rain, water, humidity, moisture, heat, direct exposure to sunlight, dust and dirt during delivery and storage on or off the Project Site.
  3. Do not remove protective packing from equipment until they are ready to be installed.
  4. If, after equipment is installed, the Project Site cannot be cleaned or is still not clean because of on-going work by others, provide protective covering and protection to prevent airborne dust and dirt originating from damaging equipment.

## **1.08 Project Site Conditions**

- A. Environment Requirements
1. The spaces where audio-visual system assemblies are installed shall meet the following requirements:



- a. Free from dust generated from construction.
  - b. The room temperature shall be within the specified operating temperature recommended by the manufacturer.
- B. Existing Conditions
  - 1. Contractor is to visit the job site to access existing conditions. All cutting, patching and painting are the responsibility of the Contractor. Contractor must work around owners work schedule and submit a schedule of projected work hours with this proposal. Contractor must thoroughly inspect existing job site conditions for acceptable wire ways and ability to install equipment in proposed location per plans and allow sufficient labor hours to complete project. All new cable and wire ways will be recessed into walls or ceiling area. No cable or conduit will be run exposed to public view. Contractor must report, to the owner, the feasibility of cable runs as laid out in these contract documents. Contractor will in no way claim additional fees for items related to existing condition assessment.

#### **1.09 Sequencing**

- A. Submit all testing documentation to the Owner's Representative for review prior to requesting the Fabrication Inspection and Substantial Completion inspections.
- B. Allow adequate time for corrections to be made after inspections to maintain the Project Schedule.

#### **1.10 Scheduling**

- A. Comply with the Project schedule.
- B. Make all Submittals specified herein in a timely manner. Failure to make timely submittals complete as specified herein is considered to be lack of substantial progress of the Work of this Section. Contractor is to work around client schedule throughout the duration of the project.
- C. Deliver all equipment, devices and materials required for the Work of this Section and install, test and ready all work for Acceptance Testing at least fourteen days prior to the completion date for the associated area of the Project, unless specifically instructed otherwise by the Owner.
- D. Temporary Equipment: Provide and operate, without claim for additional cost or time, temporary equipment and/or systems to provide reasonably equivalent function, as determined by the Owner, in lieu of the Work of this Section which is incomplete or found not in conformance with the Contract Documents as of seven days prior to the completion date. Provide such temporary equipment until Acceptance of the Work of this Section. Thereafter, remove such temporary equipment.
- E. It shall be a common understanding that there is a time constraint when executing this work. The Contractor shall use all means and resources to complete this project on or before the specified schedule at no additional cost to the Owner. This includes working beyond normal business hours and days, additional manpower, additional tools, etc.

#### **1.11 Warranty Service**



- A. Warrant all Work of this Section to be free from defects in materials and workmanship for a minimum of 1 year from the date of Owner acceptance of the Work of this Section.
- B. All manufacturers' equipment warranties shall be activated in the Owner's name and shall commence on the date of system acceptance. In the case of Contractor modified equipment, the manufacturer's warranty may be voided. In such cases, provide a warranty equivalent to that of the original manufacturer.
- C. All high-level software shall follow the warranty conditions specified by the manufacturer. Immediately update or upgrade the Owner's installed software as soon as new versions, updates or patches become available from the manufacturer at no additional cost to the Owner within this warranty period.
- D. Response Time: Provide a qualified technician familiar with the work at the Project Site within 12 hours after receipt of a notice of malfunction. Provide the Owner with the telephone number attended 8 hours a day, 5 days a week, and an answering service or equivalent facility attended 24 hours a day, 7 days a week, to be called in the event of a malfunction. Provide repairs at no expense to the Owner and at the Owner's request, alternate facilities, services and systems for the duration of the repairs to any defective work of this Section. Provide a complete and operational System, within 48 hours after notification of a malfunction.
- E. All work requested due to warranty issues shall be performed during regular working hours unless the Owner agrees to pay the difference in labor rates for overtime or night time work.
- F. The Contractor shall use qualified service personnel to respond to all warranty issues or calls.
- G. Off Site Service: Conduct all warranty repairs and services at the Project Site, unless in violation of manufacturer's standard product warranty. Provide substitute systems, equipment, and/or devices acceptable to the Owner for the duration of off-site repairs. Provide transportation for substitute and/or test systems, equipment, devices, materials, parts and personnel to and from the Project Site.

#### **1.12 Owner's Instructions**

- A. General
  - 1. Conduct training on the completed system at a reasonable convenience of the Owner during normal Owner business hours. Contractor is to assess the complexity of the system and shall fully train the operation and maintenance staff named by the Owner.
  - 2. Do not start training until all systems have been commissioned, training manuals are approved and an agenda along with schedule of each departmental training session has been submitted to the owner.
  - 3. Training shall be conducted in the actual room that is the topic of the training session.
  - 4. The client asserts legal and beneficial ownership of all training materials which are specifically commissioned for this project.
- B. Operator Training – Do not start training before system is in full operation and all components have been signed off by owner's representative. Use the items covered in the commissioning portion of this specification as a basis for the training curriculum.



1. At least two 2-hour sessions of instruction will be given in order to familiarize the Owner with the operation of the system.
- C. Maintenance Training
1. At least two 2-hour sessions of instruction will be given in order to learn how to maintain and troubleshoot the system. A maintenance binder shall be provided by the Contractor with all manufacturer-specific operating and maintenance information for each piece of equipment used. On large jobs, the binders will be subdivided into individual audio, and control binders. Provide training on at least the following system features:
    - a. Firmware upgrades
    - b. Complete use of system as outlined in the Commissioning section plus advanced troubleshooting.
- D. Training Video
1. A training video shall be produced and cover all aspects of the systems operation.
  2. Each page of all user interfaces shall be explained and recorded while gestures are made on the screen. Each button on the user interface shall be explained and demonstrated.
  3. All portable equipment that connects to the system shall be demonstrated both in their physical connection and routing method at the user interface.
  4. All source equipment shall be explained in both physical loading of media and transport control as well as user interface control.
  5. Demonstrate on basic troubleshooting.
  6. Provide training on items as outlined in the Commissioning section of this document.
  7. Demonstrate system start up and shut down.
  8. Audio and video files shall be combined and burned to DVD for distribution to each department.
  9. Provide professional MP4 with searchable index of topics covered.
  10. Provide label with client's logo, room name/number, title, length and topics covered.
- E. A training manual specific to this system will be written covering the basic and advanced functional techniques necessary to operate the system in a reliable and fully-functional condition. The Contractor shall submit hard color copies of the training manual as well as a soft copy in PDF or DOC format. Provide a hard copy of the training manual for each person to be trained. This manual shall include:
1. All contact information, including emergency and after hours phone and pager numbers, for requesting service assistance from the Contractor.
  2. A 11x17 set of as-built drawings of the completed project (a full-sized set will be issued to the client for their use, a half-size set will be attached to the inside back door of the main equipment rack).
  3. A table of contents at the beginning of the manual.
    - a. The manual will begin by explaining basic information such as manual references, abbreviations, any assumptions made by the author, prerequisites required, numbering convention, etc.



- b. It will then proceed to the manual objectives.
  - c. Explain what the end user should understand after reading the manual.
  - d. It will cover the basics of the user interface including start up and shut down procedures, log on procedures, access privileges, operator password, levels of security, file structure, etc.
  - e. The manual shall proceed to describe each user interface and its function. It will cover every layer of the interface and how to navigate through them.
  - f. Each of the system presets shall be explained and the physical setup of the equipment and floor plan during presets shall be illustrated. Source equipment shall have their routing scheme explained and illustrated. Portable equipment and its connection to the system shall be explained and illustrated.
  - g. The manual will end by explaining basic troubleshooting procedures and equipment care instruction.
- 4. The Contractor's maintenance instructions, which will include the manufacturer's maintenance instructions found on the factory manuals to keep the manufacturer's warranty in force.
- 5. A list of consumables (batteries, etc.) required to keep the system operating over time, along with sources of supply (if not readily available).
- 6. The Contractor shall compile and submit all factory warranty registration forms or cards for each piece of equipment furnished for this project.
- 7. A form requesting feedback from the end user as to how the manual can be improved and a section to report errors discovered.
  - a. The Contractor shall make the corrections and improvement suggestions after receiving feedback from the users. This will be completed at no charge to the client. The manual will contain a date stamp and version number. Each feedback and error correction manual reissue will include a new version number.
- F. Initial Use Support
  - 1. Provide standby trainer/system engineer during the first two public events.

### **1.13 Maintenance**

- A. The Contractor shall, within the warranty period, schedule two visits to inspect and perform preventive maintenance on the system. The first visit shall be six months after the commencement of the warranty period. The last visit shall be just prior to the end of the warranty period.
- B. The Contractor shall use qualified service personnel to conduct all maintenance work.
- C. All maintenance work shall be performed during regular working hours unless the Owner agrees to pay the difference in labor rates for overtime or night time work.

## **PART 2 - PRODUCTS**



## **2.01 General**

### **A. Quality of Products**

1. Materials and equipment specified herein have been selected as the basis of acceptable quality and performance and have been coordinated to function as components of the specified systems.
2. Where a particular material, device, piece of equipment or system is specified directly, the current manufacturer's specification for the same shall be considered to be a part of these specifications, as if completely contained herein in every detail.
3. Each material, device or piece of equipment provided herein shall comply with all of the manufacturer's published specifications for that item.
4. Equipment shall be from the manufacturers' current stock and shall not be stored longer than 1 year prior to installation, unless written approval to do otherwise is provided by the manufacturer and submitted for review by the Owner.
5. All products shall be a product of firms regularly engaged in the manufacturing of electrical, electronic or optical equipment. The equipment shall be the latest model or type offered which meets the applicable specifications at the time of the submittal. Discontinued items replaced by newer models or versions are prohibited and should not be submitted for review.
6. Quality of workmanship and fabrication of all equipment and components, which are custom fabricated, shall be comparable to professional equipment produced by specialized manufacturers of the trade involved and will be verified by inspection. Only firms having 5 years of experience in all aspects of the fabrication and installation of similar systems will be allowed to perform the work.
7. All materials and products shall be new and of professional quality. Unless specifically stated in the drawings or specifications, no existing or used materials will be installed.

### **B. Quantity**

1. Provide the quantity of products as shown on the Contract Drawings, or as otherwise indicated herein.
2. The equipment listed in section 2.02 consists of all major equipment for the project. The Contractor shall integrate into the system design and provide any additional components, wiring, programming, etc., to complete a functional system operating as described within the specifications and the for construction drawings.
3. Components or equipment not specified or indicated on the drawings that are required to make a fully functional systems per the Owner's requirements and the design intent, shall be furnished and installed by the Contractor, and shall be submitted for Owner review.

### **C. Preference**

1. Where more than one manufacturer is listed herein as acceptable or equivalent, no preference is intended or implied by the order of listing.



- D. In the event that a specified piece of equipment or product has been superseded, discontinued or is no longer available from the manufacturer, the Contractor shall submit a request for substitution of the originally specified product. The substitute product shall be the manufacturer's most current model of the specified product, or if the line has been discontinued, a product by the same manufacturer with specifications meeting or exceeding, and as close as possible to those of the originally specified product. Refer to Alternatives and Substitutes section for clarification.
- E. Provide Complete
  - 1. Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the Work of this Section as if specified in full herein.
- F. Provide New
  - 1. All materials provided under the Work of this Section shall be new, shall be the manufacturer's latest design/model, and shall be permanently labeled with the manufacturer's name, model number and serial number.
  - 2. Products and materials shall be clean, free of defects, damage and corrosion.
- G. Similar
  - 1. Similar devices shall be of the same manufacturer, unless specifically noted otherwise in these specifications.
- H. Safety Agency Listing
  - 1. All devices provided under the Work of this Section that are connected to the Project electrical system shall be listed by Underwriters Laboratories (UL) or other Nationally Recognized Electrical Testing Laboratory acceptable to the Authorities having jurisdiction at the Project site, and shall be so labeled. Absent such listing, comply with Regulatory Requirements applicable to Unlisted Equipment.
- I. Power Rating
  - 1. All devices provided under the Work of this Section that are connected to the Project electrical system shall provide stable performance in full accordance with these specifications when operated on main service which complies with ANSI standard tolerances for voltage, frequency, transients and related parameters.
- J. Circuit Protection
  - 1. All active devices shall include integral fuse or circuit breaker protection.
  - 2. All circuit breakers shall be fully magnetic.
  - 3. Protection devices shall be located to facilitate examination, resetting and/or replacement without the need to disassemble or demount the associated device.
  - 4. Contractor-fabricated items shall be provided with either indicating type circuit breakers or fuses of the clear glass cartridge type, mounted in fuse holders which will indicate a blown or defective fuse.
- K. Continuous Use
  - 1. All active circuitry shall be solid state and shall be rated for continuous use. All circuit components shall be operated in full compliance with the manufacturer's recommendations and shall contain sufficient permanent identification to facilitate replacement.



L. Construction

1. All electronic equipment shall be of the "dead-front" type and shall be designed for standard 19" EIA rack mounting, unless otherwise indicated.
2. Steel frames and enclosures shall be designed and wired to eliminate all induced currents within both the units and the systems.
3. All bolted connections shall be made with self-locking devices.
4. Coordinate all consoles and panels so that the general appearance is similar, or as directed by the Owner.
5. All operating panels shall be at least 1/8" thick aluminum.
6. Provide locking panel covers on all recessed, semi-recessed or surface mounted control panels not located in the equipment rooms, unless specifically noted otherwise. Panel locks shall be flush with no protrusions beyond the panel face when the door is closed. Recessed control panels shall be recessed within the back box to a depth sufficient to permit a locking hinged panel cover to completely close without affecting any device within the enclosed area.

M. Identification

1. Provide permanent intelligible identification on, or adjacent to, all connectors, receptacles, controls, fuses, circuit breakers, patching jacks, and the like. This identification shall clearly and distinctly indicate the function of the item and shall be numbered or lettered to correspond with the function, circuit and location consistent with field and shop drawings.

N. Keys

1. Key all boxes, cabinets, enclosures, panels, controls, doors and related provided for similar usage within a system identically. For each unique key type, provide a quantity of ten. Stamp each key with a reference designation.
2. Submit a schedule of keying to the Owner. Where so noted, provide Project Standard lock cylinders and keys; coordinate with the work of other Sections.

O. Assistive Listening System (RF)

1. An assistive listening system using wireless radio frequency (RF) transmitter and headsets will allow personal monitoring of the audio program for the hearing impaired. The transmitter will be a frequency agile unit with no less than 30-channel capability and will broadcast the main audio program to personal headsets used by hearing impaired audience members. The system and quantity of headsets supplied shall conform to the ADA requirements (section 219 and 706) for the space. Stereo headset type and hearing aid compatible (T-Coil) listening devices are required; ear-bud type devices are not acceptable. Supply a drop-in type battery charging system capable of servicing multiple receivers, with sufficient charging capacity to charge each receiver simultaneously. Follow the table below for quantity requirements.

Capacity of Seating in Assembly Area	Minimum Number of Required Receivers	Minimum Number of Required Hearing Aid Compatible Receivers
50 or Less	2	2



51 to 200	2, plus 1 per 25 seats over 50 Seats *1	2
201 to 500	2, plus 1 per 25 seats over 50 Seats *1	1 per 4 Receivers *1
501 to 1000	20, plus 1 per 33 seats over 500 *1	1 per 4 Receivers *1
1001 to 2000	35, plus 1 per 50 seats over 1000 seats *1	1 per 4 Receivers *1
2001 and over	55, plus 1 per 100 seats over 2000 seats *1	1 per 4 Receivers *1

\*1 Or fraction thereof

- P. Provide enclosure systems including, but not limited to racks, cabinets, cases and related panels and accessories as specified herein, or approved equivalent. Provide size and quantity as shown on drawings. Provide color as specified by Architect. If no color is shown on drawings, submit manufacturer's standard color chips for selection.
- Q. Cable Tray: Provide aluminum ladder style cable tray with flange in side rails where called out in drawings. Size the cable tray to accommodate all wire that must pass through it. Provide all supporting hardware and accessories.
1. Ladder Style Cable Tray
    - a. P-W Industries.
    - b. Equal by Hubbell.
    - c. Approved equal.
- R. Floor Mounted Equipment Racks: Provide each bay with basic frame, vented locking rear door, top panel with single 10" fan, certified seismic floor anchor kit, ganging hardware, except where otherwise indicated, at each ensemble of bays, provide end (side) panels to provide complete enclosure.
1. Rack cabinet, heavy duty welded 14ga. CRS, single bay of maximum dimensions 83-1/8"(H) x 24"(W) x 32.5"(D); floor supported with accessory louvered side rack side panel.
    - a. Mid Atlantic WRK Series.
    - b. Equal by Atlas/Soundolier.
    - c. Approved equal.
  2. Turret cabinet:
    - a. Mid Atlantic Slim 2 Series.
    - b. Equal by Atlas/Soundolier.
    - c. Equal by Hammond Manufacturing.
  3. Wall Mounted cabinet:
    - a. Atlas/Soundolier 300 Series.
    - b. Mid Atlantic DWR Series.
    - c. Equal by Hammond Manufacturing.



- S. Rack Panels and Accessories: Rack Mounting Screws: Screws 10-32; length as required for at least 1/4" excess when fully seated; oval head with black plastic non marring cup washer or equivalent ornamental head; nickel, cadmium or black plated; Phillips, Allen Hex, Square-Tip or Torx drive. Slotted screws are not acceptable.
1. Blank Panels:
    - a. Atlas/Soundolier S19 Series.
    - b. Zero ZP112000 Series.
    - c. House of Metal Enclosures (HOME) Series PM.
    - d. Middle Atlantic Products BL, SB or HBL Series.
  2. Vent Panels:
    - a. Middle Atlantic ETF Series.
    - b. Equal by Atlas/Soundolier.
    - c. Equal by Zero.
    - d. Equal by House of Metal Enclosures (HOME).
  3. Shelf:
    - a. Middle Atlantic Products U Series.
    - b. Atlas/Soundolier SH19 Series.
    - c. Zero A52 Series.
  4. Drawer:
    - a. Atlas/Soundolier SD Series.
    - b. Middle Atlantic Products UD Series.
    - c. House of Metal Enclosures (HOME) SD Series.
    - d. Zero A43/A36 Series.
  5. Equipment Custom Rackmount Shelf: Middle Atlantic Products Model RSH-4A Series.
    - a. Mid Atlantic LBP-IR4, LBP-1S, LBP-1P.
    - b. Equal by Atlas/Soundolier.
- T. Equipment Enclosure Ventilation: Provide UL Recognized devices. Connect to enclosure power, comply with applicable Codes.
1. Fan panel, 5 1/4" high painted steel rack panel with 4" diameter fans, each fan with chrome plated finger guard, low speed air flow, two fans per panel, total 120 CFM:
    - a. Mid Atlantic QFP-2 Series.
    - b. Atlas/Soundolier ES/IS Series.
    - c. BGW Systems.
  2. Thermostatic Fan control module, user definable temperature range with status LED's, temperature sensing probe.
    - a. Middle Atlantic FC Series.
    - b. Atlas/Soundolier CFT Series.



- U. Equipment Enclosure Power and Signal Grounding: Comply with applicable Codes and applicable portions of Division 26. Provide UL Listed devices, Specification or Hospital Grade. Provide all junction boxes, raceway, fittings, wire, supports and fastenings as required for complete installation. Unless otherwise noted, provide receptacles of NEMA 5-15R configuration.
1. Full height receptacle strip, Isolated Ground:
    - a. Wiremold 3000 Plugmold IG Series.
    - b. Middle Atlantic PD series vertical power strips.
  2. Full height receptacle strip, three or more circuits, Isolated Ground:
    - a. Wiremold 3000 Series with Specification Grade IG 5262 Series receptacles.
    - b. Middle Atlantic PD series vertical power strip.
  3. Wireway, lay in, NEMA 1: Any meeting NEMA 1 and UL870. Size as required.
  4. Flexible metal conduit: Comply with Division 26.
  5. Sequencing Power System:
    - a. The Contractor is to design and build power sequencing and surge suppression systems that will control and distribute power in the equipment racks. The system will be designed to sequentially connect power to all of the audio-visual equipment in the equipment racks. Outlets are mounted to the unit's back plate or on a remote strip. If the project utilizes a control system, the sequencing power system will be controlled by the software configurable control system. The touch panel's shut down button will prompt a second time asking "Are you sure you want to shut the system down?" A positive response will activate system shut down. A push button control station's shut down button will be pressed twice to shut down the system. If the project does not include a control system, the Contractor is to provide a dedicated sequential controller in the equipment racks.
      - 1) 15 amp or greater power capacity.
      - 2) 3-prong 15 amp 120VAC isolated ground outlets (provide required amount).
      - 3) Individual sequencing steps for each outlet.
      - 4) Adjustable power-up time delay and outlet sequencing intervals.
      - 5) Modular power raceway systems shall be constructed of 18-gauge min-spangle galvanized steel.
      - 6) Remote controllable via contact closures (if applicable).
      - 7) Status indicator on touch panel (if applicable).
    - b. Approved subject to above:
      - 1) Middle Atlantic RLM-XX, RM-XX, R-XX or M-XX Modular Power Raceway Series.
      - 2) Middle Atlantic USC-6R Universal Sequencing Controller.
      - 3) Equal by Atlas Soundolier.
  6. Signal Grounding bus bar, insulated from enclosure frame:



- a. Atlas/Soundolier BBG Series mounted on standoff insulators.
  - b. Zero A32 Series.
  - c. Middle Atlantic.
  - d. Panelboard Isolated Ground bus kit by manufacturer of Project Panelboards specified in Division 26.
7. Multi-Outlet Assembly, Surge Suppressing, UL Listed. Comply with ANSI/IEEE C62.41-1980. Provide at least six receptacles. Provide equivalent to:
- a. Surgex SX RT series.
  - b. EFI Electronics Corporation Model 153.
  - c. MCG Electronics, Inc. Model 296 (subject to UL Listing).



## 2.02 Products

### A. Major System Components

DEVICE ID	DESCRIPTION	MANUFACTURER	MODEL	ACCESSORIES
AIU1	AUDIO INTERFVACE UNIT (BLUETOOTH)	ATTEROTECH OR EQUAL	unBT2A	
AIU2	AUDIO INTERFVACE UNIT	ATTEROTECH OR EQUAL	AXIOM ML1	
ALA	ASSISTIVE LISTENING ANTENNA	LISTEN TECH OR EQUAL	LA-122	
ALR	ASSISTIVE LISTENING RECEIVER	LISTEN TECH OR EQUAL	LA-4200-216	LA-402 HEADPHONE
ALT	ASSISTIVE LISTENING TRANSMITTER	LISTEN TECH OR EQUAL	LT-800-216-01	LA-326 RACK MOUNTING KIT, LA-381 CHARGING STATION
BOB1	BREAK OUT BOX	ATTEROTECH OR EQUAL	AXIOM AXP20	
ERK1	EQUIPMENT RACK	MIDDLE ATLANTIC OR EQUAL	SR-24-28	PLEXI DOOR AND LOCK
GNM1	GOOSENECK MICROPHONE	AKG OR EQUAL	DST99 S	
MIX1	MIXER	SHURE OR EQUAL	SCM262	
NL	NECK LOOP	LISTEN TECH OR EQUAL	LA-430	
PA1000/4V	POWER AMPLIFIER	QSC OR EQUAL	CXD4.5	
PEC	PORTABLE EQUIPMENT CASE	PELICAN CASE OR EQUAL	iM2400	
PSQ	POWER SEQUENCER	FURMAN OR EQUAL	CN-2400S	
RC1	REMOTE CONTROL	FURMAN OR EQUAL	RS-2	
SP1	SPEAKER	JBL OR EQUAL	AWC129	MOUNTING BRACKETS & MOUNTS AS REQUIRED
SP2	SPEAKER	JBL OR EQUAL	AWC82	MOUNTING BRACKETS & MOUNTS AS REQUIRED
WLM	WIRELESS MICROPHONE	AUDIO-TECHNICA OR EQUAL	ATW-T3202/C710	
WMA	WIRELESS MIC ANT	AUDIO-TECHNICA OR EQUAL	DFINB	MOUNTING BRACKET



WMR	WIRELESS MIC RECEIVER	AUDIO-TECHNICA OR EQUAL	ATW-R3210	
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- B. The above list of Major System Components only outlines the major items necessary to allow the system to function as designed. It lists no power supplies, balancing transformers, power splitters, modular cards or other auxiliary components required to achieve a functioning system. Contractor is required to supply all components needed to provide a complete and operable system as outlined in the contract documents. The full set of construction documents are to be used when preparing a bid. This list is not intended to provide a full bill of materials.
- C. Patch bays shown on plans and elevations are for placeholder information only. Contractor is to determine the exact amount of patch needed as per single line diagrams.

### 2.03 Finishes

- A. Any item or component of the Work of this Section which is visible shall comply with the following. Finishes noted or scheduled on the Contract Drawings shall take precedence. Submit all color samples of all items visible to public for approval.
  - 1. Where finishes are not noted or otherwise defined in the Contract Documents, submit manufacturer's standard finish samples for selection by the Owner.
  - 2. Paint loudspeaker cabinets to match exactly the surrounding and adjacent surfaces. Submit paint sample to Owner's representative for approval.
  - 3. Unless otherwise noted, receptacle or device plates subject to connection or operating force shall be stainless steel or hard anodized aluminum. Provide plates which generally match the appearance of project standard receptacle or device plates in view in the same area. For anodized aluminum, submit samples of standard colors for selection by Owner.
  - 4. Operating panels shall be steel, primed, painted with thermosetting epoxy paint, with legends silk-screened in contrasting color, and coated with clear epoxy thermosetting coating; or aluminum, hard anodized, with legends engraved and filled with contrasting color, all coated with clear epoxy thermosetting coating.
  - 5. All steel surfaces shall be treated with primer equivalent to zinc phosphate and finish painted with baked enamel or painted with a thermo setting epoxy paint.
  - 6. All aluminum surfaces, except those used as operating surfaces, shall be anodized and then painted with a thermo setting epoxy paint.
- B. Custom Fabricated Plate Screws
  - 1. Match the finish of the screws used to mount the custom fabricated plates with the finish of the custom fabricated plate.
- C. Equipment or Cover Plates
  - 1. Paint equipment or cover plate to match exactly the surrounding and adjacent surfaces when require by architect.
- D. Manufacturer's logos



1. Remove all manufacturers' names, logos, or other symbols from speakers or other objects placed in view of the public.

#### **2.04 Alternatives and Substitutes**

- A. Substitutions of equal equipment beyond the alternatives listed will be permitted only in accordance with Division 1. If a requested substitution requires a change in any of the contract drawings, a revised drawing must be submitted as part of the substitution request. The Owner's Representative shall be the final judge of the acceptability of substitutions. The burden of proof of equivalence is the responsibility of the Contractor.
- B. Acceptance of a product shall not, in any form or manner, relax the system performance requirements of this Specification and the performance characteristics of the product.
- C. The Contractor shall submit for review a complete list of proposed substitutions for approved equipment listed in Part 2.
- D. For all substitutions, the Contractor shall provide the manufacturer's independent test data to demonstrate that the proposed alternatives to the approved equipment comply with the specifications. Specifications shall contain at least all information available for the specified product.
- E. The Contractor shall submit a description and drawings showing all changes to the Contract Documents that the proposed substitution will require for proper functionality and operation.
- F. Proposed substitutions shall not affect dimensions shown on the Contract Document except as submitted for review and approved by the Owner.
- G. Any redesign or construction costs required to integrate the proposed substitution shall be the responsibility of the Contractor. Any costs incurred by the Owner, Owner's representatives, Architect, Engineers or Consultants attributable to the integration of a proposed substitution shall be borne by the Contractor.
- H. Any proposed substitution shall have no adverse effect on other trades, the construction schedule or specified warranty requirements.
- I. The functionality, performance, general appearance and quality of the proposed substitution shall be equivalent to or superior to those of the specified item.
- J. Any change to the Contract (deductive or additive cost) associated with a proposed substitution shall be submitted to the Owner for review at the time the substitution is proposed and accompanying a substitution request documentation.
- K. The Contractor shall provide the same warranty for the substitution that the Contractor would for the specified product.
- L. The Contractor shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects equal to the designed system before the substitution was made. In the event that the substituted material or equipment fails to meet performance testing standards after installed, the Contractor shall replace substituted material or equipment with those initially specified.



## **PART 3 - EXECUTION**

### **3.01 General**

- A. Perform the Work of this Section in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.
- B. Furnish and install (herein, "provide") all materials, devices, components, and equipment required for complete, operational systems.
- C. Contractor is to supervise the installation of back boxes and terminal cabinets installed by the Division 26 Contractor. Contractor is to verify that correct boxes are installed in their proper locations before any drywall has been installed.

### **3.02 Examination**

- A. Immediately report to the Consultant any discrepancies between the specifications and drawings. This includes discrepancies between the technical specification documents and actual field dimensions or findings that may hinder installation work, conflict with other trades, or cause delays.
- B. Carefully examine all details that affect all aspects of the systems described in the specifications and drawings.
  - 1. Examine, coordinate and confirm all drawings and details.
  - 2. Examine, coordinate and confirm all electrical power requirements, conduits, raceways, boxes, and etc.
  - 3. Examine, coordinate and confirm work of other trades that may influence the outcome of the design, specification, and performance of the systems.

### **3.03 Preparation**

- A. This installation section is only meant as a guideline for the Contractor. The Contractor shall be responsible for executing all installation work in a manner that is in accordance to industry-accepted standards or governing codes, whichever is more stringent. Installation activities shall be executed in an organized and orderly manner. These steps include, but are not limited to, pre-delivery testing, delivery, unloading, installation, equipment / cable labeling, programming, set-up / calibration / alignment / adjustment, testing, commissioning, training, and documentation.
- B. Protect all existing work surfaces, furniture, equipment, fixtures and etc. before commencing installation work. Any damage to the existing physical and electrical property due to installation work shall be the responsibility of the Contractor.
- C. Immediately hand over any de-installed equipment to the Owner for safe-keeping if equipment is to be reused.
- D. Carefully remove any obstructions such as fixed seating, ceiling tiles, furniture, equipment and etc. that would obstruct or hinder the installation work. Damage caused by undue care in moving these items shall be responsibility of the Contractor.



- E. Examine, coordinate, and confirm the cleanliness of the work site before commencing the portion the installation work that involves dust-sensitive electronic or electrical equipment such as audio mixers, switchers, etc. Dust-sensitive equipment that is installed in a work site with air borne dust and dirt shall be properly protected. For example, a video camera on a wall-mounted bracket is protected by a clean plastic bag to prevent dust from contaminating it. Seal the bag's opening using adhesive tape.
- F. Prior to commencing installation work, ensure that the surrounding areas are clean and promote ease of installation work.
- G. Ensure that all equipment rack and equipment locations are clean before commencing installation work.
- H. Unless specified otherwise, furnished products / equipment shall be tested, delivered and installed. And, all systems shall be tested and commissioned to fully operational and properly configured condition.
- I. All electrical equipment shall be burned-in or tested at the Contractor's shop before delivery. This pre-installation test shall reveal any equipment that is faulty, malfunctioning or dead out of the box ahead of time.
- J. All radio frequency (RF) operated devices shall be tested on-site prior to installation to determine blind spots, RF interference, or any other transmission / reception problems. The Contractor shall be responsible for costs associated with providing additional support or accessory equipment (antennas, amplifiers, cables, etc.) and / or services to improve signal transmission / reception.
- K. Provide all support equipment (ladders, man-lifts, tools, etc.) required to complete the installation work in a safe and expeditious manner.
- L. Obtain any plan approvals, permits and licenses required by inspection authorities prior to execution of any installation work. The Contractor shall be responsible for all associated fees and costs incurred while fulfilling this requirement.
- M. Ensure that all equipment is accessible for operation and maintenance work. Under no circumstance shall equipment be inaccessible or inconveniently located.
- N. Aside from the systems' operational features, provide equal attention to the overall aesthetics of the installed equipment and cabling. Special attention to aesthetics shall be extended to equipment or cabling in public spaces.
- O. Firmly secure all fixed equipment and hardware in place and ensure that they are plumb and / or square. An exception to this shall be portable or movable equipment.
- P. Structurally mounted equipment: All equipment shall be mounted in accordance to all applicable safety codes, standards and practices. The one that provides for the most stringent rule shall prevail. All mounting hardware shall have a load rating by, at least, a factor of 5 (500% or greater) in reference to the weight of the equipment to be mounted or suspended. An exception to the rule shall be existing local safety codes or standards requiring greater load capacities.
- Q. Seismic restraints: Abide by all the seismic restraint requirements described in all applicable building codes in force at the work site. If no provisions exist for a particular situation, follow these minimal recommendations.
  - 1. Fixed equipment: Mount and brace to the building structure to minimize potential hazards to personnel and damage to property during any kind of seismic event.



2. Floor mounted equipment: Bolt equipment securely to the floor to prevent from toppling during any kind of seismic event
3. Vertical-mounted columns: Apply braces to the vertical column in four opposing directions back to the mounting surface. This will minimize sway in any direction. Provide a separate, flexible restraint (e.g. aluminum braided aircraft cable) with a capacity of 5 times the weight of the total mounting system. The same applies to the anchor to which the flexible restraint is attached and the method of attachment to the structure.
4. No equipment, equipment supports, or mounts must fail before the structure fails.
5. Seismic restraint measure must not interfere with fire stopping.
6. Notwithstanding compliance with these minimum recommendations, it is the Contractor's responsibility to ensure that the seismic restraint measures taken are adequate for the circumstances, including, if required, verification by an independent structural engineer. The cost of all such engineering shall be the responsibility of the Contractor.
7. Penetration of the Slab: Verify that any mounting or restraint work that requires deep or thorough penetration of the slab shall not damage embedded materials including, but not limited to, slab tensioning devices or conduit. Verify the slab by X-ray or other method before proceeding. The Contractor shall be responsible for all costs associated with this investigation.

### **3.04 Installation**

- A. Follow manufacturer's instructions for installing, operating, configuring, and programming their equipment. Do not perform modifications to equipment that would void its warranty.
- B. Pull and terminate all cables, and interconnect all equipment and components in accordance with approved drawings. Install audio-visual cover plates and faceplates onto all boxes.
- C. Loudspeaker Assembly Installation
  1. Loudspeakers:
    - a. Verify proper installation of loudspeaker enclosures and related support.
    - b. Verify that no loudspeaker assembly is subjected to stresses or loading effects in any way contributing to possible extraordinary failure.
    - c. Connect loudspeaker assemblies to the appropriate 70 volt-line transformer tap as applies. Verify specified polarity. Use insulated crimp connectors or insulated "bobtail" splices applied with manufacturer's recommended ratchet tooling. Wago Wall-Nuts 773 Series or equal are acceptable. Wire nuts or "Scotchlock" connectors shall not be acceptable.
    - d. Verify that loudspeaker grille openings and loudspeaker components are clear of paint after finishing.
    - e. Perform preliminary loudspeaker tests specified herein. Correct non-conforming conditions.
    - f. Adjust 70 volt-line transformer taps as required to realize uniform sound pressure level as specified herein. Document final 70 volt-line transformer taps on the Record Drawings.



- g. Correct all conditions giving rise to noise, rattle or other extraneous sounds owing to operation of a loudspeaker assembly under any specified operating condition.
- 2. Packaged Loudspeakers:
  - a. Design, engineer and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter "support") of packaged loudspeakers. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction. Submit in timely manner.
    - 1) Comply with applicable Code and the requirements of the Authorities having jurisdiction.
    - 2) Provide safety factor greater than six or as required by Code, whichever is greater.
  - b. Mounting shall:
    - 1) Permit each packaged loudspeaker to be re-oriented at least plus or minus 5° from angles shown on the Contract Drawings for optimum coverage.
    - 2) Maintain precise location and orientation of each packaged loudspeaker component after such adjustment when subject to vibration of loudspeaker components due to operation at full specified system output level, and when subject to normal building motion and Code defined seismic induced building motion.
    - 3) Use rigid metal support members, such as threaded rod with locking nuts.
  - c. Test each packaged loudspeaker prior to installation at design locations. Test at least polarity and freedom from buzzes, rattles and objectionable distortion, using procedures specified herein. Correct non-conforming conditions.
  - d. Do not apply any load to building structure without first obtaining written approval of the Owner. Obtain per Project procedures.
  - e. During Acceptance Testing, adjust orientation of packaged loudspeakers as directed to achieve optimum coverage. Provide workers and ladders as required. Perform such adjustment with no claim for additional cost or time.
  - f. Do not suspend or orient the loudspeaker cluster prior to verification by the Owner or Owner's representative, that the intended location is correct with respect to as-built conditions such as the final dimensions of the space.

### **3.05 Labeling and Identification**

- A. All cables and connecting blocks shall be clearly, logically and permanently marked and identified by the following means:
  - 1. Use cable labels similar to the Panduit Polyolefin Self-laminating Labels for inkjet or LaserJet printers or any other means acceptable to the Consultant. Cable labels should be machine printed and not handwritten.
  - 2. Cable labels should be placed approximately 12 cm. from each end of the cable.



3. Labeling conventions shall be clear, logical, and must be acceptable to the Consultant.
  4. Include all cable identification numbers on all wiring diagrams and cable schedules.
  5. For fiber optic cables, use cable identification products such as the Panduit Label Core series or any other means acceptable to the Consultant.
  6. For connector and terminal blocks, label using Wago, Phoenix or any means acceptable to the Consultant.
- B. All cover plate, switches, panels, outlets, etc. labeling shall be engraved and filled, or silk-screened or by any other means acceptable to the Consultant. Do not use Dymo, Brother Ptouch, or other similar labeling products.
- C. Protective Devices
1. Identification of fuses and circuit breakers shall indicate protected circuitry, rating of protective device and voltage across open circuited protected device.
- D. Panels and Receptacles
1. Panel surfaces shall be engraved and filled or silk screened with identification, or shall be provided with 1/16 inch (minimum) thick laminated plastic labels with engraved block characters at least 1/8 inch high fastened to the equipment by stainless steel screws or rivets. Provide white characters on black background unless otherwise noted. Do not use Dymo, Brother Ptouch, or other similar labeling products.
- E. All equipment shall be labeled in a clear, logical manner or by any other means acceptable to the Consultant.
1. For equipment identification, use 'badges' made of aluminum or plastic or any other acceptable material with engraved and filled, or silk-screened labeling. Stick these badges using industrial-strength doubled-sided 3M adhesive tape. Label schemes should be clear, logical, and simple or by any other means acceptable to the Consultant. Indicate equipment labeling schemes on all elevation and plan drawings showing the front and / or rear of the equipment racks. The reader should be able to easily reference the label description to specific equipment in the Operation and / or Maintenance Manuals. Do not use Dymo, Brother Ptouch, or other similar labeling products.

### **3.06 Wiring**

- A. General
1. This section does not apply if the drawings incorporate a wire schedule.
- B. Audio Signal Wiring Classification:
1. Type A-1: Microphone level wiring less than -30 dBu, 20 Hz to 20 kHz.
  2. Type A-2: Line level wiring -30 dBu to +24 dBu, 20 Hz to 20 kHz.
  3. Type A-3: Loudspeaker level or circuit wiring greater than +24 dBu, from 20 Hz to 20 kHz.
- C. Control Signal Wiring Classifications:
1. Type C-1: DC control wiring 0 to 50 volts.
  2. Type C-2: Synchronous control or data wiring 0 to 40 volts, peak-to-peak.



3. Type C-3: AC control wiring 0 to 48 volts, 60 Hz.
- D. Additional Wiring Classifications:
  1. Type M-1: DC power wiring 0 to 48 volts.
  2. Type M-2: AC power wiring greater than 50 volts, 60 Hz.
- E. Wiring Combinations: Except as indicated herein, conduit, wire ways and cable bundles shall contain only wiring of a single classification. The following combinations are acceptable in conduit, or cable harnesses. Additional acceptable combinations may be indicated on the Contract Drawings.
  1. Types A-1, C-1, and M-1.
  2. Types A-2, C-1, C-2, and M-1, runs less than 20 feet.
  3. Types A-2, C-1, and M-1.
  4. Types A-3, C-1, C-2, and M-1.
  5. Types A-2, V-1, and V-3.
  6. Types V-1, V-2, V-3, and C-1.
  7. Types M-2 and C-3.

### **3.07 Wire and Cable Installation**

- A. Provide permanent identification of run destination at all raceway terminations.
- B. All wire and cable shall be continuous and splice-free for the entire length of run between designated connections or terminations.
- C. All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, panels, connector shell or equipment enclosures.
- D. Within buildings, make splices only in designated terminal cabinets and/or on designated equipment backboards. Outside buildings, make splices only in designated manholes and/or hand holes. Protect splices outside of buildings with splicing kits equivalent to Scotch-cast Re-enterable. Make splices only with connectors or terminal devices specified herein. Document all splices on Record Drawings.
- E. Verify that all raceway has been de-burred and properly joined, coupled, and terminated prior to installation of cables. Verify that all raceway is clear of foreign matter and substances prior to installation of wire or cable.
- F. Inspect all conduit bends to verify proper radius. Comply with Code for minimum permissible radius and maximum permissible deformation.
- G. Apply a chemically inert lubricant to all wire and cable prior to pulling in conduit. Do not subject wire and cable to tension greater than that recommended by the manufacturer. Use multi-spool rollers where cable is pulled in place around bends. Do not pull reverse bends.
- H. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Provide tool formed thermal expansion loops at cable at manholes, handholes and at both sides of all fixed mounted equipment. Cable loops and bends shall not be bent at a radius greater than that recommended by the manufacturer.



- I. Secure all wire and cable run vertically for continuous distances greater than 30 feet. Secure robust non-coaxial cables with screw-flange nylon cable ties or similar approved devices appropriate to weight of cable. For all other cables, provide symmetrical conforming nonmetallic bushings or woven cable grips appropriate to weight of cable.
- J. All Category type cable, connectors and plugs shall be color coded for easy visual distinction. Color coded insert type boots shall be installed on all Category type plugs. A colored coded ring will be provided on all chassis connectors (i.e. Neutrik ACRF-#). Cable connectors shall be equipped with Neutrik BSE-# color coded bushings. The Color code shall be as follows:
  1. LAN =Yellow
  2. Audio Network =Red
  3. AV Local Area Network =Orange
  4. Computer Training KVM =Grey
  5. AV UTP =White

### 3.08 Connector and Signal Polarity Convention

- A. Maintain consistent absolute signal polarity at all connectors, patch points and connection points accessible in the system. Where applicable, a positive polarity electrical signal shall yield positive acoustic pressure from the loudspeakers.
- B. Audio signal connector convention: AES14-1992 (ANSI S4.48-1992) AES standard for professional audio equipment - Application of connectors, Part 1, XLR-type polarity and gender.

<u>Signal</u>	<u>Connector</u>	<u>Wire</u>
Signal Phase	Pin 2	Red or White
Signal Anti-Phase	Pin 3	Black
Signal Ground	Pin 1	Drain Wire

- C. RF Connector Convention:

<u>Signal</u>	<u>Connector</u>	<u>Wire</u>
Signal Phase	Center Pin	Center conductor
Signal Anti-Phase	Shell	Shield
Signal Ground	Shell	Shield

- D. Voice/Data Connector Convention: Comply with EIA/TIA-568C.

### 3.09 Wiring Practice



- A. Land all non-coaxial field wiring entering each equipment rack at specified terminal devices prior to connection to any equipment or devices within racks. At Contractor's option, such terminals may be located in the equipment racks or at backboards provided. Coordinate such selection with Project construction sequence and test procedures specified herein.
- B. Identify all wire and cable clearly with permanent labels wrapped about the full circumference within one inch of each connection. Indicate the number designated on the associated field or shop drawing or run sheet, as applies. Assign wire or cable designations consistently throughout a given system. Each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations. Provide any of the following:
  - 1. Continuous permanent imprint; equivalent to Clifford of Vermont, Inc. "Quik-Pull".
  - 2. Direct hot stamp.
  - 3. Heat shrinkable factory hot stamped; equivalent to Brady sleeve Heat shrink.
  - 4. Adhesive strip printed labels wrapped the full circumference of the wire and sealed with clear heat shrink tubing; equivalent to Thomas and Betts or Panduit Insta-code with clear heat-shrunk tubing equivalent to Alpha.
- C. Apply all crimp connectors only with manufacturer's recommended ratchet type tooling and correct crimp dies for connector and wire size. Plier type crimp tooling shall not be acceptable.
- D. Coordinate insulation displacement (quick connect) terminal devices with wire size and type. Comply with manufacturer's recommendations. Make connections with automatic impact type tooling set to recommended force.
- E. Make all connections to screw-type barrier blocks with insulated crimp-type spade lugs. Lugs are not required at captive compression terminal type blocks. Provide permanent designation strips designed for use with the terminal blocks provided. Make neat, intelligible markings with indelible markers equivalent to "Sharpie".
- F. Tin terminated shield drain wires and insulate with heat shrinkable tubing.
- G. Use only rosin core 60/40 tin/lead solder for all solder connections.
- H. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections. No wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.
- I. Termination and build out resistors and related circuit correction components shall be visible. Do not install in connector shells or internally modify equipment. Show locations on Record Drawings.
- J. Correct any and all of the following unacceptable wiring conditions:
  - 1. Deformed, brittle or cracked insulation.
  - 2. Insulation shrunken or stripped further than 1/8-inch away from the actual point of connection within a connector, or on a punch block.
  - 3. Cold solder joints.
  - 4. Flux joints.
  - 5. Solder splatter.



6. Non-grommet, non-bushed, or non-insulated wire or cable entries.
7. Deformation or improper radius of wire or cable

### **3.10 Signal Grounding Procedures**

- A. Comply with National Electrical Code.
- B. Unless otherwise noted maintain a unipoint ground scheme.
- C. Signal and electrical system grounds shall be isolated except at the Project ground field connection.
- D. Equipment enclosures shall not be permitted to touch each other unless bolted together and electrically bonded.
- E. Ground and bond equipment racks and similar equipment enclosures containing powered equipment exclusively via the Isolated Ground conductors provided under Division 26. INSULATE RACK MOUNTING, ANCHORAGE, AND RACEWAY CONNECTIONS.
- F. At each rack, provide an Isolated Ground bus within the rack. At each rack, provide a lug bonded to the rack frame with a #8 TW stranded wire to the rack Isolated Ground bus.
- G. At each ensemble of racks, provide a single labeled Isolated Ground tubular-clamp bus bar terminal strip to land the individual rack Isolated Ground bus ground conductors. Connect the main Isolated Ground conductor from the Technical Power panel board at this point.
- H. Equipment signal ground shall be to the Isolated Ground System via the green wire of the equipment power cord. Where equipment uses two wire power cord, provide #12 green bond wire to rack IG bus bar. At equipment, provide crimp lug and suitable hardware for bonding.
- I. Shielded cables of this section shall be grounded exclusively to Isolated Ground by a single path. Shield shall be tied to Isolated Ground at one end only, i.e., at the low potential (receiving) end of run, unless otherwise noted.
- J. Unless otherwise noted, at audio jackfields, tie source shield at jackbay frame. Float shields at connections to output jacks. Bus each row of jack frames and run individual #12 green ground wire for each row to rack IG bus bar.
- K. Signal Ground provisions shall realize less than 0.15 ohms to the primary ground connection.

### **3.11 Equipment Enclosure (Rack) and Equipment Backboard Fabrication**

- A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.
- B. Within each equipment enclosure, provide a full-height multi-circuit ISOLATED GROUND outlet strip with branch circuit count as shown on drawings; locate on the left side of the equipment enclosure, as viewed from the rear. In each enclosure provide number of receptacles required by present and future equipment indicated on drawings, plus at least two spare receptacles. Provide flexible steel raceway and junction box for connection of power service. Bond internal raceway to rack frame.



- C. Provide a permanent label on the front of each equipment rack including the rack designation, and the circuit breaker number and associated electrical distribution panel designation servicing same.
- D. Maintain separation of wiring classifications as specified herein. Separately dress, route and land microphone and line level cables and related on the right side of the equipment enclosure, as viewed from the rear; dress, route, and land loudspeaker level and control cables on the left side of the equipment enclosure, as viewed from the rear.
- E. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.
- F. Fasten removable covers containing any wired component with a continuous hinge along one side, with associated wiring secured and dressed to provide an adequate service loop. Provide an appropriate stop locks to hold all hinged panels and drawers in a serviceable position.
- G. Provide permanent labels for all equipment and devices. Where possible, fasten such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.
- H. At jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contacts for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.
- I. Coordinate the design and execution of wire harnessing of multi-bay rack ensembles with conditions of delivery to installation locations at Project Site, and with the requirement herein for test of the completely wired system in the shop prior to delivery to the Project Site. Organize the wiring harnesses such that they will fold within one shippable unit without risk of damage, or provide polarized multipin connectors and related interconnect systems as specified elsewhere herein.
- J. At each equipment backboard, provide UL Listed surge suppressing multi-outlet assembly with at least six receptacles.

### **3.12 Adjusting and Testing**

- A. Test Equipment
  - 1. Furnish, store and maintain test equipment at the fabrication shop and the job site for both routine and Acceptance Testing of the Work of this Section. Maintain all test equipment at the job site while work is in progress from installation of equipment racks until Owner Acceptance of this Work; thereafter remove all of this test equipment from the job site. Provide all required test cables, jigs and adapters. Provide at least one of the following items or approved functional equivalents:
  - 2. Audio Systems:
    - a. Wide Band Oscilloscope (Tektronix THS700 Series).
    - b. True RMS Analog / Digital Volt-Ohm Multimeter (Fluke 187 Series or equal).
    - c. Low Distortion Audio Frequency Sine Wave Oscillator (Gold Line TS1).



- d. Measurement Microphones (Earthworks M30, Bruel & Kjaer 4007, Josephson 550).
  - e. Sound System Optimization and Acoustic Measurement Analyzer (Goldline TEF, Meyers SIM, SIA Smaart, WinMLS, EASERA).
  - f. Harmonic Distortion Analyzer (Sound Technology or Tektronix AA 501A) or Swept Spectrum Analyzer, HP 3580A, or Swept Test System, Audio Precision or Neutrik).
3. Communications and Related:
- a. Level II, Cat5e Cable Pair Tester (Microtest, HP, Scope, Fluke or Siemons set up to meet Category 5e parameters).
  - b. Outside Plant Voice Cabling Plant Tester – capable of detecting shorts, opens, reversals, mis-wiring and crosstwists (Siemon STM-8 or equal by Mod-Tap).
  - c. Metallic cable pair tester (Wavetek Corporation, Instruments Division, model LANTech 100).
  - d. Tone Test Set.
  - e. Optical Time Domain Reflectometer (OTDR) for fiber optics.
  - f. Any other items of equipment or materials required to demonstrate conformance with the Contract Documents.
- B. System Performance Testing and Adjusting Procedures
- 1. Upon completion of the installation of all equipment in an area, perform the following tests and record results. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Correct all non-conforming conditions prior to requesting Acceptance Review and Testing. Perform at least the following procedures:
  - 2. Mechanical: Verify:
    - a. Integrity of all support provisions.
    - b. Absence of debris of any kind, tools, etc.
  - 3. Power and Isolated Ground: Verify:
    - a. Isolation of Isolated Ground system from raceway and related ground.
    - b. Grounding of devices and equipment. Integrity of signal and technical power system ground connections.
    - c. Proper provision of power to devices and equipment.
  - 4. Signal Wiring: Verify:
    - a. Integrity of all insulation, shield terminations and connections.
    - b. Integrity of soldered connections. Absence of solder splatter, solder bridges.
    - c. Routing and dressing of wire and cable.
    - d. Continuity, including conformance with wire designations on running sheets, field and shop drawings.



- e. Absence of ground faults.
    - f. Polarity.
  - 5. Use the proper sequence of energizing systems to minimize the risk of damage.
  - 6. Audio Systems:
    - a. Electronic Tests; confirm:
      - 1) Gain at 1 kHz.
      - 2) Maximum output.
      - 3) Input clipping level.
      - 4) Frequency response.
      - 5) Total harmonic distortion.
      - 6) Signal-to-Noise ratio.
      - 7) Signal-to-Crosstalk ratio.
    - b. Electro/Acoustic Tests:
      - 1) Uniformity of coverage.
      - 2) Electronic and acoustic frequency response/one-third octave equalization. Transfer function measurement shall be as close to flat as possible. Measure at ear level. Representative of the Owner will direct final adjustment.
      - 3) Maximum continuous sound pressure level (in the reverberant field). Drive systems with broadband pink noise. Sustain for at least five minutes with no system damage. Measure for "A" and "C" weightings at ear level on loudspeaker axis. Turn off noise.
      - 4) Acoustic signal-to-noise ratio referenced to the specified maximum continuous sound pressure level in the reverberant field. Measure for "A" and "C" weightings at ear level on loudspeaker axis with mechanical systems operating. Present comparison with previous measurement.
      - 5) Acoustic gain before feedback. Locate acoustic source (4 inch loudspeaker/pink noise generator) two feet from system microphone. Measure at system microphone position and at most distant listener position at ear level. Present comparison.
  - 7. Diagnostic Monitoring System:
    - a. Demonstrate complete operation.
  - 8. System Overall:
    - a. Verify levels.
    - b. Provide permanent "wedge" type labels on all controls, as applies, to indicate correct settings after systems performance testing and adjustment procedures have been successfully completed.
- C. Loudspeaker Assembly Testing and Adjusting Procedures



1. Upon completion of the installation of all loudspeakers in an area, perform the following tests and record results. Correct non-conforming conditions, unless the cause is clearly outside the Work of this Section, in which case submit the apparent cause to the Owner.
  2. Loudspeaker Line Impedance: At terminal cabinets at equipment rooms, measure the impedance of each loudspeaker line. Sweep from at least 20 Hz to at least 16 kHz.
  3. Loudspeaker Polarity: Test the acoustic polarity of all loudspeakers using an Acoustic Polarity Tester.
  4. Freedom From Buzzes, Rattles and Objectionable Distortion: Individually apply to each loudspeaker line a slow sine wave sweep from 50 Hz to 5 kHz at a level of 6 dB below rated power amplifier output voltage. Listen carefully for buzzes, rattles and objectionable distortion.
  5. Uniformity of Coverage: Apply broadband Pink Noise. Adjust level to approximately 70-80 dBA at measurement locations. Measure in 4 kHz octave band at ear level. Adjust loudspeaker aiming and 70 Volt loudspeaker taps for uniformity of coverage.
- D. Equipment Rack and Equipment Testing and Adjusting Procedures
1. 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:
  2. Preliminary: Verify:
    - a. Grounding of devices and equipment. Integrity of signal and electrical system ground connections.
    - b. Proper provision of power to devices and equipment.
    - c. Integrity of all insulation, shield terminations and connections.
    - d. Integrity of soldered connections. Absence of solder splatter, solder bridges.
    - e. Absence of debris of any kind, tools, etc.
    - f. Routing and dressing of wire and cable.
    - g. All wiring, including polarity and continuity, including conformance with wire designations on running sheets, field and shop drawings.
    - h. Mechanical integrity of all support provisions.
  3. Rig temporary power and grounding: Comply with all applicable Codes, regulations and ordinances.
  4. Determine the proper sequence of energizing systems to minimize the risk of damage. Energize. Burn in for at least 120 hours.
- E. Telecommunications Cabling Testing



1. Perform telecommunications cabling inspection, verification, and performance tests in accordance with TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3. Perform optical fiber field inspection tests via attenuation measurements on factory reels and provide results along with manufacturer certification for factory reel tests. Remove failed cable reels from project site upon attenuation test failure.
2. Visually inspect UTP and optical fiber jacket materials for UL or third party certification markings. Inspect cabling terminations in telecommunications rooms and at workstations to confirm color code for T568A or T568B pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3. Visually confirm Category 6 marking of outlets, cover plates, outlet/connectors, and patch panels.
3. Perform testing for each outlet as follows:
  - a. Perform Category 6 link tests in accordance with TIA-568-C.1 and TIA/EIA-568-B.2. Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay, and delay skew.
  - b. Optical fiber Links. Perform optical fiber end-to-end link tests in accordance with TIA-568-C.3. E. Final Verification Tests
  - c. Perform verification tests for UTP and optical fiber systems after the complete telecommunications cabling and workstation outlet/connectors are installed.

### **3.13 Cleaning**

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

### **3.14 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.

### **3.15 Acceptance Review, Testing Procedures and Commissioning**



- A. Complete all Work of this Section. Submit Test Report. Submit review copies of Operating and Maintenance Manuals, less reduced set of Record Drawings. Notify the Owner in writing that the Work of this Section is complete and fully complies with the Contract Documents. Request Acceptance Review and Testing by returning Attachment "A" to the Design Consultant. The representative of the Owner will conduct Verification of Submitted Test Data, and otherwise direct testing and adjustment of this Work. These Procedures may be performed at any hour of the day or night as required by the representative of the Owner to comply with the Project Schedule and avoid conflict with these procedures from possible ongoing work of other Separate Contracts and/or the Owner's operations. Provide all specified personnel and equipment at any time without claim for additional cost or time.
- B. Personnel: Provide services of the designated supervisor and additional technicians familiar with work of this Section. Provide quantity of technicians as required to comply with Project Schedule.
- C. In Addition, Provide:
  - 1. Set of hand and power tools appropriate for performance of adjustment of and corrections to this Work.
  - 2. Include spare wire and connectors and specified tooling for application.
  - 3. Ladders, scaffolding and/or lifts as required to access loudspeakers and other high devices.
  - 4. Test equipment to include but not limited to:
    - a. Dual channel FFT-based audio analyzer
    - b. Category cable tester, cable length, short, open and miswire test.
  - 5. Complete set of latest stamped, actioned submittals of record for reference.
  - 6. Complete set of Shop and Project Site Test Reports.
  - 7. Complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.
- D. Demonstrate: Complete operation of all systems and equipment, including Portable Equipment.
  - 1. General
    - a. Configure room for each type of event and demonstrate audio-visual system.
    - b. Connection of portable equipment. (Laptop, document camera, etc.)
    - c. Demonstrate to the Consultant that all functions and equipment for the system work properly when installed as a complete system.
    - d. The Contractor shall demonstrate the satisfactory operation of all controls and adjustment circuits of the system.
    - e. Demonstrate system startup and shut down procedures.
  - 2. Audio
    - a. Route audio to program speakers.
    - b. Connect microphone to each panel input and route through system.
    - c. Demonstrate and document gain structure through the system.



- d. Demonstrate and document with a dual channel FFT-based audio meter the following:
    - 1) Polarity of each driver in each cabinet.
    - 2) Crossover point of high, mid and low section of each loudspeaker.
    - 3) dB SPL levels from 1-4 kHz at various position in the audience area.
    - 4) dB SPL level of high, mid, low and sub frequency bandwidth at crossover.
  - e. Wireless microphones.
  - f. Demonstrate that the audio system is properly time aligned and equalized.
  - g. Assistive listening system.
- 3. The Contractor 's personnel and test equipment shall be made available to the Consultant in order that:
  - a. Selected tests and measurements previously made by the Contractor can re-run.
  - b. Other tests may be made at Consultant's discretion.
  - c. Additional tests or measurements may be made due to changes in field conditions.
- 4. It is estimated that the acceptance tests and demonstrations will require approximately *two hours*, unless construction or installation problems or deviations from the specifications are discovered.
- E. Adjust: As directed by the representative of the Owner.
- F. Correct: In timely manner, failure to comply with the Contract Documents, as reasonably determined by the representative of the Owner.
- G. Acceptance Documentation
  - 1. Official acceptance of the system covered by this specification will occur when the Design-Builder receives the following written documents:
    - a. A letter from the Consultant to the Architect acknowledging Final Acceptance of the system stating compliance with all articles of the specifications.
    - b. A letter from the Architect to the Contractor stating that all related work has been completed to his satisfaction. Until these documents are received, the installation is not formally complete. The official date of acceptance shall be the date of the letter from the Architect to the Contractor described above.

### 3.16 Closeout

- A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit Test Report. Notify Owner of completion of Punch List.
- B. Portable Equipment: Furnish all portable equipment and spares to the designated representative of the Owner, along with complete documentation of the materials presented. Where applicable, furnish portable equipment in the original manufacturer's packing.
- C. Operating and Maintenance Data: Install framed operating and maintenance instructions. Submit Manuals.



- D. Project Record Documents: Submit.
- E. Keys: If applicable, replace construction locks with permanent locks. Transmit keys to Owner.
- F. Training: Conduct specified training and submit training manuals.
- G. Warranty: Submit Warranty dated to run from date of Acceptance of the Work of this Section.

### **3.17 Owner's Right to Use Equipment**

- A. Acceptance of the Work of this Section will be after completion of corrections and adjustments required by the "Punch List" which results from Acceptance Review and Testing of the completed installation. The Owner reserves the right to use equipment, material and services provided as part of the Work of this Section prior to Acceptance without incurring any obligation to Accept any equipment or completed systems until all Punch List work is complete and all systems comply with the Contract Documents; or accept any claim for additional cost or time.



**Attachment "A"**  
**NOTICE OF COMPLETION**

**&**  
**REQUEST FOR FINAL INSPECTION**

We hereby give notice that the work associated with the Audio-Visual system, at the project named below, is completed and fully complies with the contract documents issued to the Contractor. The required submittals below have been marked as completed.

- |   |  |
|---|--|
| <input type="checkbox"/> Programming        | <input type="checkbox"/> Training Manual       |
| <input type="checkbox"/> Test Reports       | <input type="checkbox"/> Training              |
| <input type="checkbox"/> Operation Manual   | <input type="checkbox"/> Warranty Certificates |
| <input type="checkbox"/> Maintenance Manual | <input type="checkbox"/> Record Drawings       |

We request commissioning and verification testing be scheduled with the Owner's Representative for final system sign off. Attached is a list of test equipment for review and acceptance.

**PROJECT INFORMATION**

Project Name:	
Project Phase:	

**CONTRACTOR INFORMATION**

Name:	Company:
Address:	

Note to Contractor: Provide all test equipment for final inspection as described in the specification.

**Please complete and fax or email this form to Veneklasen Associates attention AV Department**

**Fax (310) 396-3424**

**Email [dyoung@veneklasen.com](mailto:dyoung@veneklasen.com)**

**END OF SECTION**



GENERAL NOTES:

SCOPE OF WORK

Remove all existing light fixtures, & cross-arm support from top of (6) existing poles F1, F4, F5, F6, F7, F8 and replace with new light fixtures, new cross-arm supports as indicated. Remove existing ballast boxes & add ballast boxes as indicated.  
Install (2) new poles F2, F3

APPLICABLE BUILDING CODE

All construction and workmanship shall conform to the 2016 California Building Code, California Code of Regulations – Title 24, Parts 1 & 2.

This pole and foundation standard has been designed for lateral loads on the completed structure as follows:

- Wind Design Data:
  - Vult = 110 MPH (Exposure C); Vasd = 85 MPH (Exposure C)
  - Risk Category = II

- Seismic Design Data:
  - Ie = 1.0
  - Risk Category = II (Self Supporting Poles)
  - Ss = 2.208
  - Si = 0.795
  - Site Class = D
  - Sa = 1.472
  - Su = 0.795
  - Seismic Design Category = E
  - Basic Seismic-Force-Resisting System = Non-Building Structure, not similar to buildings
  - R = 1.5
  - Analysis Procedure = Equivalent Lateral Force Procedure
  - See Pole Foundation Schedule for maximum pole seismic forces.

LIGHT POLE FOUNDATIONS

Reference chapter 18A, sections 1806A, 1807A, and 1810A of the 2016 edition of the California Building Code, assume class 5 soils.

Assumed allowable end bearing soil pressure: 1,500 psf (table 1806A.2) or 250 psf skin friction (section 1810A.3.3.1.4)

Assumed allowable lateral passive soil bearing pressure: 200 psf/ft for isolated poles not adversely affected by a 0.5 inch motion at the ground surface (section 1806A.3.4).

Assumed design soil parameters are as noted. Actual allowable soil design parameters at level or sloping conditions (if any) must be verified by a geotechnical engineer.

The Contractor must familiarize himself with the complete geotechnical report, and borings and contact the above firm to understand the soil conditions and the possibility of ground water pumping and excavation stabilization or bracing during the foundation installation and placement of concrete.

Soil formations that will require special design considerations or excavation procedures may exist. Pole foundations may need to be reanalyzed according to the soil conditions that exist.

If any discrepancies or inconsistencies arise, notify the RDP in Responsible Charge of such discrepancies.

All concrete must bear on and against firm undisturbed soil as determined by the Geotechnical Engineer.

Place plywood collar around perimeter at the top of foundation excavation to prevent soil from entering pier.

All excavations must be free of loose soil, and debris prior to foundation installation and placement of concrete. Casing or drilling slurry may be required if caving occurs. Review and approval of the Geotechnical Engineer and DSA is required.

All excavations must be free of water or concrete shall be placed by the Tremie Method in accordance with ACI standard 336. Concrete placed by the Tremie Method shall have a minimum ultimate strength of 1,000 PSI greater than required under "Concrete Cast-in-Place" and a maximum slump of 8".

GENERAL CONSTRUCTION

These notes shall be used in conjunction with the plans and any discrepancies shall be brought to the attention of the Engineer.

Contractor must check all dimensions, clearances and job conditions before starting work. Engineer shall be notified immediately of any discrepancies or possible deficiencies.

The drawings and specifications represent the finished structure. All bracing, temporary supports, shoring, etc., is the sole responsibility of the Contractor. Observation visits to the job site by the Engineer do not include inspection of construction procedures. The Contractor is solely responsible for all construction methods and for safety conditions at the worksite. These visits shall not be construed as continuous and detailed inspections.

Design, material, equipment, and products other than those described below or indicated on the drawings may be considered for use, provided prior approval is obtained from the School District, Engineer, and the Division of the State Architect.

All changes in approved plans shall be made by means of construction change documents (CCD) approved by the Division of State Architect, as required by Section 4-338, Part 1, Title 24, CCR. All CCD documents shall be signed by the Architect and Owner. Addenda shall be signed by the design professional in general responsible charge.

Substitutions shall be considered as a CCD and shall be approved by DSA prior to fabrication or use.

A Class 1 or Class 2 Project Inspector employed by the District (Owner) and approved by the Division of State Architect shall provide continuous inspection of the work, the duties of the Inspector are defined in Section 4-342, Part 1, Title 24, CCR.

All Tests And Inspections shall be performed by an Independent lab employed by the School District and approved by DSA.

Reference pole location drawings provided by the Architect, Structural Engineer, or Electrical Engineer for actual pole placement and site location.

CONCRETE (CAST-IN-PLACE)

Concrete pier foundations with steel reinforcement shall attain a minimum ultimate compressive strength at 28 day test of 3,000 psi. Batch plant inspection not required.

All concrete shall attain a minimum strength of 2,500 psi prior to steel pole erection.

Use Type II/V Portland cement or as directed by the Geotechnical Engineer.

Portland Cement ASTM C-150.

Aggregate ASTM C-33. 1" maximum aggregate size. 3/8" max agg. size are not permitted.

Mix in conformance with ASTM C-94, ACI 318 SECTIONS 19.2 and 26.4.

Place concrete immediately after completion of excavation and inspection by the Geotechnical Engineer and the DSA Inspector. Under no circumstances shall piers be allowed to remain open for more than 12 hours without the approval of the Geotechnical Engineer. Excavations shall be covered and protected until filled with concrete.

Concrete shall be placed in one continuous operation (no construction joint) with special equipment to assure a maximum freefall of 5 ft and to prevent concrete from striking the sides of the excavation. Freefall of concrete is unacceptable through water or drilling slurry.

Vibrate concrete full depth, except for concrete with slump greater than 6", then vibrate only upper 10"-0". Concrete placed under water shall have a slump of 6"-8".

PRECAST BASE

The precast concrete base conforms to California Code of Regulations, T.24, part 2, Chapter 19A and to Building Code Requirements for Reinforced Concrete, ACI 318-14.

See detail "A" on "MS2" sheet for material strengths and specifications.

STEEL POLE

All miscellaneous structural steel items conform to AISC 360-10.

All weldment conforms with AWS D1.1 specification for ASTM A123 latest standards.  
utilizing F7XX-EXXX or F8XX-EXXX filler metal.  
GMAW procedure conforms to AWS A5.18.  
SAW procedure conforms to AWS A5.23.

All field welding shall be in compliance with AWS D1.1 specification.

All welding shall be continuously inspected by an AWS CWI certified inspector approved by DSA.

All exposed steel shall be hot dipped galvanized to ASTM A123 latest standards.

Steel pole sections conform to the California Code of Regulations T.24, Part 2, Chapter 22A.

All steel conforms to referenced ASTM specifications. (See Pole Data Table for each pole type).

Longitudinal seam welds for pole sections shall have 60% minimum penetration: Except longitudinal seam welds on the female section of telescopic field splices shall be full penetration groove welds for a length equal to the minimum splice length plus 6 inches. See drawing number MD1 for seam weld details.

Steel pole sections shall be assembled in the field by attaching two 1.5 ton "come alongs" to jacking ears, using full effort on each simultaneously, to ensure minimum overlaps as indicated on the "MS2" sheet and detail G/MD1.

TESTING AND INSPECTION

Testing and inspection in accordance with Title 24, Part 1 & Part 2.

STEEL MATERIALS:

Structural steel – 2203A.1 & 2205A.1

Cold formed steel – 2210A.1

High strength bolt identification – table 1705A.2.1 & DSA IR 17-9

STEEL QUALITY:

Tests of structural steel & cold formed steel – 2203A.1

Non-destructive weld tests – 1705A.2.5 & DSA IR 17-9

Tests of high strength bolts, nuts, & washers – 2213A.1 & DSA IR 17-8

STRUCTURAL STEEL INSPECTIONS:

Table 1705A.2.1

Shop fabrication inspection – 1704A2.5

Welding – 1705A.2.5, DSA IR 17-9 and AWS D1.1

High strength bolt installation – Table 1705A.2.1 & DSA IR 17-9

(Including Skidmore-Wilhelm bolt tension pre-installation verification testing)

(NOTE: ALL WELDING SHALL BE CONTINUOUSLY INSPECTED BY AN AWS CWI CERTIFIED INSPECTOR APPROVED BY DSA)

NOTE: Field verify existing pole conditions & repair any defects, if found. Repair procedures and details to be reviewed and approved by Structural Engineer of Record and DSA.

EXCAVATIONS & FOUNDATIONS:

Inspection of cast-in-place deep foundations – 1705A.8 & Table 1705A.8

CONCRETE MATERIALS:

1903A.1

Portland cement – 1910A.1

Concrete aggregates – 1903A.5

Prestressing steel and anchorages – 1910A.3

CONCRETE QUALITY:

Proportions of concrete – Reference ACI 318 Section 26.4.3.1 Through 26.4.4.1

Strength tests of concrete – 1905A.1.16 and ACI 318 Section 26.12 & 26.5.3.2

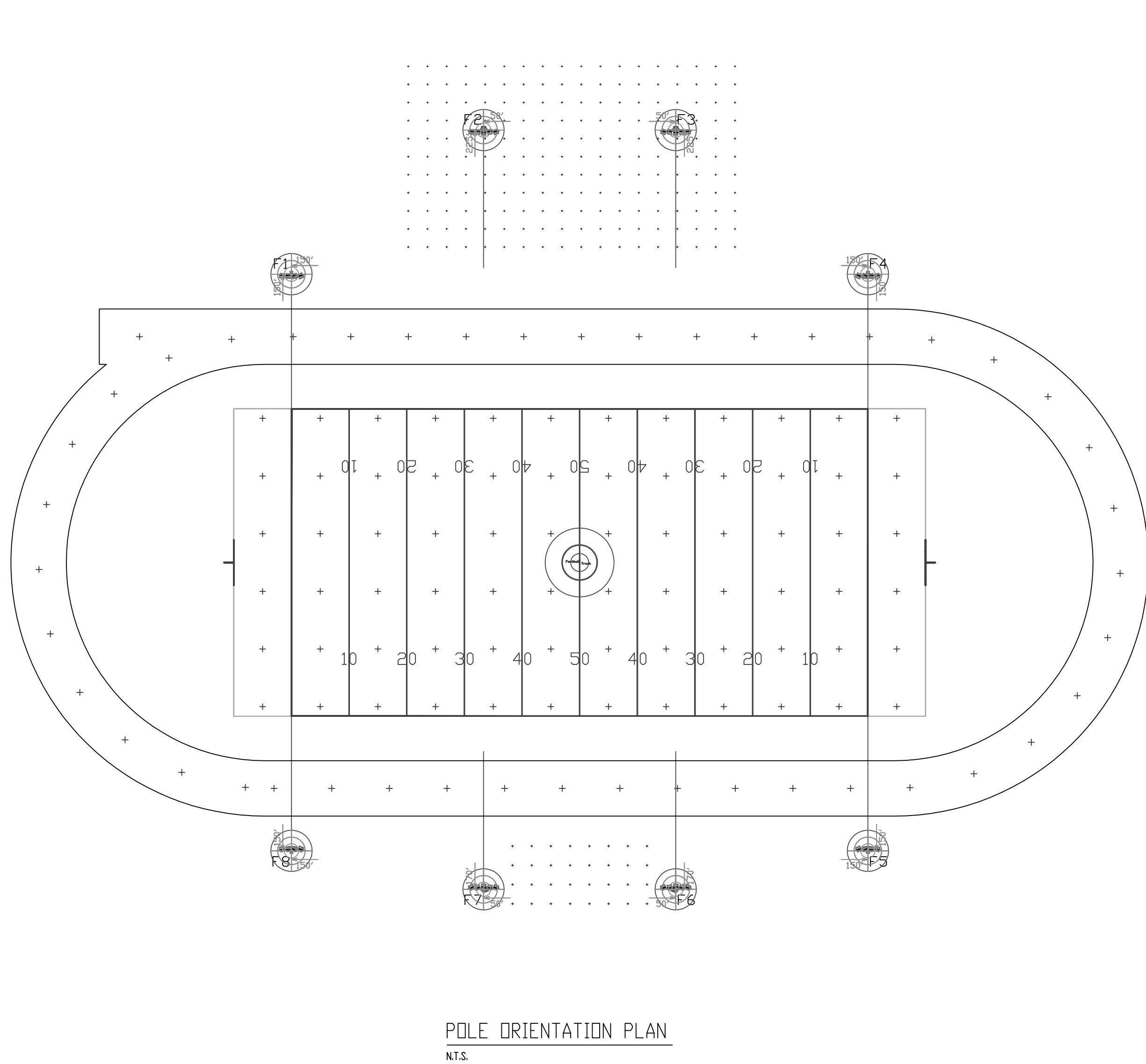
CONCRETE INSPECTION:

1705A.3 & Table 1705A.3

Job site – Reference ACI 318 Section 26.5.1, 26.5.2.1(a) & (b), 26.6.1.2(d), 26.11.1.1(a)

Batch Plant Inspection Not Required – 1705A.3.3.2

Prestressed concrete – 1705A.2.5, 1705A.3.4



Existing Retrofit Configuration										
Exist Pole (As=Built)	Type Attachment	Number Attachments	EPA <sup>1</sup> / Attachment sq ft (t)	Total EPA sq ft	Weight <sup>2</sup> / Attachment lbs	Total Attachments Weight lbs	Weight Ballast Per Fixture lbs	Total ballast Weight lbs	Pole weight lbs	Total weight lbs
F1– F8	LIGHT FIXTURE	12	2.7	32.4	49	590	–	–	2,144	2,734

1. EPA VALUES OF EXISTING FIXTURES WERE TAKEN FROM DSA APPROVED CALCULATIONS..
2. WEIGHTS OF EXISTING FIXTURES WERE ASSUMED.

Proposed Retrofit Configuration												
Exist Pole (As=Modified)	Type Attachment	Number Attachments	EPA/Attachment sq ft	Total EPA sq ft	Weight/ Attachment lbs	Total Attachments Weight lbs	Weight Elect. Driver Per Fixture lbs	Total Elect. Driver Weight lbs	Pole weight lbs	Total weight lbs	Max. % Weight Difference	Max. % EPA Difference
F1, F4, F5, F8	LED1500	4	3.4	13.5	92.8	371	20	120	2,144	2,744	0.37	-44.28
	LED575	2	2.3	4.5	54.5	109						
F6, F7	LED1500	5	3.5	17.4	92.8	464	20	120	2,144	2,865 2,982	4.80 9.08	-29.98 -15.20
	LED400	1	2.1	2.1	71	71						
	SPEAKER*	1	3.2	3.2	66	66	-	-				
	JBL AWC82	1	3.4	3.4	84	84	-	-				
	JBL AWC129	1	4.6	4.6	99	99	-	-				
F2, F3	LED1500	5	3.4	16.9	92.8	464	20	140	2,144	2,998	9.64	0.09
	LED400	1	4.3	4.3	71	71						
	EXTENSION MOUNTING HARDWARE	1	0	0	107	107						
	LED400	1	4.1	4.1	71	71						
	SPEAKER*	2	2.9	5.8	56	111	-	-				
	SPEAKER*	1	1.4	1.4	51	51	-	-				

\* EXISTING SPEAKERS ON POLES F6, F7 TO BE REMOVED. SPEAKERS WERE NOT INCLUDED IN ORIGINAL POLES DESIGN.

These plans are for construction approval. An application number and approval of these drawings by the Division of The State Architect of California must be secured to build from these plans.

INDEX OF SHEETS

MT1 NOTES, RETROFIT CONFIGURATION

MT2 NEW FOUNDATION DETAIL

MS1 70' POLE DETAILS

MS2 70D POLE DETAILS

MD1 ATTACHMENT DETAILS

MD2 ATTACHMENT DETAILS

MD3 ATTACHMENT DETAILS

Adolfo Camarillo High School Relight  
FIELD LIGHTING  
Camarillo, CA



CORPORATE OFFICE:  
P.O. Box 808  
100 1st Avenue West  
Oskaloosa, Iowa 52577  
800/825-6020

DRAWING TITLE: SEE PLAN  
NOTES, RETROFIT CONFIGURATION

REVISIONS:  
ADDITION #1

REFERENCE:

PROJECT NO.  
200796

DATE:  
08/07/2020

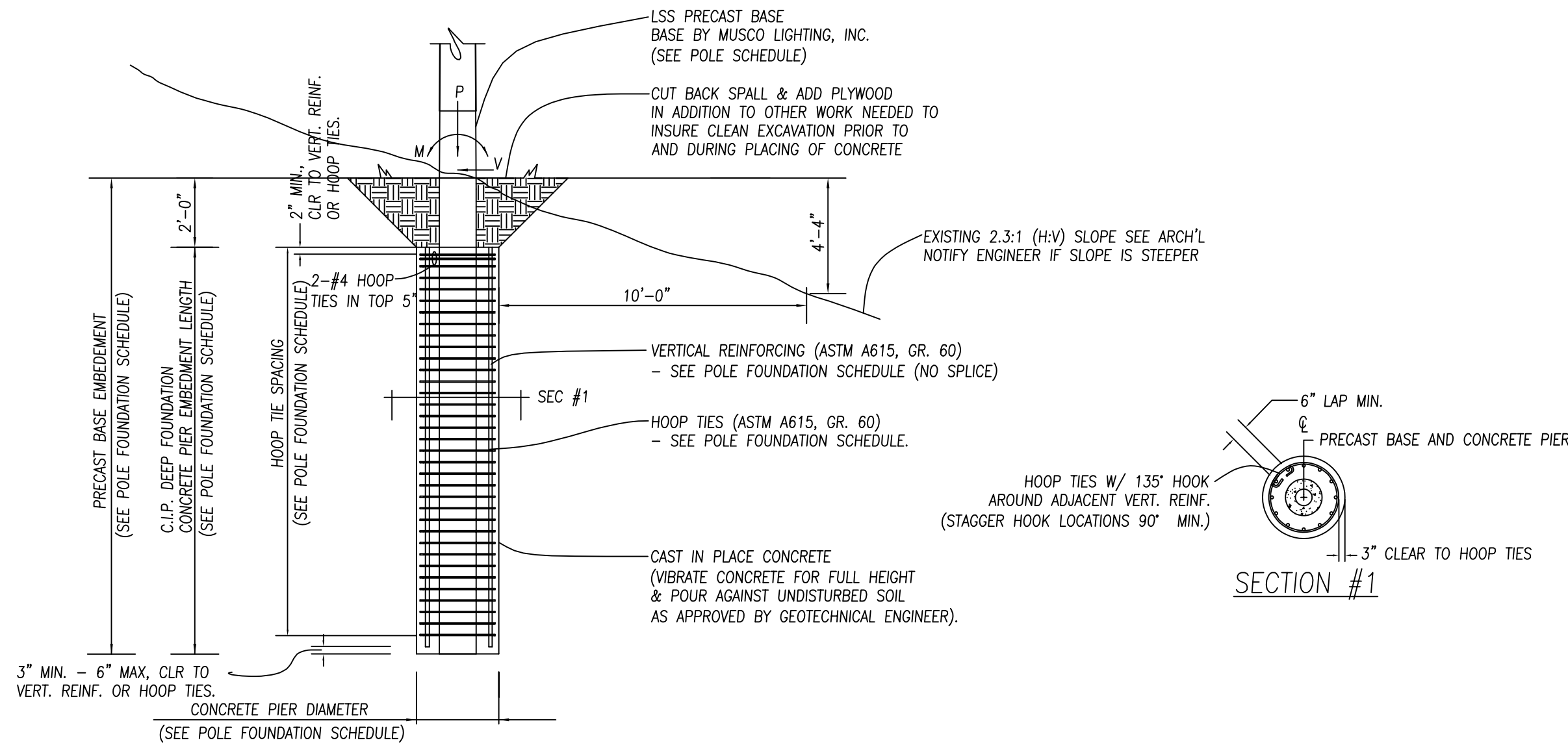
DRAWN BY:  
DCL

DRAWING NO.  
(MT1) AD1-MT1

1 OF 7

DSA-TITLE\_E





**A** REINFORCED FOUNDATION DETAIL  
N.T.S.

POLE FOUNDATION SCHEDULE										
POLE TYPE-# OF FIXTURES (MAX) (LSS=LIGHT STRUCTURE)	MARK (SEE POLE ORIENTATION PLAN)	WIND OR SEISMIC (SEISMIC FORCE INCLUDES OVERSTRENGTH FACTOR=1.5)	ASD LEVEL FORCES (MAX)			C.I.P. DEEP FOUNDATION			PRECAST BASE	
			MOMENT (M) FT-LBS*	SHEAR (V) LBS	VERTICAL (P) LBS**	DIAMETER INCHES	EMBEDMENT FEET (SEE NOTE BELOW)	VERTICAL REINFORCING (ASTM A615, GR 60)	HOOP TIE SIZE & SPACING (ASTM A615, GR 60)	EMBEDMENT FEET
LSS70D-6	F2, F3	SEISMIC	114,200	2,246	5,044	42"	14'-0"	12-#7	#4 @ 5 1/2" O.C. TOP 10'-6" & #4 @ 10 1/2" O.C. BELOW	16'-0"
		WIND	119,100	2,464	3,282					

\*Moment (M) computed below grade at Shear (V) = 0.  
\*\*Vertical (P) load includes steel pole, light fixtures, and attachments. Vertical (P) load for wind is the dressed pole weight for erection purposes. Vertical (P) load for seismic also includes weight of precast base above groundline. Reference Detail "A" on MS Sheet(s) for precast base weight.  
Note:  
Final Embedment to be determined in the field by the Geotechnical Engineer of Record

Adolfo Camarillo High School Relight  
FIELD LIGHTING  
Camarillo, CA

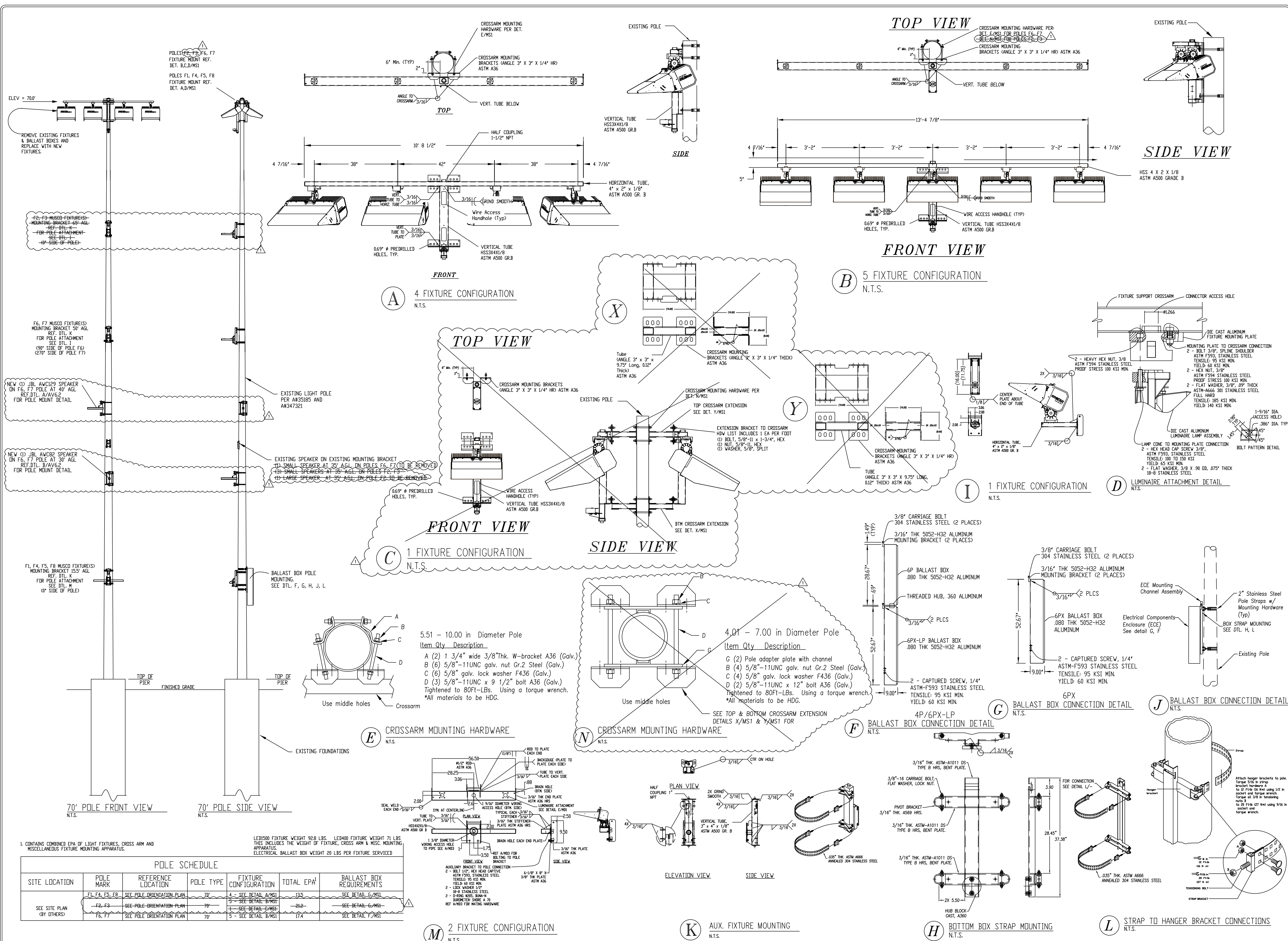
**KNA STRUCTURAL ENGINEERS**  
CONSULTANT  
2921 W. Main St., Suite 200  
Oskaloosa, IA 52577  
Tel: (646) 440-2200 • Fax: (646) 440-2201  
www.knastructural.com  
KNA Job No.: 36279

CORPORATE OFFICE:  
P.O. Box 808  
100 1st Avenue West  
Oskaloosa, Iowa 52577  
800/825-6020

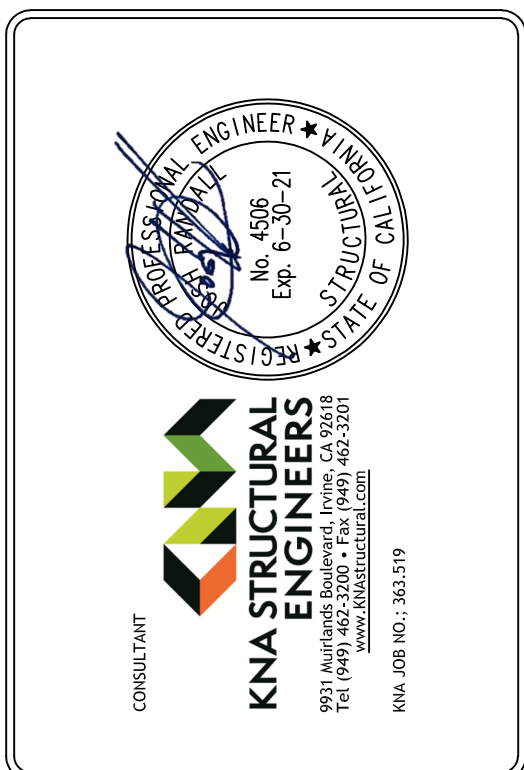
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REVISIONS	
REFERENCE	

PROJECT NO.	200796
DATE:	08/07/2020
DRAWN BY:	DCL
DRAWING NO.	(MT2) AD1-MT2





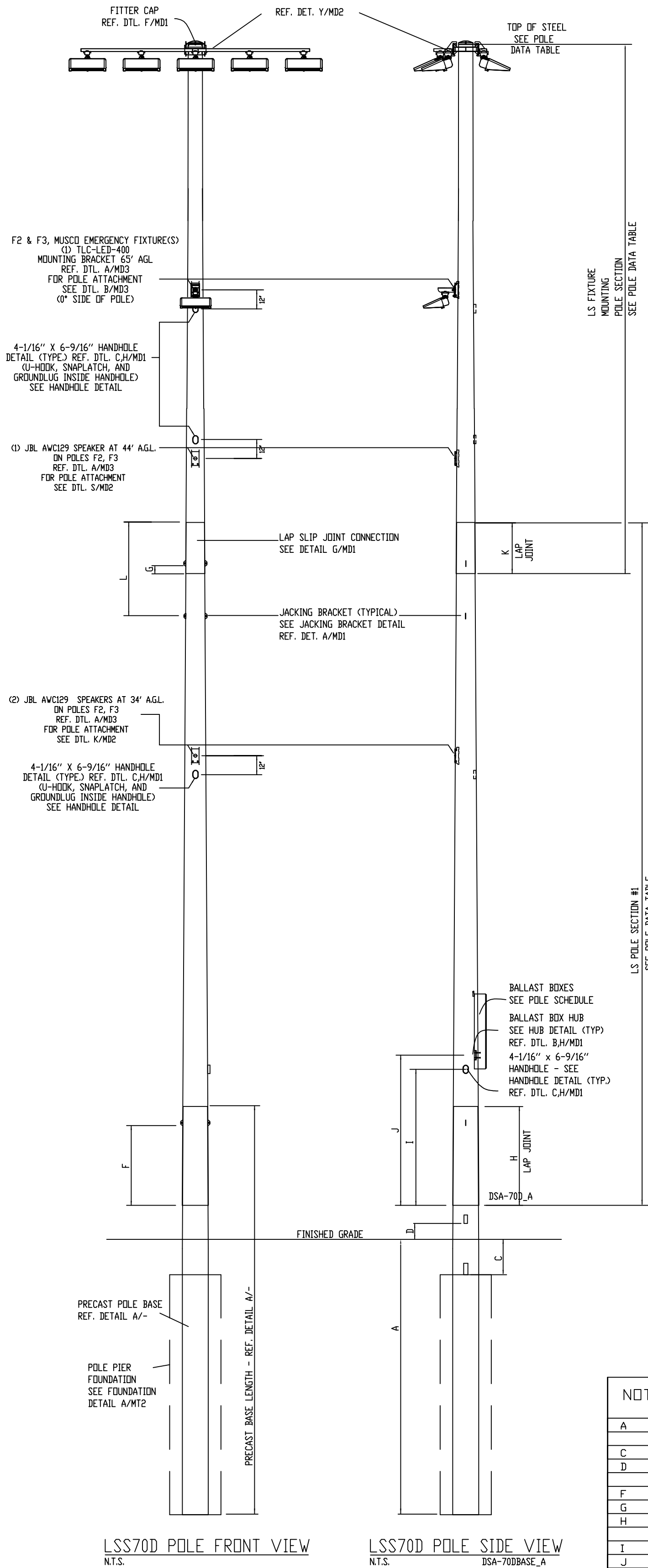
Adolfo Camarillo HS  
FIELD LIGHTING  
Camarillo, CA



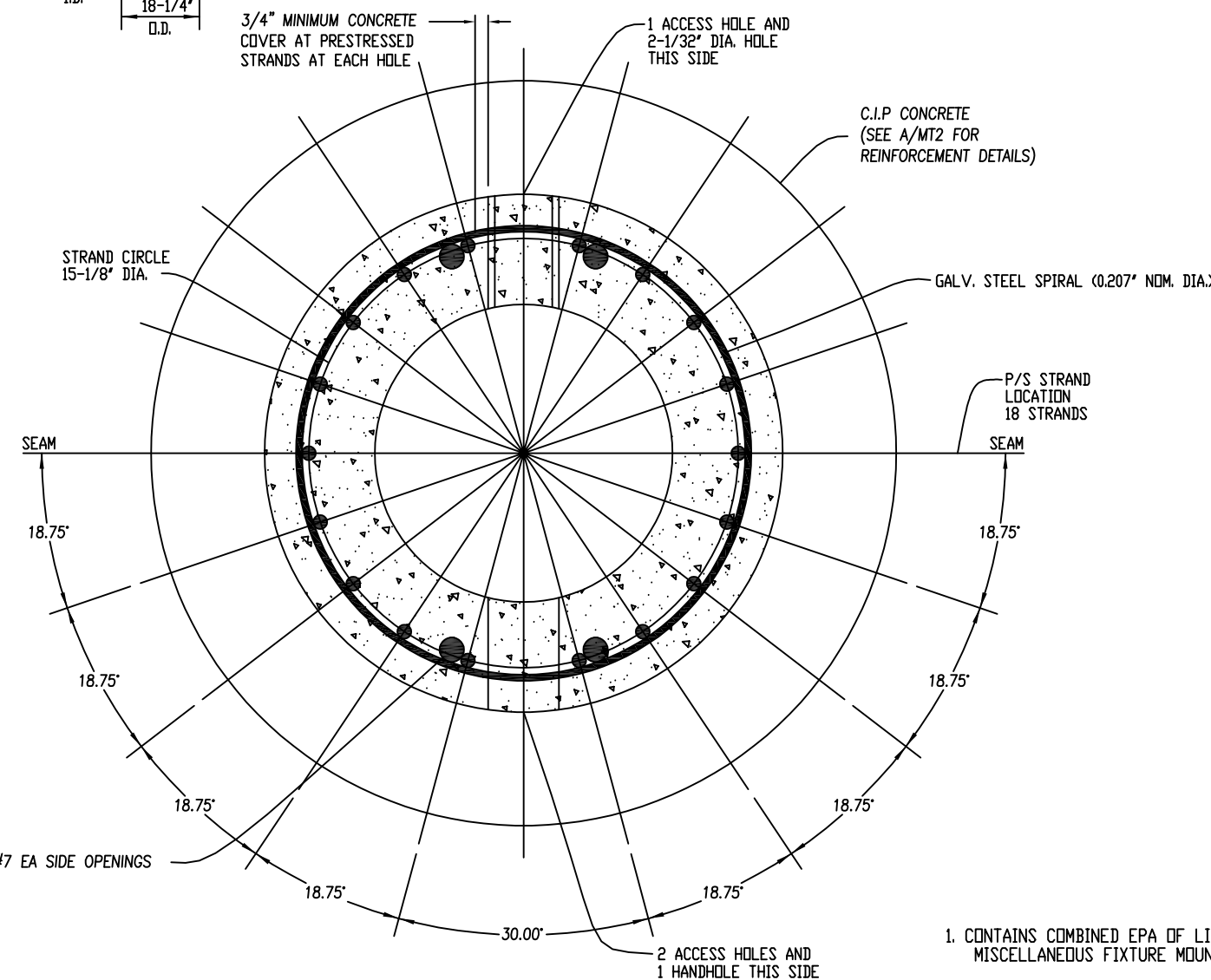
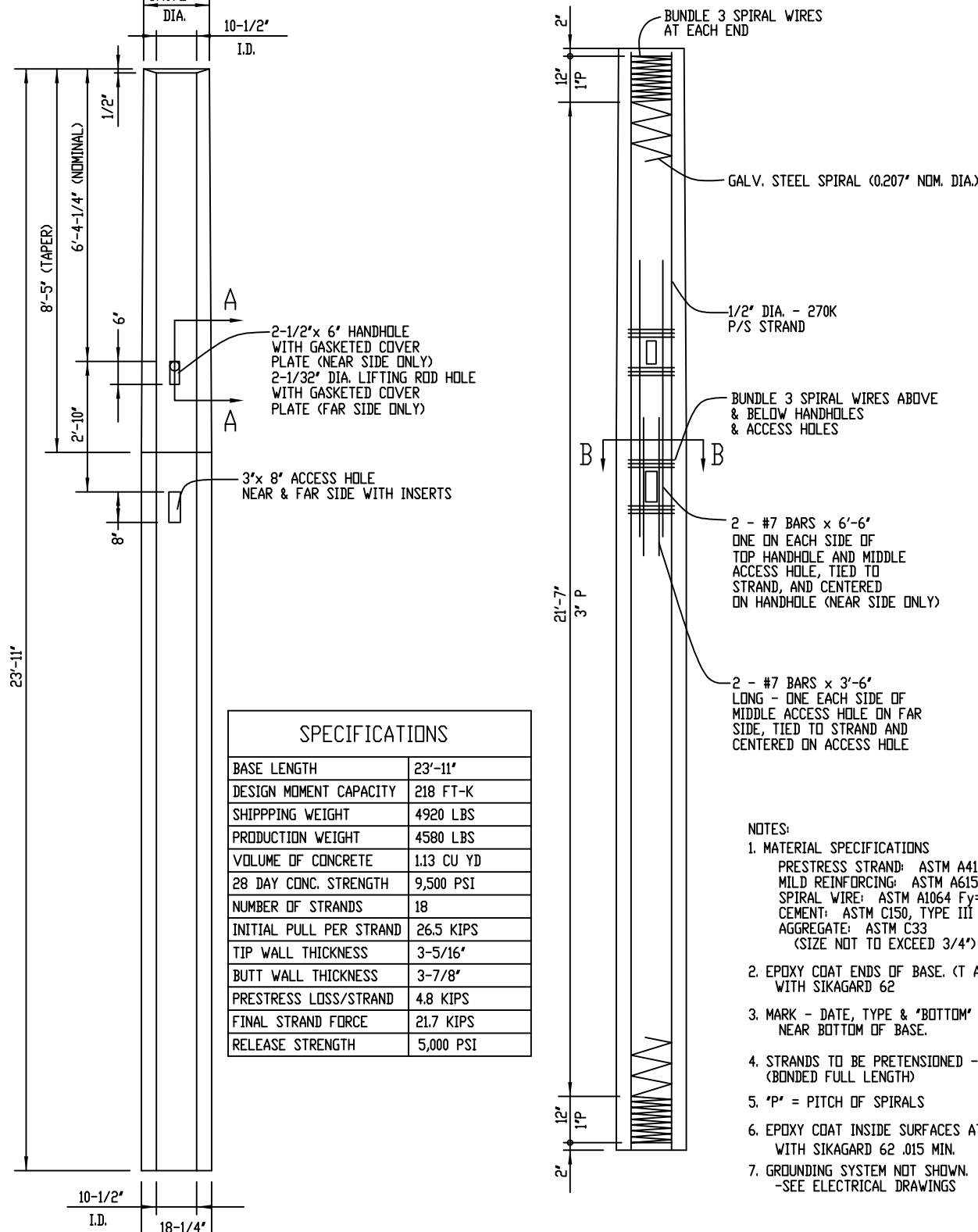
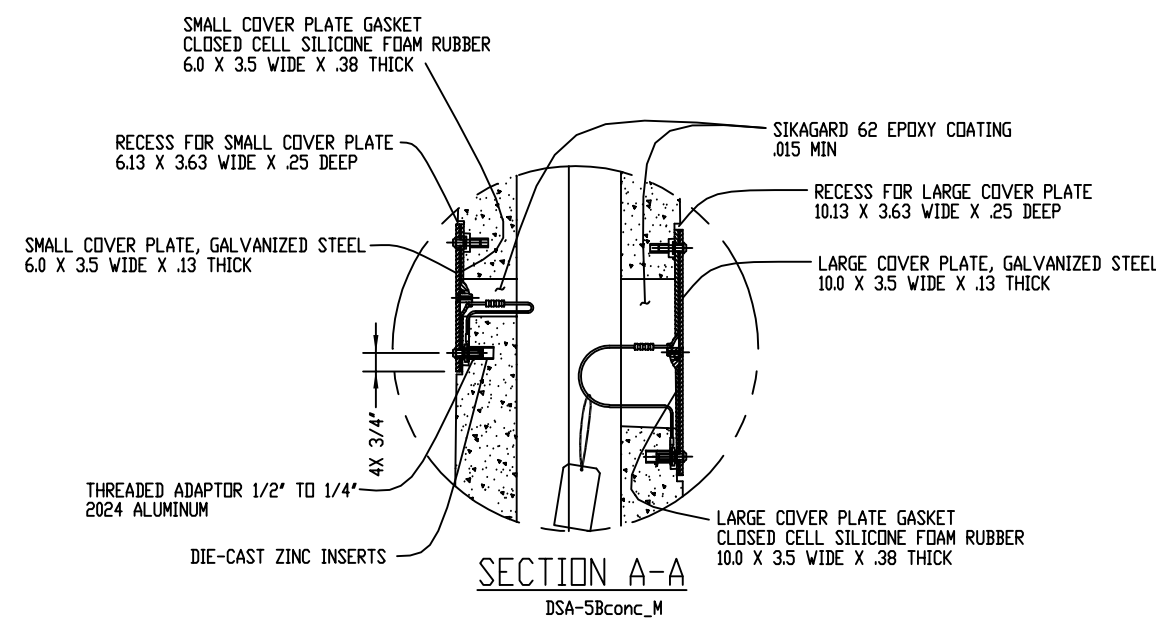
**MUSCO Lighting**  
CORPORATE OFFICE:  
P.O. Box 808  
100 1st Avenue West  
Oskaloosa, Iowa 52577  
800/825-6020

DRAWING TITLE: POLE DETAIL  
SCALE: SEE PLAN  
REVISIONS: ADDENDUM 1  
PROJECT NO.: 200796  
DATE: 08/07/2020  
DRAWN BY: T. Hamilton  
DRAWING NO.: (MS1) AD1-MS1  
3 OF 7

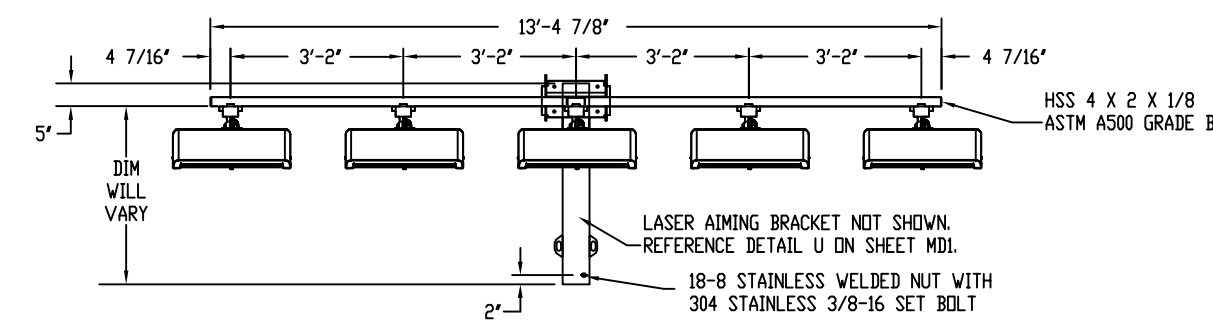




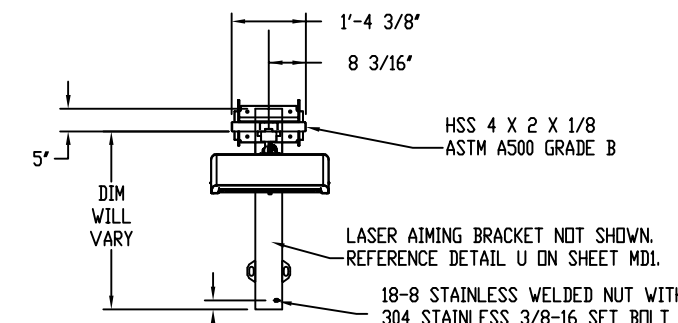
NOTATION	DIMENSION
A	16'-0"
C	2'-0" NOM.
D	1'-0" NOM.
F	4'-8" NOM.
G	6"
H	6'-1 1/2" NOM. 5'-3 3/4" MIN.
I	7'-11 1/2" NOM.
J	9'-1 1/2" NOM.
K	3'-11 1/4" NOM. 2'-7 3/4" MIN.
L	4'-11 1/2" NOM.



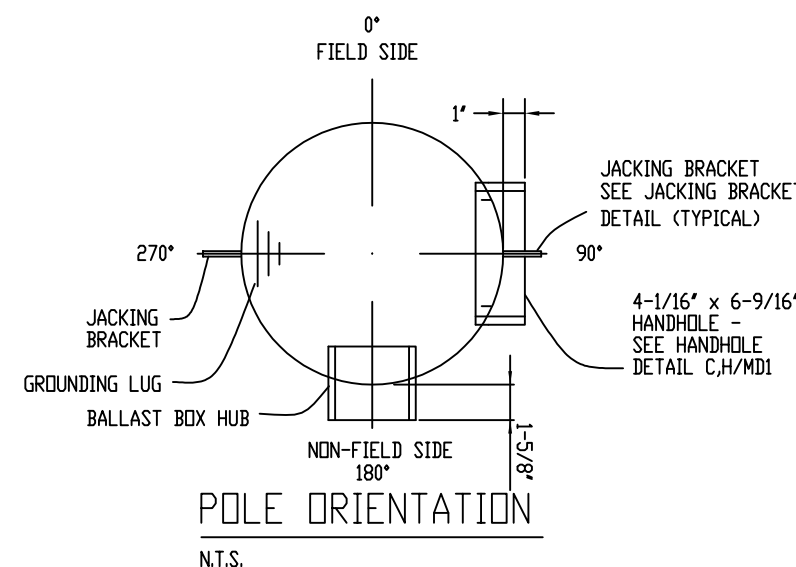
(A) TYPE SB PRECAST BASE DETAIL  
N.T.S.



(B) 5 FIXTURE CONFIGURATION  
N.T.S. DSA-BSC-WEDGE4\_A



(C) 1 FIXTURE CONFIGURATION  
N.T.S. DSA-B1C-WEDGE4\_A



SITE LOCATION	POLE MARK	REFERENCE LOCATION	POLE TYPE	FIXTURE CONFIGURATION	TOTAL EPA <sup>1</sup>	BALLAST BOX REQUIREMENTS
SEE SITE PLAN (BY OTHERS)	F2 & F3	SEE POLE ORIENTATION PLAN	LSS70D	5 - SEE DETAIL B/MSI 1 - SEE DETAIL C/MSI	19.8	SEE DETAIL P, D/MSI SEE DETAIL P, D/MSI

POLE TYPE	PIECE MARK	MAX NUMBER OF X-ARMS	POLE SECTION	TOP O.D. (INCHES)	BTM O.D. (INCHES)	OVERALL LENGTH	STRAIGHT LENGTH	TAPER LENGTH	THICKNESS (INCHES)	TOP OF STEEL NOMINAL	ASTM REFERENCE
LSS70D	MP-4BT1DSA-6	2	FIXTURE MOUNTING	9.118"	13.582"	31'-10 5/8"	-----	31'-10 5/8"	.179	70"-8 1/2"	A599A (F <sub>y</sub> =55 ksi) or A572, Gr. 55 or 65
	MP-6BT1DSA-D			12.672"	18.407"	40'-11 5/8"	-----	40'-11 5/8"	.229	-----	A599A (F <sub>y</sub> =55 ksi) or A572, Gr. 55 or 65
	MP-5BDSA		PRECAST BASE								

DSA-7000T\_A

Adolfo Camarillo HS  
FIELD LIGHTING  
Camarillo, CA



CORPORATE OFFICE:  
P.O. Box 808  
100 1st Avenue West  
Oskaloosa, Iowa 52577  
800/825-6020

DRAWING TITLE: POLE DETAIL  
SCALE: SEE PLAN  
REVISIONS:  
REFERENCE:

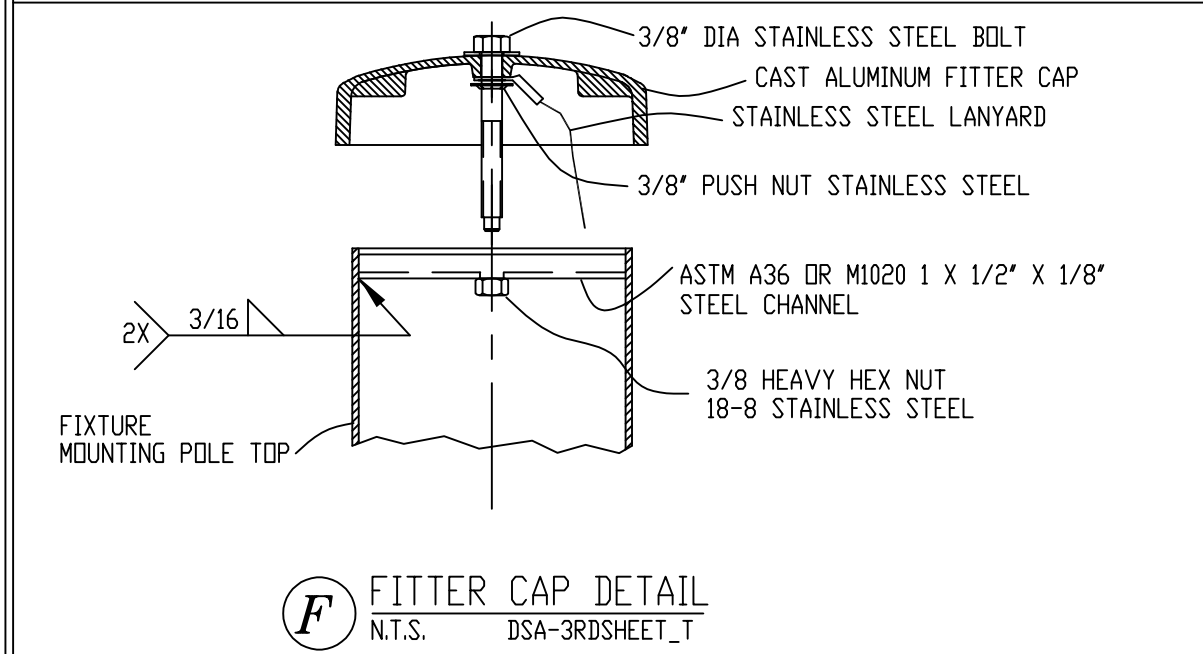
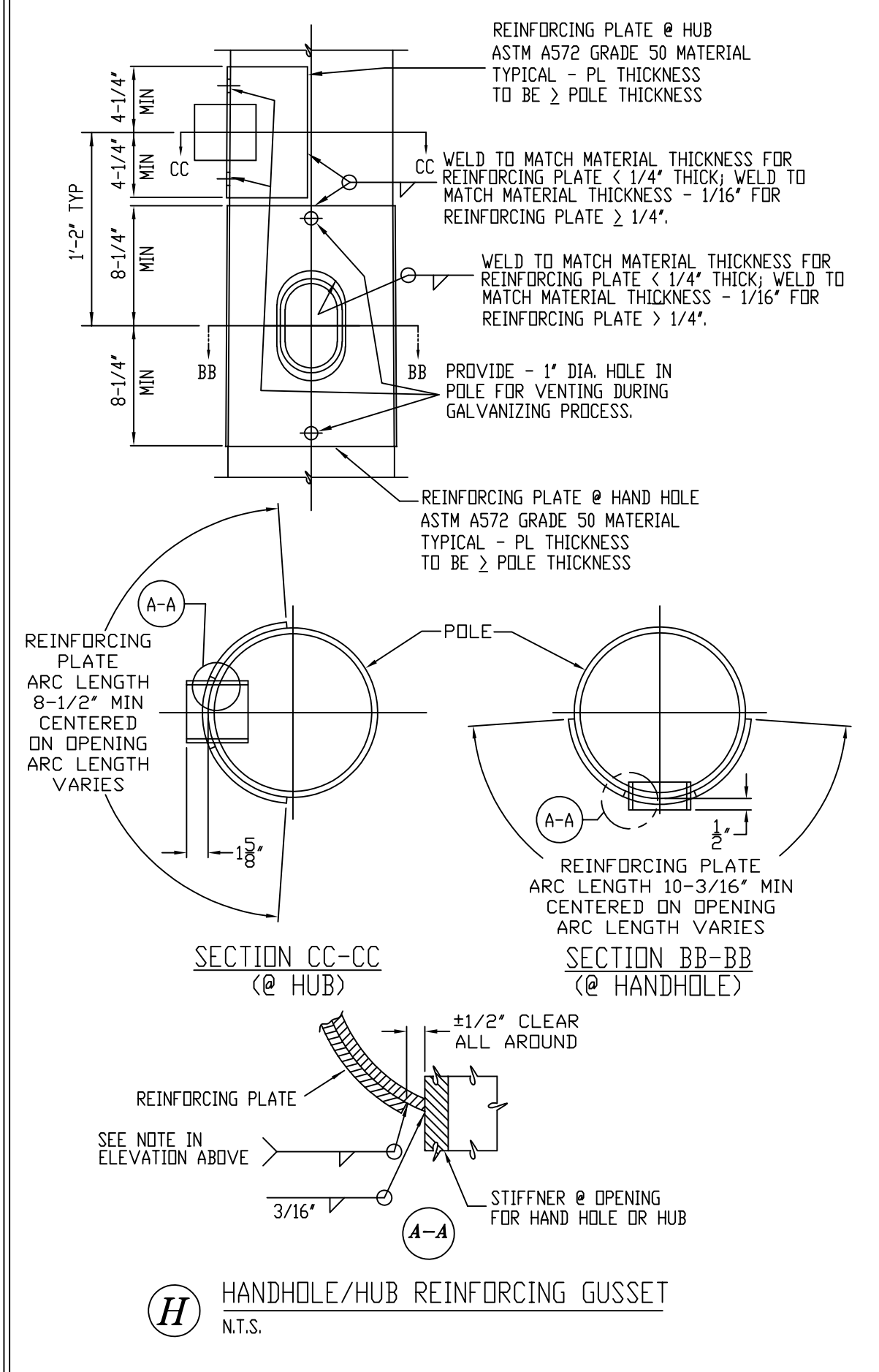
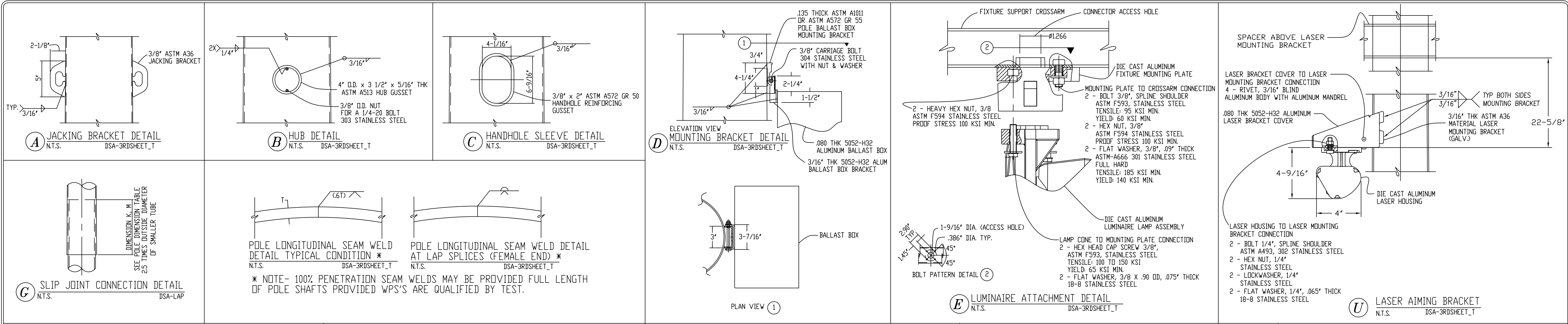
PROJECT NO. 200796

DATE: 08/07/2020

DRAWN BY: T. Hamilton

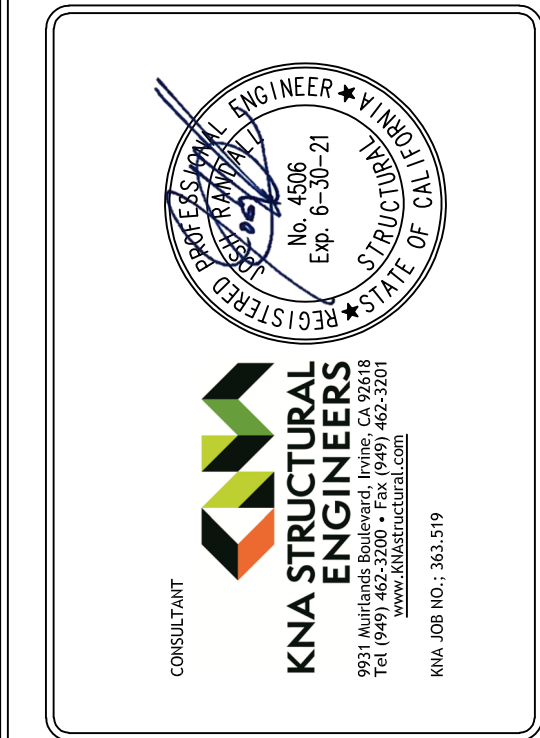
APPROVED BY: (MS2) ADI-MS2





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Adolfo Camarillo HS  
FIELD LIGHTING  
Camarillo, CA

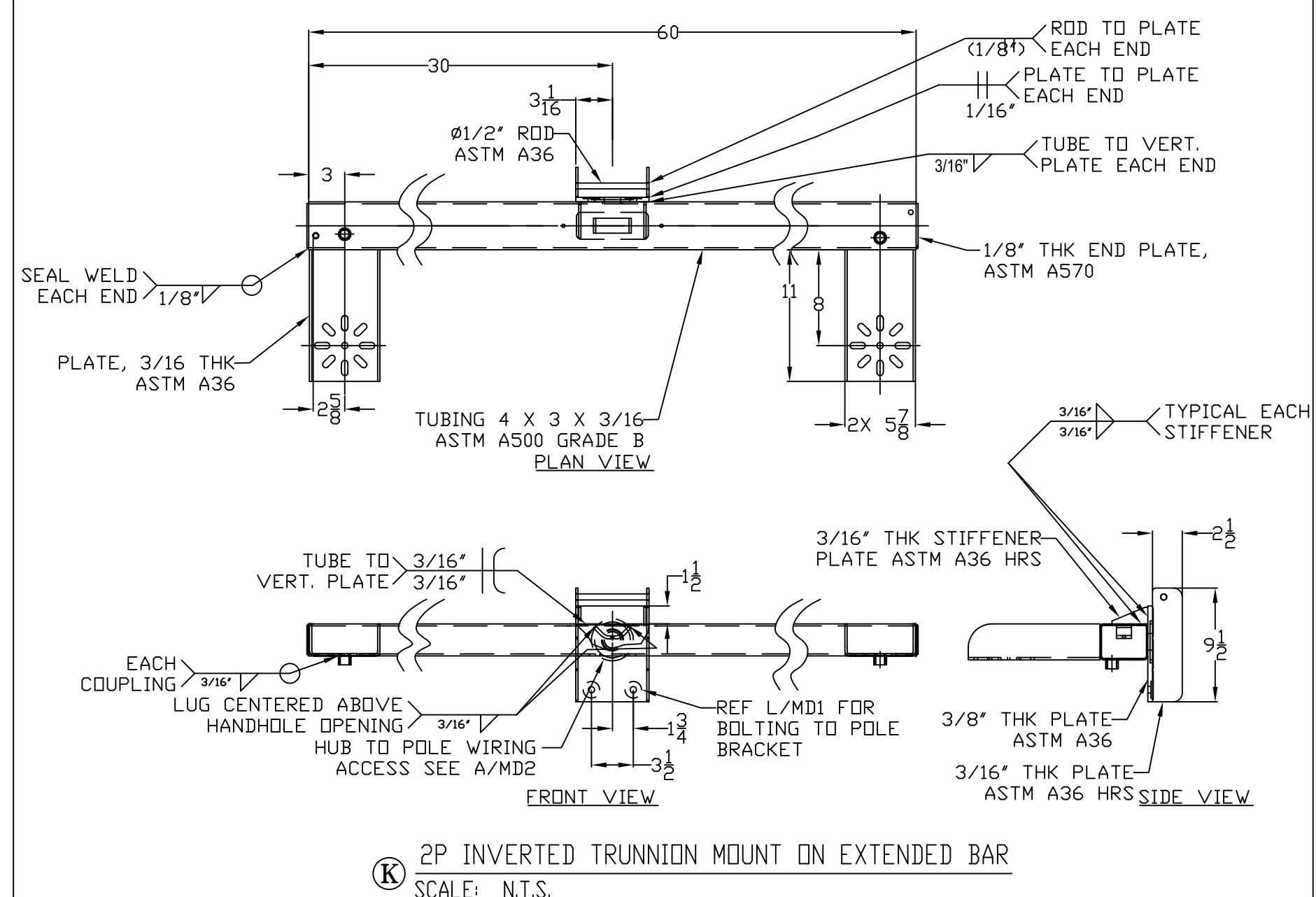
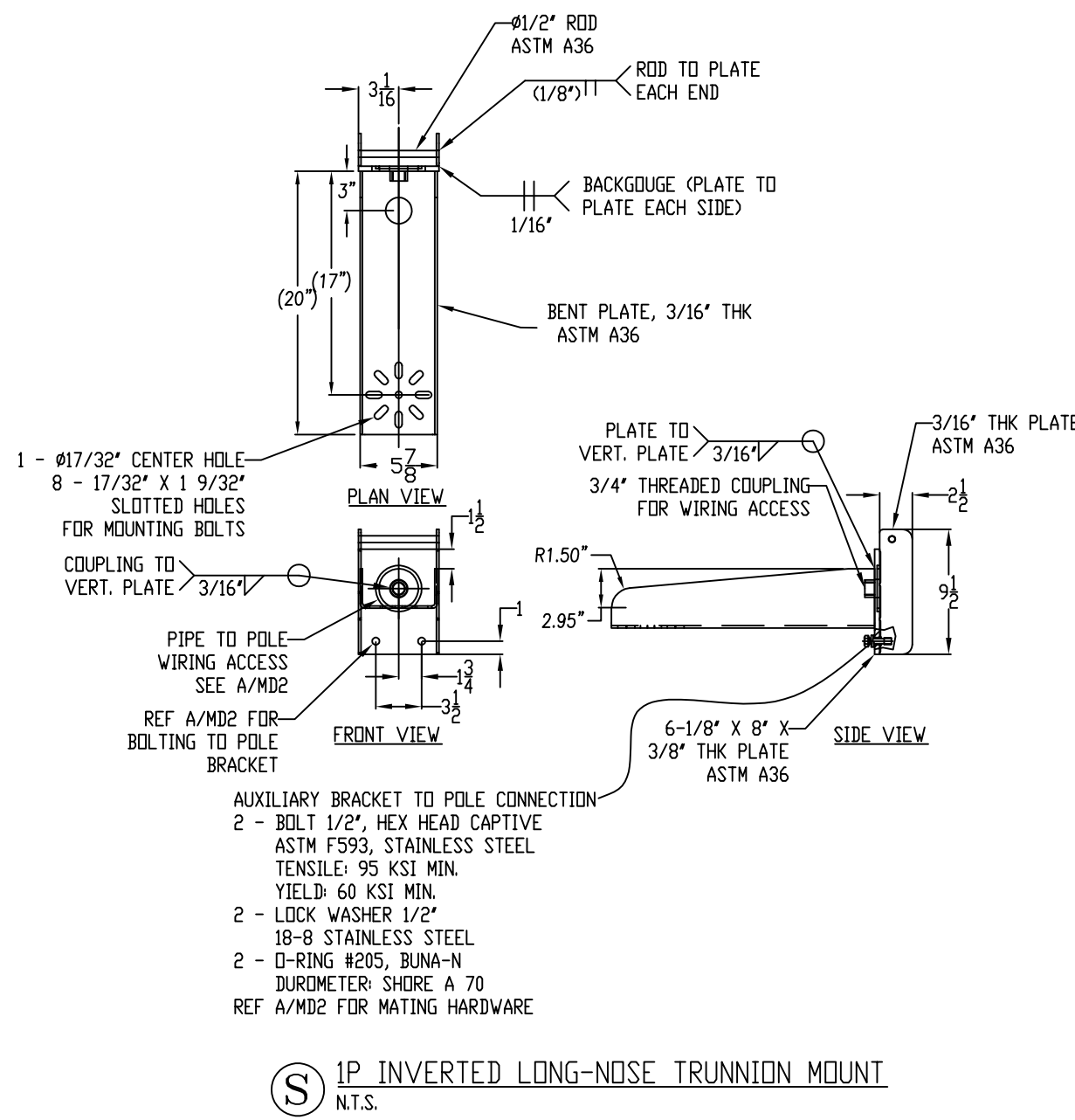
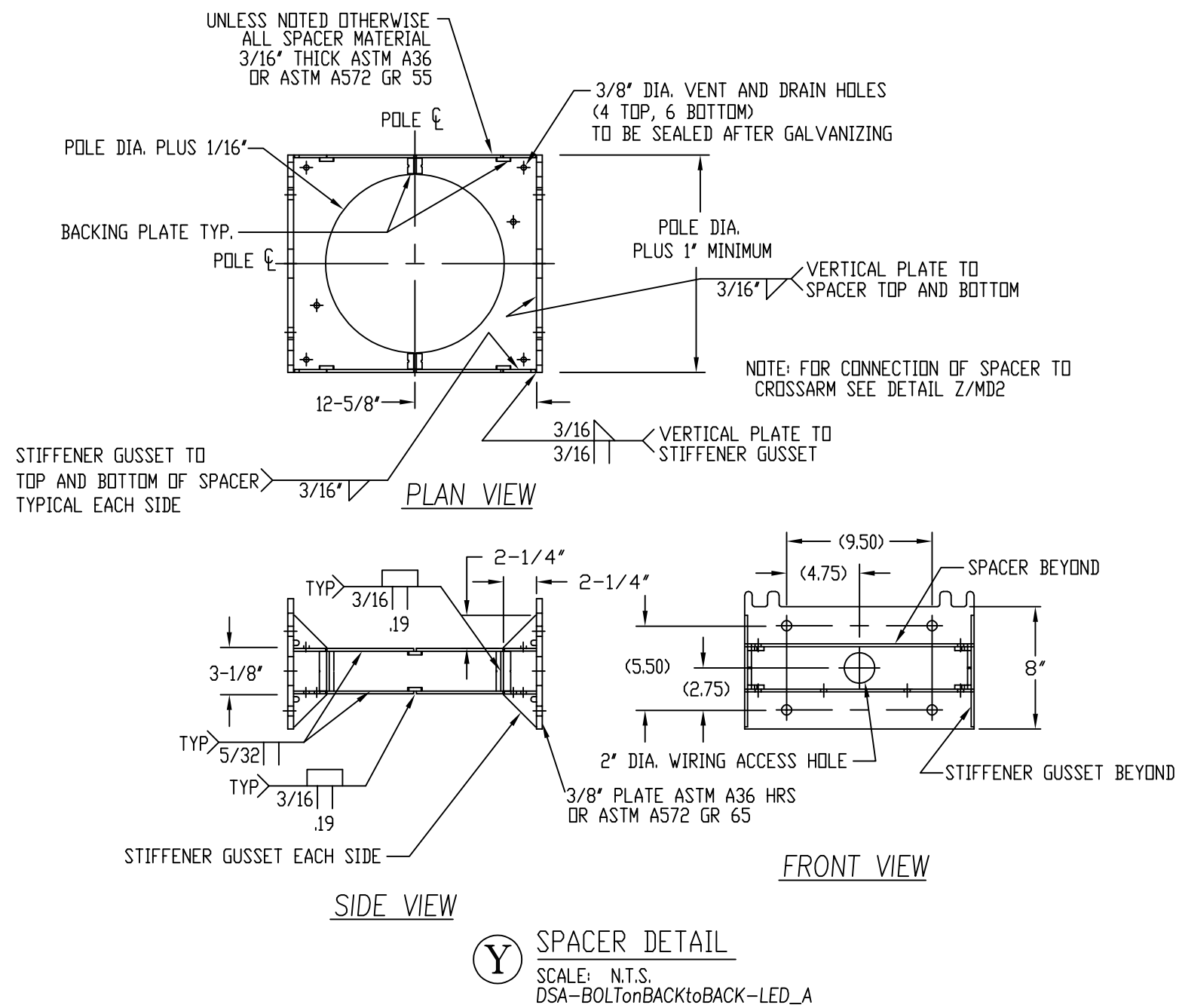
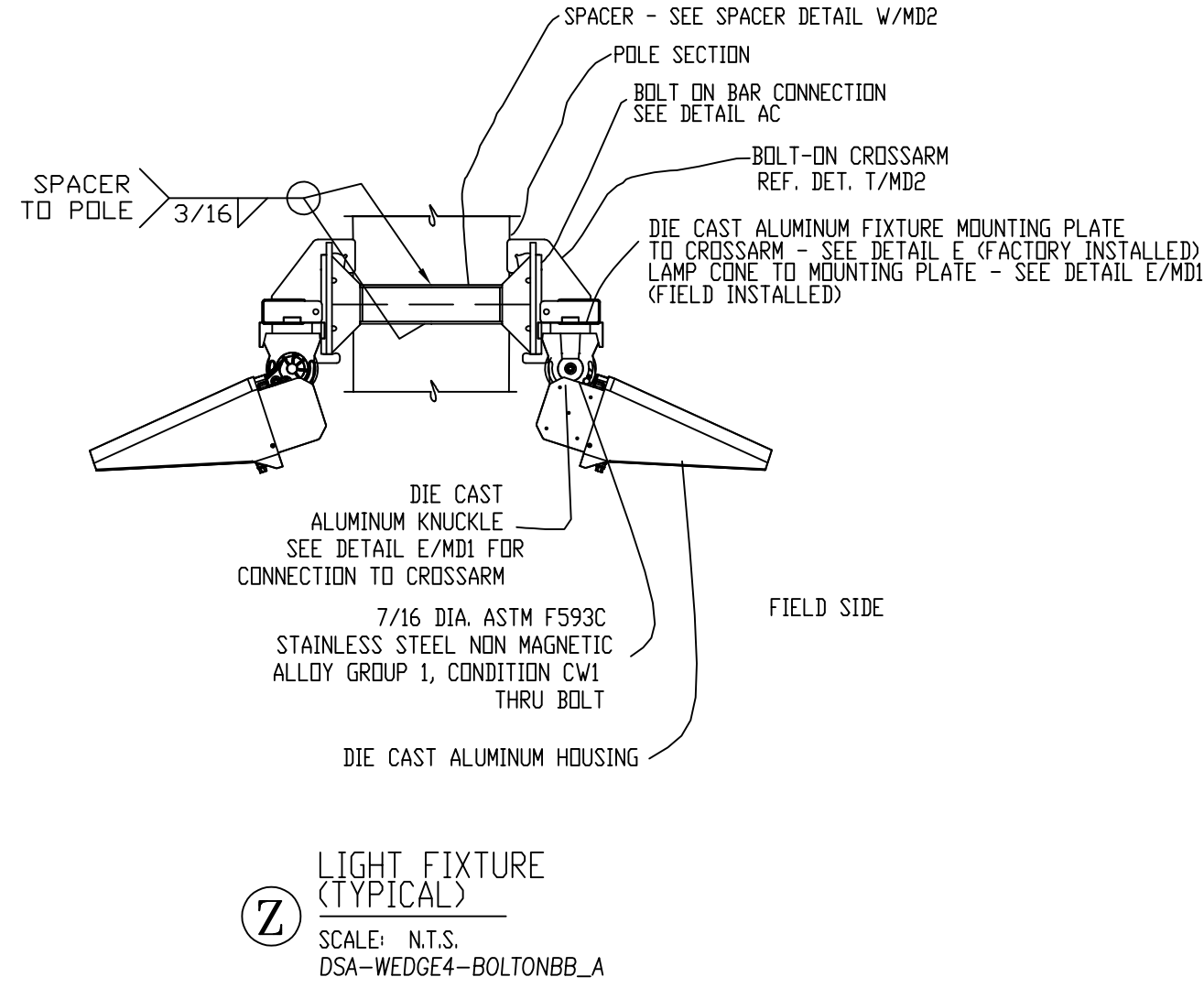
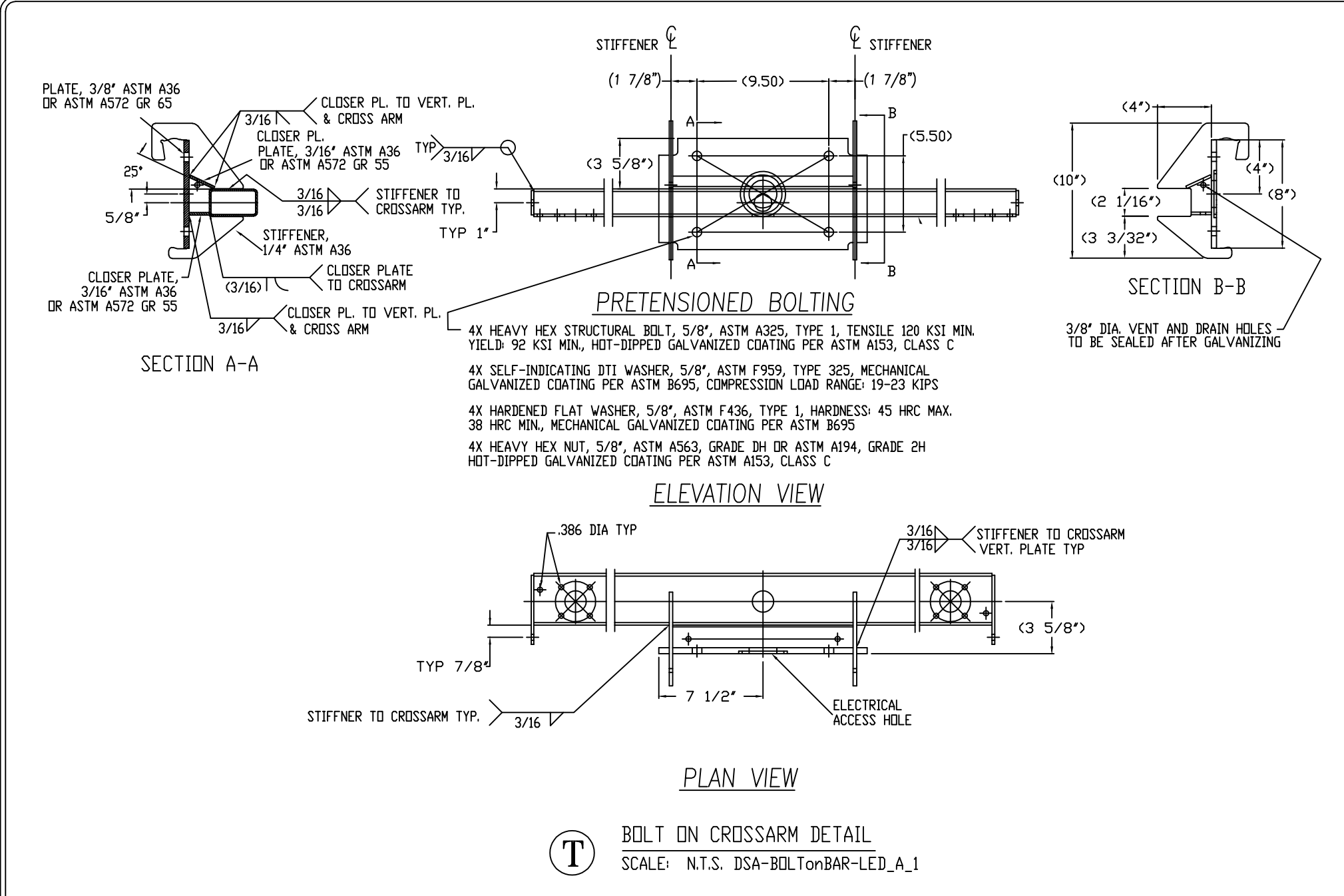


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DRAWING TITLE: ATTACHMENT DETAILS	SCALE: SEE PLAN
REVISIONS	REFERENCE:
PROJECT NO. 200796	
DATE: 08/07/2020	
DRAWN BY: T. Hamilton	
DRAWING NO. MDI	AD1-MDI





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PROJECT NO: 200796

DATE: 08/07/2020

DRAWN BY: T. Hamilton

DRAWING NO: (MD2) AD1-MD2

STW-MD2







ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM  
OXNARD UNION HIGH SCHOOL DISTRICT  
CAMARILLO, CA

GENERAL NOTES

REFER TO AUDIO VISUAL SPECIFICATION SECTION FOR COMPLETE REQUIREMENTS

1. ELECTRICAL

A. All conduits, junction boxes, back boxes, pull string and power outlets by Division 26 contractor as required.

B. All power to AV equipment to originate from dedicated audio video load center in accordance with the latest local and national codes referencing "technical power systems", NEC Article 640.

C. Branch circuits feeding audio-visual equipment must not originate from load centers connected to inductive loads.

D. Provide all AV circuits with isolated ground, dedicated neutral.

2. COORDINATE

A. Coordinate with the work of all sections. Coordinate the location of blocking and backing required by this section. Make reasonable minor adjustments to preserve architectural symmetry and alignment with adjacent features at no claim for additional cost or time. Present conflicts in timely manner for resolution.

B. Relocation, revision or correction caused by failure of the contractor to coordinate the work shall not be subject to claim for additional cost or time.

C. Power receptacles shown on the AV drawings outside of equipment racks are shown for coordination information only. Refer to Division 26 documents for construction.

D. These drawings show scope. The exact location & elevations of loudspeakers, receptacles and devices must be coordinated with the architectural drawings.

E. Conduit, back boxes and pull boxes supplied and installed by electrical contractor under supervision of AV contractor.

F. General contractor shall coordinate the conduit, devices, pathways and junction boxes for the AV system with other trade to avoid any conflicts.

3. LOCATIONS AND DIMENSIONS

A. Locations and dimensions shown on architectural drawings take precedence over these AV drawings. In case of apparent conflict or ambiguity, submit to the Architect in timely manner for resolution.

B. Dimensions take precedence over scale. Large scale drawings take precedence over small. Report all conflicts before installation.

C. Unless otherwise noted, dimensions are shown height x width x depth.

D. Verify all dimensions, locations and conditions in the field prior to starting work. Notify Architect of any apparent discrepancies.

4. SUPPORT

Provide all blocking, bridging, ties, fasteners and related support provisions for all work of this section. Comply with applicable code requirements for means of support of electrical equipment of the same weight under the same mounting conditions. Do not apply any load to building structure without first obtaining written approval of the project Structural Engineer. Obtain prior project procedures. Supports for raceway system by Division 26 contractor.

5. BOX, PANEL AND ENCLOSURE INSTALLATION

A. Coordinate the location of all boxes, panels, enclosures and related raceway with the work of other sections.

B. Verify access to boxes, panels and enclosures comply with applicable code.

C. Coordinate and correct all conditions of occlusion of all loudspeaker assemblies. Where more than one (1) flush mounted ceiling loudspeaker has been scheduled, none shall be located closer to any fixed wall than one-half (1/2) of the adjacent clear height, except at ceiling discontinuities, or where specifically shown on the drawings.

D. Install boxes, panels and enclosures square and plumb. Set flush mounted units so that the face of the cover, Bezel or Escutcheon, is in the same plane as the surrounding finished surface. Mount boxes, panels and trim so that there are no gaps, cracks or obvious lines between the trim and the adjacent finished surface.

E. Unless otherwise noted, provide steel boxes, panels and enclosures. Comply with Division 26 requirements and applicable code.

F. Unless otherwise noted, boxes and enclosures shall be not less than 2-1/8 inches deep. Provide the larger of the size required by applicable code or as shown on drawings. Coordinate wire and cable bend radius with box and enclosure size.

G. Pull boxes: Provide as required by the most restrictive of applicable code or the provisions of Division 26. Coordinate with wire and cable bend radius.

H. Provide required fire rated junction boxes or fire stop box guards at all fire rated walls.

6. RACEWAY

A. For all work of this section, raceway above ground shall be EMT, raceway below ground shall be PVC.

B. Raceway shall be ¾ inch diameter trade size unless otherwise noted.

C. All conduit runs over 100 ft. must have large radius bends.

D. A maximum of two 90 degree elbows in each conduit run.

E. Conduit with fiber optic cable installed, must conform to the minimum bend radius as specified by the manufacturer of the cable. Division 26 contractor is to apply radius bends where needed. Fiber bend radius shall be a minimum long-term low-stress radius not less than 20 times the cable diameter.

F. Keep a minimum of 12" clear between electrical conduit and low voltage conduit.

G. Provide fire rated conduit penetration seals at all fire rated walls.

H. Conduit and accessories must be installed plumb and true with uniform fastening, fully dressed and finished.

7. GROUNDING AND BONDING

Comply with all applicable codes and ordinances. Refer to National Electrical Code Section 250.

A. Bond raceway and related boxes, panels, enclosures and cabinets as required by applicable code and Division 26.

B. Make raceway connections to equipment racks and similar equipment enclosures containing powered equipment with isolated fittings.

C. Ground and bond equipment racks and similar equipment enclosures containing powered equipment exclusively via the isolated equipment grounding conductors provided under Division 26. Size such conductors according to applicable code. For each technical branch circuit, the isolated equipment grounding conductor shall be copper of the same gauge as supply and neutral conductors. Main isolated equipment grounding conductor to each ensemble of equipment racks shall be copper, sized as required by applicable code.

D. D.C. resistance between the isolated equipment grounding bus at equipment room technical power panels and the main project ground field shall not exceed 0.15 OHMS.

E. For community antenna television and master antenna television systems and related provisions, comply with Article 800, National Electrical Code.

8. CABLE AND WIRE

A. All low voltage cable and wire by Audio-Visual Contractor.

B. Use plenum rated wire where required by code.

C. Cable splicing not allowed in any pullboxes.

9. GENERAL

A. In the event that these plans, notes or details or any part or portion thereof are used by any third-party without the express authorized permission of VENEKLASEN ASSOCIATES, the unauthorized user and anyone benefiting therefrom, shall defend, indemnify and hold harmless VENEKLASEN ASSOCIATES and its Agents, Principals, Employees and Consultants from and against any and all claims, including attorneys' fees arising out of said unauthorized use.

B. Furthermore, the unauthorized use of these plans, notes, details or any part or portion therefore is expressly prohibited and VENEKLASEN ASSOCIATES retains a copyright over any and all documents prepared by VENEKLASEN ASSOCIATES.

C. In the event that the installer deviates from the plans and specifications prepared by VENEKLASEN ASSOCIATES which results in damage to persons or property of any kind, Installer hereby agrees to defend, indemnify and hold harmless VENEKLASEN ASSOCIATES, its Agents, Principals, Employees and Consultants from and against any and all claims, including attorneys' fees caused by such failure to follow the plans and specifications prepared by VENEKLASEN ASSOCIATES, excepting only the damages to persons or property which are caused by the sole negligence or willful misconduct of VENEKLASEN ASSOCIATES.

D. Drawings are diagrammatic and are intended to convey Scope of Work and to indicate general arrangement. There are not intended to show every detail including offset or fitting or every structural difficulty that may be encountered during the work. Except as otherwise indicated, locations of items are approximate only. Exact locations necessary to secure proper conditions and results must be determined at project site and must be approved by the Owner's representative.

E. Except as otherwise indicated, make reasonable modifications in layout as needed to prevent conflict with other work or proper execution of work.

F. Include work not usually shown or specified, but necessary for proper installation and operation of a system or piece of equipment in work.

BOX SCHEDULE

DEVICE ID	DESCRIPTION	BOX TYPE	BOX SIZE	INSTALL METHOD	ELEVATION
AIP/PSQ	AUDIO INPUT PANEL AND POWER SEQUENCER JUNCTION BOX	FSR WB-4G WITH COVER & KEY	8.9 x 8.9 x 3.75	WALL	8" ABOVE COUNTER
ALA	ASSISTIVE LISTENING ANTENNA	N/A	N/A	CEILING	N/A
ERK1	EQUIPMENT RACK	N/A	N/A	WALL	N/A
JB1#	JUNCTION BOX	HANDHOLE BUILT INTO POLE BRACKET	N/A	INTEGRATED IN POLE BRACKET	SEE DETAIL ON AV6.1
JB2	JUNCTION BOX	BELL 4" ROUND WEATHERPROOF BOX 5361-0 W/ 5361 COVER	5.5 x 5.5 x 1.5	POLE MOUNTED	SEE DETAIL ON AV6.2
WMA	WIRELESS MIC ANTENNA	N/A	N/A	CEILING	N/A

NOTE: CONTRACTOR IS TO PROVIDE BLANK PANELS FOR ALL BOXES THAT ARE DESIGNATED FOR FUTURE USE. BOXES THAT ARE ABLE TO ACCEPT STANDARD SIZE BLANK PANELS SHALL BE PROVIDED WITH SAME (SGMR, 2GMR, SWITCH BOXES, ETC). NON STANDARD SIZE BOXES (I.E. TOUCH PANELS) WILL BE PROVIDED WITH ANODIZED ALUMINUM BLANK PANELS. SEE SPECIFICATION FOR REQUIREMENTS (I.E. COLOR COORDINATION). CONTRACTOR TO LABEL ALL CONDUIT STUBS AND FUTURE BACK BOXES WITH PERMANENT MARKER. SEE SPECIFICATION FOR DETAILS.

SHEET INDEX

FOR REVIEW 02/07/20

ADDENDUM 1 08/07/20

Sheet Number	Sheet Title		
(AV0.1)	GENERAL NOTES AND SHEET INDEX	X	X
(AV0.2)	ABBREVIATIONS NOTES AND SYMBOLS	X	X
(AV1.1)	ENLARGED AV SITE PLAN	X	X
(AV1.2)	AV SPEAKER COVERAGE PLAN	X	X
(AV1.5)	AV ENLARGED LAYOUTS	X	X
(AV2.1)	AV ENLARGED PLANS	X	X
(AV2.2)	AV ENLARGED PLANS	X	X
(AV3.1)	AV RISER DIAGRAM	X	X
(AV4.0)	WIRING SCHEME AND SYMBOL KEY	X	X
(AV4.1)	AV ONELINE DIAGRAM	X	X
(AV5.0)	AV TYPICAL SEISMIC AND GROUNDING DETAILS	X	X
(AV6.1)	AV DETAILS	X	X
(AV6.2)	AV DETAILS	X	X
(AV6.3)	AV DETAILS	X	X

AGENCY REVIEW

LITTLE

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CLIENT NAME

OXNARD UNION HIGH SCHOOL DISTRICT

PROJECT NAME

ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM

4660 MISSION OAKS BLVD,  
CAMARILLO, CA. 93012

CONSULTANT

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ISSUE FOR

ISSUE DATE

REVISIONS

08/07/2020

ADDENDUM 1

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JACK R. FIFTH

PROJECT LEADER:  
PABLO AMEZQUITA

DESIGN TEAM:  
VENEKLASEN ASSOCIATES

PROJECT NAME

ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM

PROJECT NO.

6121235311

SHEET TITLE

GENERAL NOTES AND SHEET INDEX

SHEET NUMBERS

AV0.1

AD1-AV1



DEVICE / BOX ID

Device ID	Description	CPP	Central Paging Processor		Graphic Equalizer	MPL	Music Player	RPN	Rack Panel	TPM	Teleprompter
1GMR	1 Gang Mud Ring	CPU	Central Processing Unit	GEQ	Graphic Equalizer	MPN	Monitor Panel	RPT	Repeater	TPR	Twisted Pair Receiver
2GMR	2 Gang Mud Ring	CRC	Camera Remote Control	GNM	Gooseneck Microphone	MPS	Motorized Projection Screen	RSC	RGB System Controller	TPT	Twisted Pair Transmitter
30TV	30 Television	CRK	Control Rack	MPY	Media Player	RSH	RGB Switching Interface	TRI	Talent Receiver	TR	Transceiver
3GMR	3 Gang Mud Ring	CS	Conference Station	HP	Headphone	MR	Message Repeater	RSRS	Rotating Sliding Rail System	TRC	Transceiver
4GMR	4 Gang Mud Ring	CSF	Call Signal Flasher	HDTV	High Definition Television	MRP	MD Recorder Player	RSW	RGB Switcher	TS	Touch Screen
		CT	Control	HDW	Hardware	MSC	Main System Controller	RTP	Remote Truck Panel	TT	Turn Table
A	Audio	CTM	Control Module	HFS	High Frequency Speaker	MSF	Master Fader	RX	Receiver	TTP	Table Top Panel
ABA	Audio Buffer Amplifier	CTN	Cable Tuner	HHM	Hand Held Microphone	MSP	Microphone Splitter			TV	Television
AC	Audio Combiner	CTR	Control Rack	HPK	Headphone Remote Station	MST	Microphone Splitter Rack	S	Speaker Level	TYP	TV Panel
ACM	Audio Card Module	CTS	Computer Training System	HRB	Headset Remote Box	MSV	Media Server	SA	Aquatic Speaker	TVT	TV/R Tuner
ACN	Audio Control Network	CVM	Computer Video Monitor	HS	Headset	MSW	Matrix Switcher	SAN	Storage Area Network	TX	Transmitter
ACR	Audio Control Relay			HTS	Home Theater System	MXP	Mixer Pre-Amplifier	SAT	Satellite Receiver		
ACS	Audio Conferencing System	DA	Distribution Amp					SB	Bass Speaker	UBC	Unbalance to Balance Converter
ADA	Audio Distribution Amplifier	DAB	Digital Audio Bus	IAA	Integrated Audio Amplifier	NADU	Network Audio Distribution Amp	SC	Ceiling Speaker	UC	Up Converter
ADB	Audio Distribution Box	DAO	Digital Analog Output	IBP	Intercom Belt Pack	NET	Network Outlet	SCB	Cinema Speaker Bass	UCD	Under Communication Device
ADI	Analog To Digital Input	DAR	Digital Audio Recorder	IBS	Intercom Base Station	NHB	Network Hub	SCD	Speaker Control Distribution	UP	User Panel
ADK	Audio Ducker	DAS	Digital Audio Source	IC	Intercom	NI	Network Interface	SCF	SC Fiber Connector	UPS	Uninterruptible Power Supply
ADP	Adaptor	DAT	Digital Audio Tape Unit	IDS	Intercom Station	NMCPU	Network Manager CPU	SCN	Cinema Speaker	USB	Universal Serial Bus
AE	Audio Extractor	DB	Direct Box	ICD	Interactive Display	NSG	Noise Gate	SCP	System Control Pad	USBX	Universal Serial Bus Extender
AFT	AM/FM Tuner	DC	Document Camera	IFC	Interface Card	NSS	Network Source Switch	SDA	SDI Distribution Amplifier		
AIM	Audio Input Module	DCA	Digital Controlled Amplifier	IH	Intercom Handset	NT	Network Terminator	SDB	Speaker Distribution Box	V	Video
AIP	Audio Input Panel	DCC	Data Control Card	IRE	IR Emitter	PAD	Pad	SOD	Solid State Disk Dock	VOSS	Volume Control / Selector Switch
AIU	Analog Interface Unit	DCM	Digital Cart Machine	IMS	Intercom Main Station	NWS	Network Switch	SE	Effects Speaker	VCA	Voltage Controlled Amplifier
AL	Audio Left	DCN	Divider Combiner Network	IOP	Input/Output Panel	OPJ	Optical Projector	SER	Serial	VCC	Video Conference Camera
ALA	Assistive Listening Antenna	DCPU	Digital Central Processing Unit	IPC	IP Camera			SES	Sound Enhancement Speaker	VCM	Video Card Module
ALR	Assistive Listening Receiver	DCR	Digital Capture Recorder	IR	Infrared	P	Power	SFF	Front Fill Speaker	VCR	Video Cassette Recorder
ALS	Assistive Listening System	DD	Dimmer Doubler	IRB	IR Broadcast	PA	Power Amplifier	SG	Ground Speaker	VCS	Video Conferencing System
ALT	Assistive Listening Transmitter	DOL	Digital Delay	IRE	IR Emitter	PAD	Pad	SGN	Sync Generator	VCU	Video Conferencing Unit
AM	Audio Monitor	DEB	De-Embedder	IRM	IR Modulator	PB	Push Button	SGMR	Single Gang Mud Ring	VD	Video Display
AMS	Audio Monitor Speaker	DEC	Decoder	IRR	IR Receiver	PBR	Play Back Rack	SGP	Signal Processor	VDA	Video Distribution Amplifier
AMX	Auto Mixer	DEQ	Dynamic Equalizer	IRS	Intercom Remote Station	PC	Personal Computer	SGS	Signage Server	VDR	Video Disk Recorder
ANT	Antenna	DFR	Digital File Recorder	IRT	IR Transmitter	PCB	Patch Cable	SH	Horn Speaker	VE	Video Encoder
AOB	Analog Output Bridge	DIM	Dimmer Module	ISDN	Integrated Service Digital Network	PCC	Personal Computer Control	SHF	Shelf	VEH	Video Encoder Hub
AOP	Audio Output Panel	DIU	Digital Interface Unit	IRE	IR Emitter	PCD	Power Conditioner	SI	Sensor Interface	VF	View Finder
AP	Access Point	DJCC	Digital Joystick Camera Control	ISR	Isolation Transformer	PCLD	Projector Controller With Line Doubler	SIS	Set Integrated Speaker	VFX	Video Effects Processor
APB	Audio Patch Bay	DM	Digital Mixer	JB	Junction Box	PCT	Portable Cart	SIW	In-Wall Speaker	VIC	Visual Concert
APD	Antenna Power Distribution	DMR	Dimmer Rack			PD	Plasma Display	SJB	Speaker Junction Box	VIP	Video Input Panel
APM	Audio Program Monitor	DMX	DMX	KB	Keyboard	PD	Plasma Display Lift	SLA	Speaker Line Array	VL	Voice Lift
AR	Audio Right	DMXC	DMX Control Cable	KM	Keyboard & Mouse	PEC	Portable Equipment Case	SMP	Stage Manager Panel	VLCF	Voice Lift Card Case Frame
ASP	Antenna Splitter	DMXN	DMX Noise	KMI	Keyboard & Mouse Interface	PE	Parametric Equalizer	SMP	Stage Manager Rack	VM	Video Monitor
ASV	Audio Server	DPB	Disc Publisher	KMK	Keyboard & Mouse Kit	PQM	Program Monitor	SMS	Scaling Matrix Switcher	VMS	Video Matrix Switcher
ASW	Audio Switcher	DRC	Door Control	KVM	Keyboard, Video & Mouse	PGS	Paging System	SMSW	Satellite Multiswitch	VOL	Volume Control
AT	Audio Tie Line	DREC	Digital Recorder	KVME	Keyboard, Video & Mouse Extender	PI	Power Injector	BMX	Splitter Mixer	VOP	Voice Over Paging Module
ATI	Audio Teleconference Interface	DSD	Data Storage Device			PJL	Projector Lift	SO	Speaker Overhead	VPB	Video Patch Bay
ATN	Attenuator	DSMP	Digital Signage Media Player	LAN	Local Area Network	PJS	Projection Screen	SP	Speaker	VPJ	Video Projector
AV	Audio Video	DSP	Digital Signal Processor	LC	Lighting Console	PL	Paging Microphone	SPCL	Speaker Cluster	VPRM	Video Projector Rotating Mount
AVC	Auto Volume Controller	DSS	Digital Satellite System	LD	Line Doubler	PMIC	Presentation Microphone	SPQ	Program Speaker	VPM	Video Program Monitor
AVD	Audio Video Distribution	DTP	Digital Twisted Pair	LDP	Laser Disc Player	PMP	Podium Microphone Panel	SPJ	Slide Projector	VPS	Video Production Switcher
AVI	Audio Video Interface	DVC	DVD/VCR Combo	LDR	Line Driver	PNWS	Power Network Switch	SPL	Splitter	VSC	Video Scan Converter
AVIM	Audio Video Input Module	DVD	Digital Versatile Device	LEC	Lectern	POD	Podium	SPN	Stage Panel	VSL	Video Scaler
AVN	Audio Video Network	DVHS	Digital Cassette Recorder	LFD	Light Emitting Panel	PP	Podium Panel	SPP	Speaker Patch Panel	VSP	Video Signal Processor
AVP	Audio Video Panel	DVP	Digital Video Processor	LES	Low Frequency Speaker	PFS	Phantom Power Supply	SPK	Speaker Processor	VSPC	Video Screen Panel Control
AVR	Audio Video Router	DVR	Digital Video Recorder	LI	Lighting Interface	PRE	Pre Amplifier	SPT	Speaker Portable	VSS	Video System Switcher
AXF	Auto Transformer	DVS	Digital Video Scaler	LL	Line Level	PRK	Portable Rack	SRA	Stereo Receiver Amp	VSV	Video Server
		DWR	Drawer	LM	Line Module	PS	Power Supply	SS	Surround Sound Speaker	VSW	Video Switcher
BAT	Battery			LP	Lectern Panel	PSB	Powered Subwoofer	SSA	Solid State Audio Source	VT	Video Tie Line
BC	Battery Charge	EBD	Embedder	LPM	Lapel Microphone	PSC	Projection Screen Control	SSF	Sliding Shelf	VW	Video Wall
BOP	Blu-Ray Disc Player	EBF	Expanded Beam Fiber Connector	LPT	Laptop	PSD	Paging Station Desk Mount	SSV	Streaming Server	VWP	Video Wall Processor
BOB	Break Out Box	EC	Expansion Card	LTF	Line Transformer	PSLR	Program Select & Level Remote	SSW	Serve Switch		
BP	Belt Pack	EDB	Electrical Distribution Box	LTP	LCD Touch Panel	PSP	Powered Speaker	STB	Stage Box	WAA	Wireless Antenna Amplifier
		EFX	Effects Processor	LVR	Line Voltage Regulator	PSQ	Power Sequencer	SUM	Summing Amplifier	WAD	Wireless Antenna Distribution
C	Conduit	ELTC	Emergency Lighting Transfer Cabinet			PSR	Paging Station Rack Mount	SV	S-Video	WAS	Wireless Antenna Splitter
CAM	Video Camera	EN	Ethernet	MA	Mixer Amplifier	PSW	Paging Station Wall Mount	SVC	Slide to Video Converter	WB	White Board
CAS	Cassette Deck	ENC	Encoder	MAL	Media Archive Library	PT	Poke-Through	SVD	Signage Video Display	WBC	Window Blind Control
CASR	Cassette Deck Recorder	ENG	Electronic News Gathering	MATV	Master Antenna Television	PTC	Pat & Tit Camera	SVDA	S-Video Distribution Amp	WBP	Wireless Belt Pack
CATV	Community Antenna Television	EQ	Equalizer	MCS	Media Collaboration System	PVM	Preview Video Monitor	SVHS	S-Video Cassette Recorder	WC	Word Clock
CBT	Cable Tray	ERK	Equipment Rack	MCT	Main Cabinet Tray	PWS	Power Strip	SVMS	S-Video Matrix Switcher	WER	Wireless Ethernet Router
CC	Contact Closure	ERT	Ethernet Router	MCV	Media Converter	PXS	Proximity Switch	SVS	S-Video Switcher	WFM	Waveform Monitor
CCC	Contact Closure Card	EXG	Expander/Gate	MD	Mix Disc	PZM	Pressure Zone Microphone	SVSS	S-Video Separator Switcher	WGA	Wireless Gateway Antenna
CCF	Card Cage Frame	EXT	Extender	MDCF	Matrix Digital Card Frame	MDCF	Matrix Digital Card Frame	SW	Wall Mounted Speaker	WGW	Wireless Gateway
CCU	Camera Control Unit			MOR	Motion Detector	RAS	RGB Auto Switcher	SWG	Switch Glass	WIA	Wireless Intercom Antenna
CDB	Creston Distribution Block	F	Fiber	MFP	Microphone Facility Panel	RC	Remote Control	SWH	Sound Web Hub	WLM	Wireless Microphone
CDC	Compact Disc Changer	FB	Floor Box	MFS	Mid Frequency Speaker	RDA	RGB Distribution Amp	SYSW	System Switcher	WLU	Wireless Unit
CDP	Compact Disc Player	FBS	Feed Back Suppressor	MI	Mid Interface	REC	Record			WM	Wireless Mouse
CG	Character Generator	FLM	Floor Monitor	MIC	Microphone	REV	Reverb	TAM	Telephone Access Module	WMA	Wireless Mic Antenna
CIM	Control Interface Module	FMA	FM Antenna	MIDI	MIDI	RF	Radio Frequency	JB	Junction Box	WMAP	Wireless Mic Antenna Panel
CIU	Computer Interface Unit	FMR	FM Receiver	MIX	Mixer	RFA	RF Amplifier	TBC	Time Base Corrector	WMG	Wired Manager
CL	Camera Lens	FMT	FM Tuner	MKB	Monitor Keyboard Sliding Shelf	RFAS	RF Antenna Splitter	TBU	Tape Backup	WMKA	Wireless Mic Keyboard Antenna
CM	Card Module	FMTA	FM Transmitting Antenna	MM	Microphone Module	RFDA	RF Distribution Amplifier	TC	Programmable Time Clock	WMKS	Wireless Mouse Keyboard Antenna
CME	Control Module Extended	FMTT	FM Transmitter	MMC	Media Matrix Computer	RFS	RF Splitter	TCB	Terminal Cabinet	WMR	Wireless Mic Receiver
CMIC	Ceiling Microphone	FOH	Front Of House	MMP	Monitor Mix Panel	RFT	RF Transmitter	TCR	Transcoder	WP	Wall Plate
CMP	CD/Media Player	FAP	Facility Panel	MMPA	Measurement Mix Pre Amplifier	RFTA	RF Translating Antenna	TCS	Teleconferencing System	WPP	Wireless Presentation Gateway
CN	CableNet	FPL	Floor Panel	MNP	Masking Noise Processor	RGB	RGB/V	TEL	Telephone Output	WPN	Wall Panel
CNT	Control Network	FPP	Fiber Patch Panel	MOB	Monitor Out Box	RIP	Rack Input Panel	TI	Telephone Interface	WSI	Work Station Interface
COD	Codec Unit	FREC	Fiber Receiver	MOD	Modulator	RK	Rack Lights	TJB	Transformer Junction Box	WTA	Wireless Touch Panel Adapter
CON	Converter	FSC	File System Controller	MON	Monitor	RKM	Rack Mount	TM	Table Microphone	WTP	Wireless Touch Panel
CP	Conduit Pocket	FT	Fiber Tie Line	MOU	Mouse	RM	Relay Module	TMB	Table Microphone Box	WTPR	Wireless Touch Panel Receiver
CPIS	Control Plug In Station	FTP	Fiber Tie Panel	MP	Media Panel	RMS	RGB Matrix Switcher	TP	Twisted Pair		
CPL	Compressor/Limiter	FW	Firmware	MFA	Microphone Pre-Amplifier	RPM	Releasable Projector Mount	TPC	Touch Panel Control		

ABBREVIATIONS

(E)###	Existing	CLG	Ceiling			NTS	Not To Scale		
(F)	Future	CM	Construction Manager	GC	General Contractor			SECT	Section
A D	Above Zero Floor Level	CO	Conduit Only			OC	On Center	SHP	Shielded Pair
ACT	Above Counter Top	DIA	Diameter	HR	Home Run	OD	Outer Diameter	SIM	Similar
AFB	Above Floor Below	DR	Door	IW	In Wall	OFCl	Owner Furnished Contractor Installed	SM	Stage Manager
AFC	Above Finished Ceiling					OFE	Owner Furnished Equipment	STD	Standard
AFF	Above Finished Floor	E.C.	Empty Conduit	LP	Lightning Protector	OFOf	Owner Furnished Owner Installed		
AH	Above Header	EC	Electrical Contractor	LRR	Lightning Room Rack	P/O	Part Of	TPD	Tripod
AS	Above Slab	EL	Elevation	LTG	Lighting	PF	Press Feed	TST	Test Set
		ELEC	Electrical			POC	Point of Connection	TYP	Typical
BFC	Below Finished Ceiling	EOL	End Of Line	MISC	Miscellaneous	PRG	Program	UBC	Uniform Building Code
BGM	Background Music	EQUIP	Equipment	MOM	Momentary	PROJ	Project	UCN	Unless Otherwise Noted
BOH	Back Of House	MTD	Mounted			PSCH	Project Standard Control Height		
BTU	British Thermal Units	MTF	Mounting Termination Fabrication			PSCH	Project Standard Receptacle Height	VIF	Verify In Field
		FAN	Fan Panel	MTL	Metal	PSH	Project Standard Switch Height		
CAB	Cabinet	FCA	Finished Ceiling Above			PST	Pull String	WP	Weather Proof
CATV	Cable TV	FIN	Finished	NC	Normally Closed	PWR	Power		
CBC	California Building Code	FOH	Front Of House	NIC	Not In Contract				
CL	Center Line	FSF	Folding Shelf	NO	Normally Open	RCP	Reflected Ceiling Plan		

FACILITY INPUT SYMBOL SCHEDULE AND DESCRIPTIONS FOR FLOOR AND CEILING PLANS

F FLOOR MOUNTED

W WALL MOUNTED

C CEILING MOUNTED

I INTERGRATED (MILLWORK, PODIUM, TABLE)

Ⓢ BOX MOUNTED BELOW

Ⓢ BOX MOUNTED ABOVE

Ⓢ EXISTING EQUIPMENT

Ⓢ CEILING SPEAKER

SWING OUT RACK

WALL MOUNTED RACK

IN-WALL RACK

FLOOR STANDING RACK

MOUNTING

(E) = EXISTING TO REMAIN

(EN) = EXISTING JBOX/BACKCAN

NEW SPEAKER

(F) = FUTURE

(R) = REPLACE EXISTING

SYMBOL ID

CONDUIT STUB

STUB UP/DOWN

DETAIL NUMBER

AV SHEET NUMBER

RISER SYMBOL SCHEDULE AND DESCRIPTIONS

### AV DEVICE

CONTINUE CABLE/ CONDUIT ROUTING TO LAST DEVICE

### TOTAL QUANTITY OF DEVICES ON RUN

CONDUIT SIZE IN INCHES

LINE OR SECTION

WIRE TYPE

WIRE QTY.

\* QUANTITY (1) UNLESS OTHERWISE NOTED

\*\* ONE CONDUIT PER LINE OR SECTION UNLESS OTHERWISE NOTED

FACILITY PANEL CONNECTOR LEGEND

3 PIN FEMALE XLR

3 PIN MALE XLR

4 PIN FEMALE XLR

4 PIN MALE XLR

5 PIN FEMALE XLR

5 PIN MALE XLR

6 PIN FEMALE XLR

6 PIN MALE XLR

CPC 16

CPC 37

WHIRLWIND W-TYPE CONNECTOR

BCJ-JRU

RJ-RU

XLR/TRS

NJ3FPCB

NL4MP

S-VIDEO

TY3F

C3F

C3M

D37

D25

D15

15HD

D9

NA4DMI-#

RJ-45

RJ-11

etherCON D-SERIES

etherCON EBFDY- G6-8

FIBERCON

4P DIN

5P DIN

S-VIDEO

119-5F

PS2 MOUSE

SC FIBER

LEMO EBW

LED

TRS

RCA

FEED THRU RCA

BNC

MINI-PHONE

F

BINDING POST

WIRE SCHEDULE

NOTES:

1. CONTRACTOR TO USE PLENUM RATED CABLE WHERE REQUIRED BY CODE.

2. WIRING TO BE INSTALLED BY AV CONTRACTOR

TYPE

APPLICATION

DESCRIPTION (FIXED INSTALL CABLE)

O.D.

MANUF.

PART NO.

A1

AUDIO ANALOG/DIGITAL CABLE

ANALOG/DIGITAL AUDIO CABLE, MICROPHONE AND LINE LEVEL WIRING. LESS THAN +24 dBu. FROM 20Hz TO 20kHz, 24 AWG, IMPEDANCE 110Ω ±20%, CAPACITANCE 26pF/FT, 100% SHIELDED, STRANDED TWISTED PAIR

0.177

BELDEN

1800B

C2

CONTROL/PWR SUPPLY

CONTROL CABLE AC/DC, 22 AWG, 2 PAIR, TWISTED, TINNED COPPER

0.233

BELDEN

9744

D3

CAT 6 DATA NETWORK CABLE

CATEGORY 6 DATA CABLE, 23 AWG, UNBONDED PAIR CABLES, SOLID BARE COPPER, MAX. ATTENUATION 28.3dB/100m @ 200MHz, MAX DELAY SKEW 45ns/100 m , NOM MUTUAL CAPACITANCE @ 1kHz 15pF/FT, MAX DC RESISTANCE 8.2Ω/100m

0.220

BELDEN

2412

R1

LOW LOSS 50Ω WIRELESS

RG58C/U, 20 AWG, 50Ω, 95% BRAIDED SHIELD, NOM ATTN -21.5dB/100ft @ 1GHz

0.195

BELDEN

8262

S4

SPEAKER

LOUDSPEAKER LEVEL OR CIRCUIT WIRING GREATER THAN +24dBu, FROM 20Hz TO 20kHz, 10 AWG, STRANDED, TWISTED PAIR WITH PVC JACKET.

0.356

BELDEN

5T00UP

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CLIENT NAME

OXNARD UNION HIGH SCHOOL DISTRICT

PROJECT NAME

ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM

4660 MISSION OAKS BLVD., CAMARILLO, CA. 93012

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NO. C12565

REG. 11-30-21

STATE OF CALIFORNIA

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08/07/2020

ADDENDUM 1

PROJECT TEAM

PRINCIPAL IN CHARGE: JACK BERNARD

PROJECT LEADER: PABLO AMEZQUITA

DESIGN TEAM

VENEKLASEN ASSOCIATES

PROJECT NAME

ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM

PROJECT NO.

6121235311

SHEET TITLE

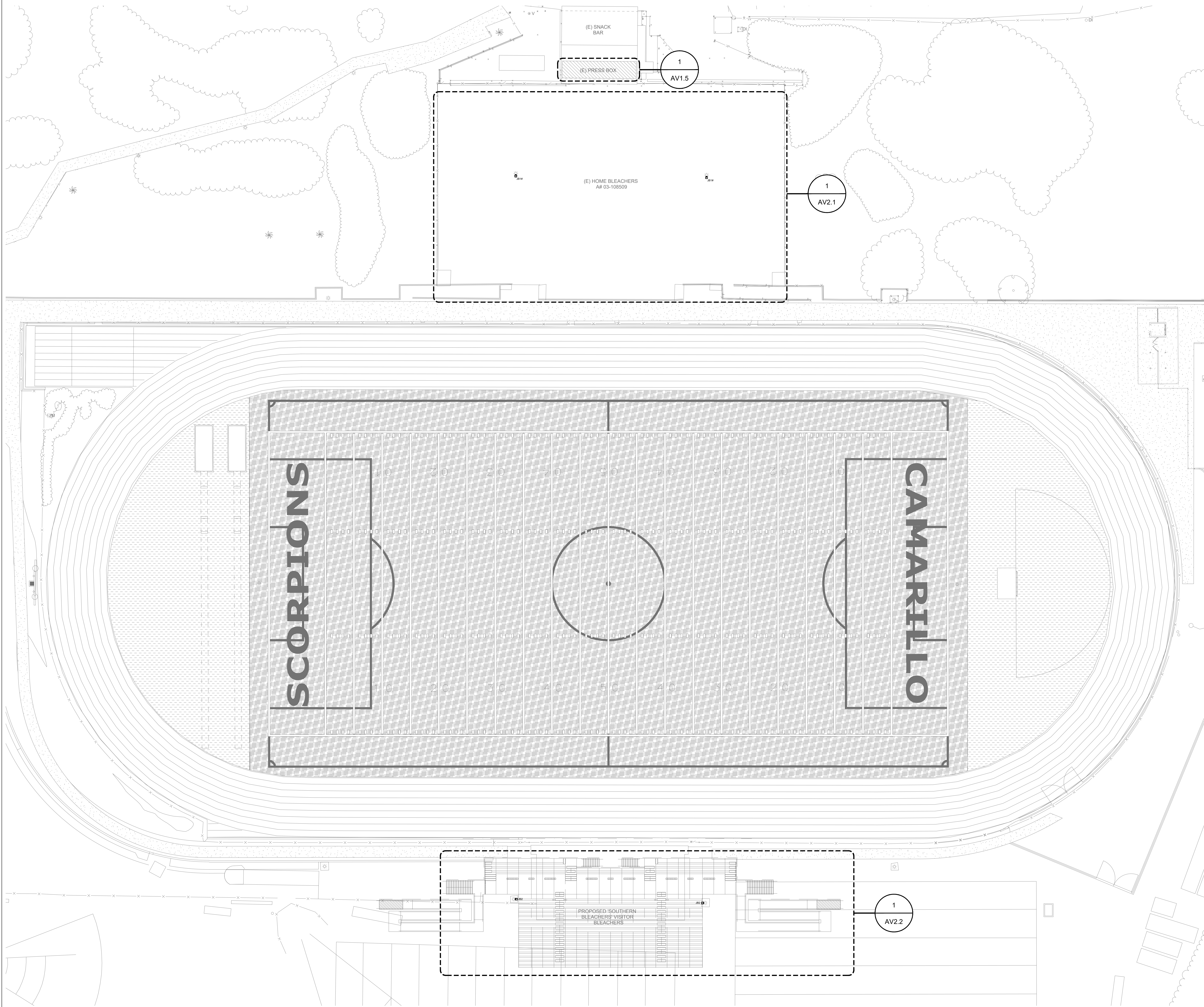
ABBREVIATIONS NOTES AND SYMBOLS

SHEET NUMBER

AV0.2

AD1-AV2

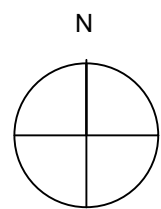




ENLARGED SITE PLAN

1" = 20'-0"

1  
AV1.1



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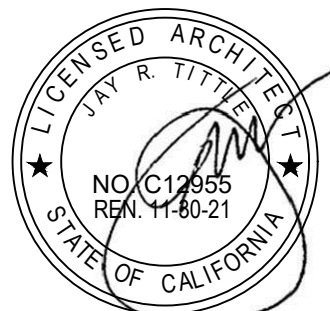
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PROJECT TEAM

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DESIGN TEAM:

VENEKLASSEN ASSOCIATES

PROJECT NAME

**ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM**

PROJECT NO.

**6121235311**

SHEET TITLE

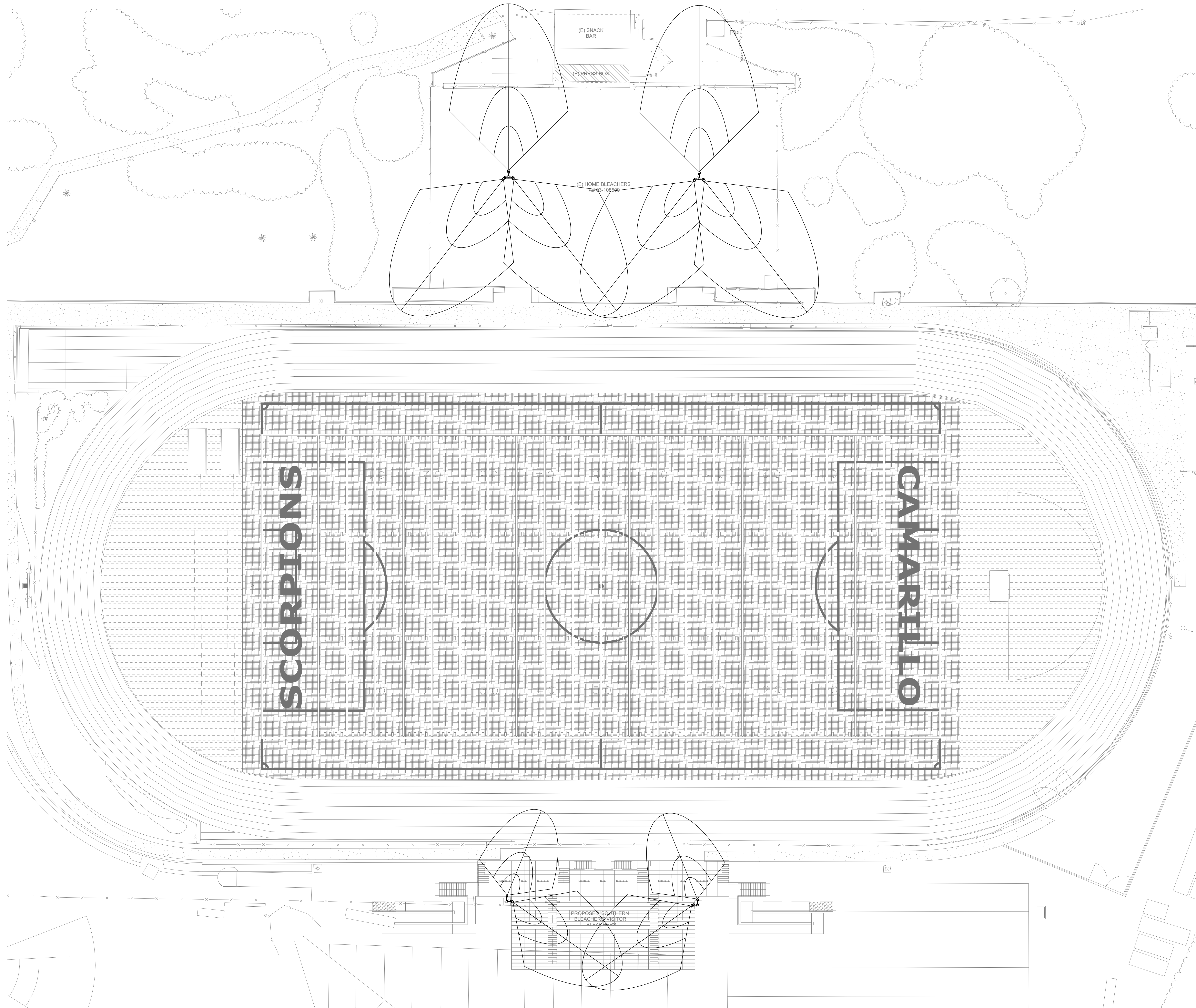
**ENLARGED AV SITE PLAN**

SHEET NUMBER

**AV1.1**

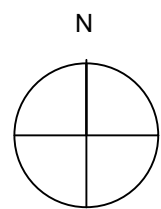






SPEAKER COVERAGE PLAN  
1" = 20'-0"

1  
(AV1.2)



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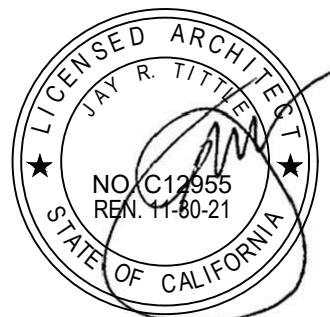
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PROJECT NAME

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SCHOOL STADIUM SOUND  
SYSTEM**

PROJECT NO.

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SHEET TITLE

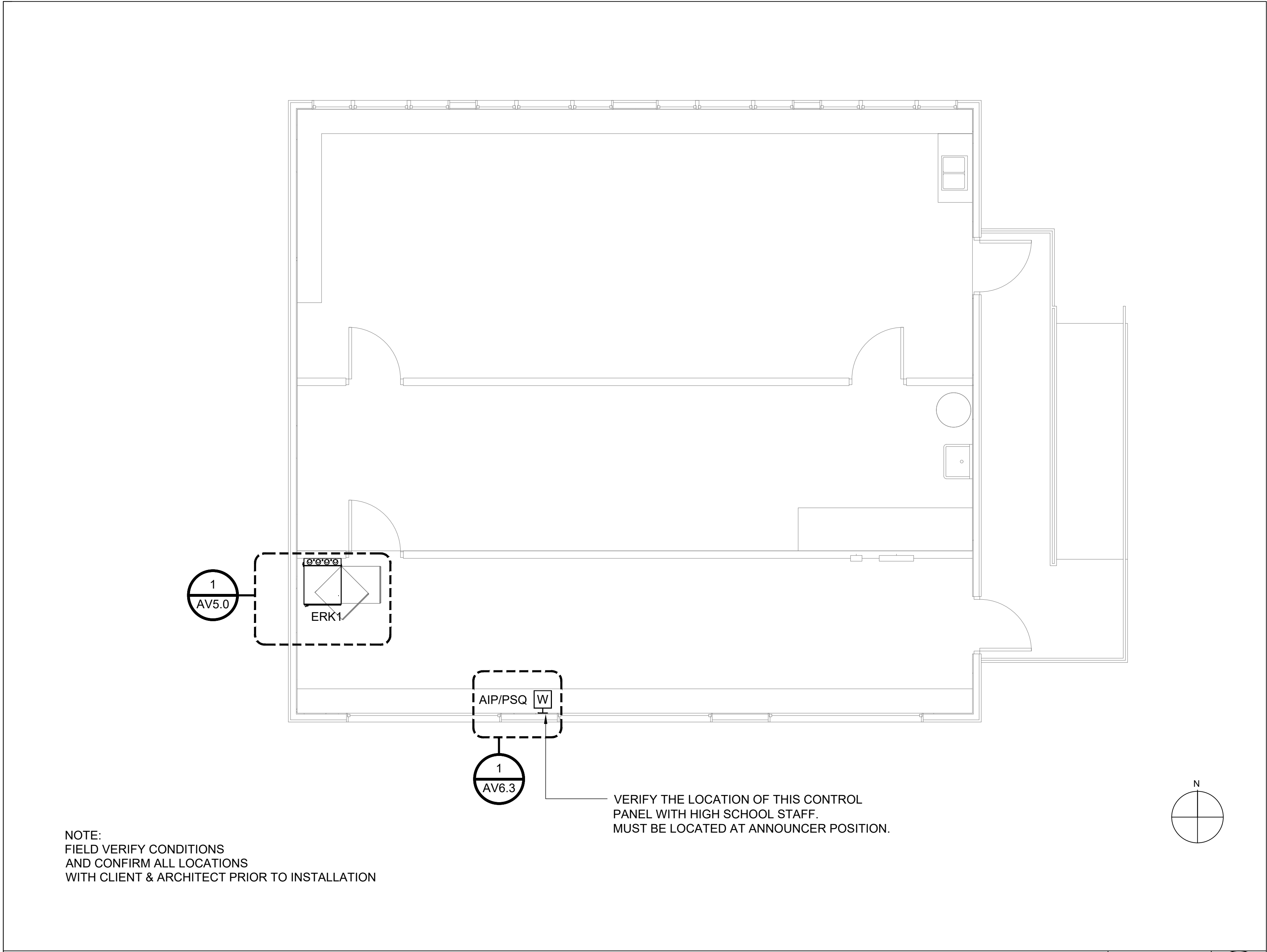
**AV SPEAKER COVERAGE  
PLAN**

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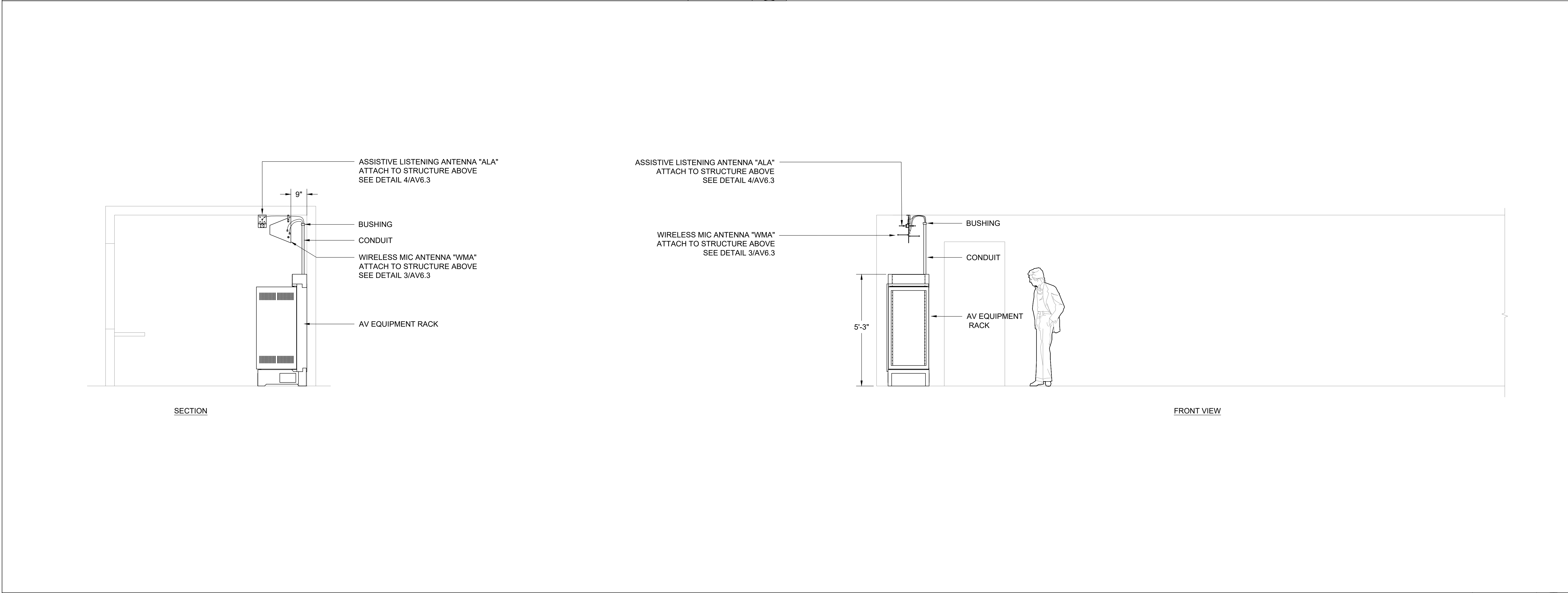
**AV1.2**

**AD1-AV4**





PRESS BOX FLOOR PLAN - ENLARGED AV LAYOUT



PRESS BOX SECTION - ENLARGED AV LAYOUT

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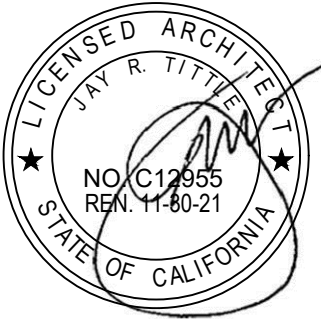
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PROJECT NAME

ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM

PROJECT NO.

6121235311

SHEET TITLE

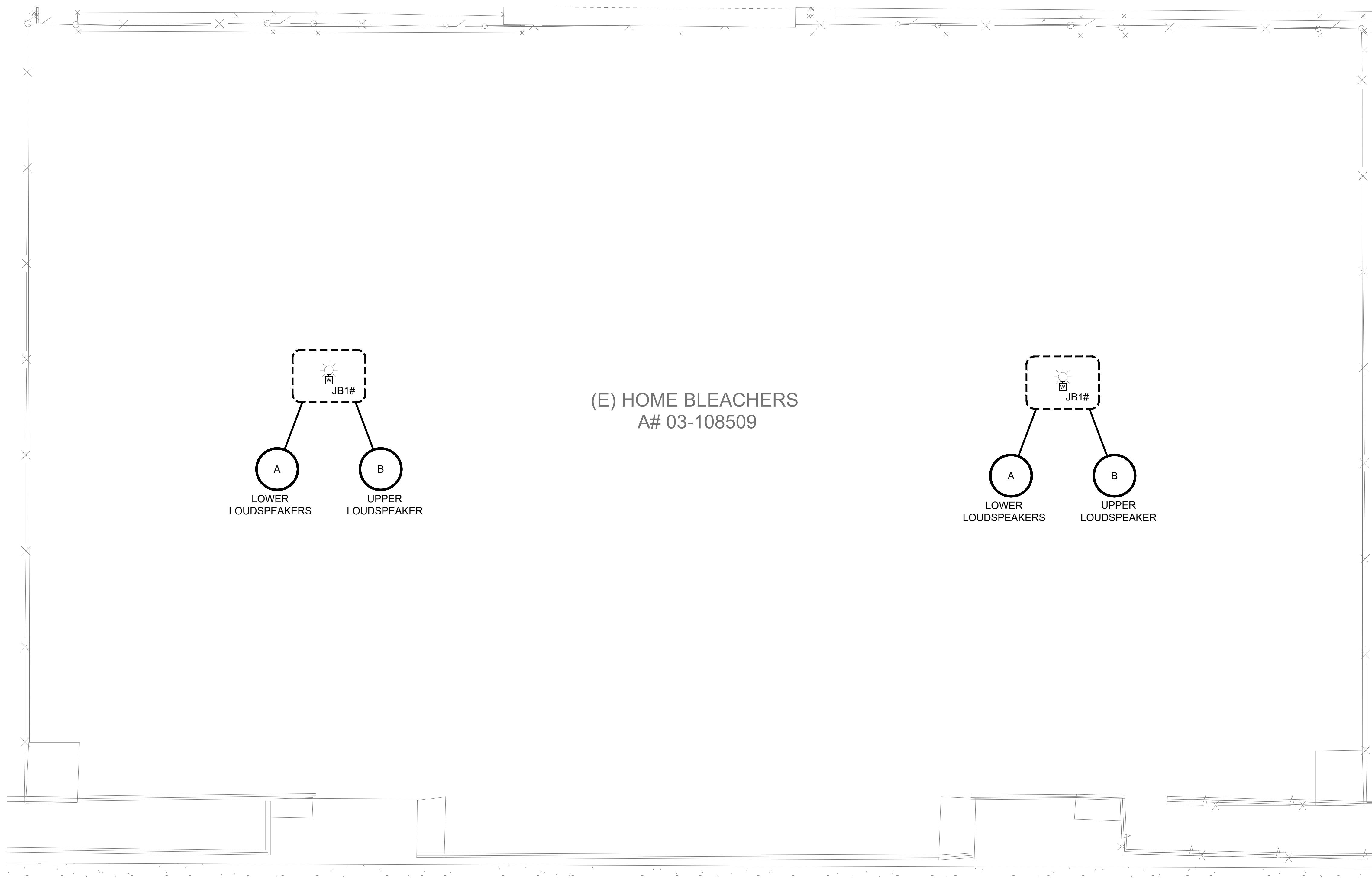
AV ENLARGED LAYOUTS

SHEET NUMBERS

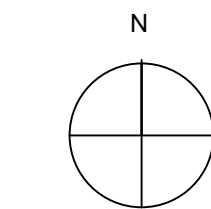
AV1.5

AD1-AV5





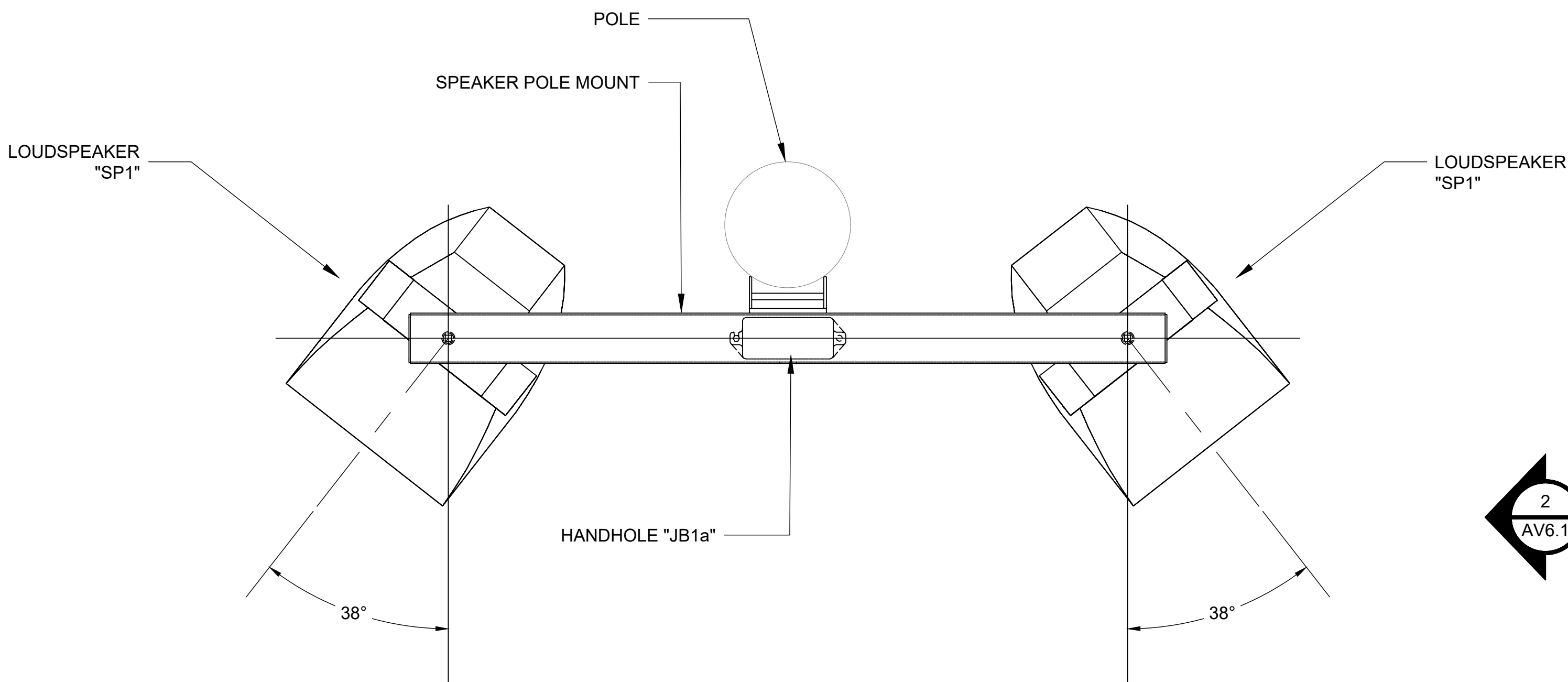
(E) HOME BLEACHERS  
A# 03-108509



HOME BLEACHERS - ENLARGED AV PLAN

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

1



2  
AV6.1

1  
AV6.1

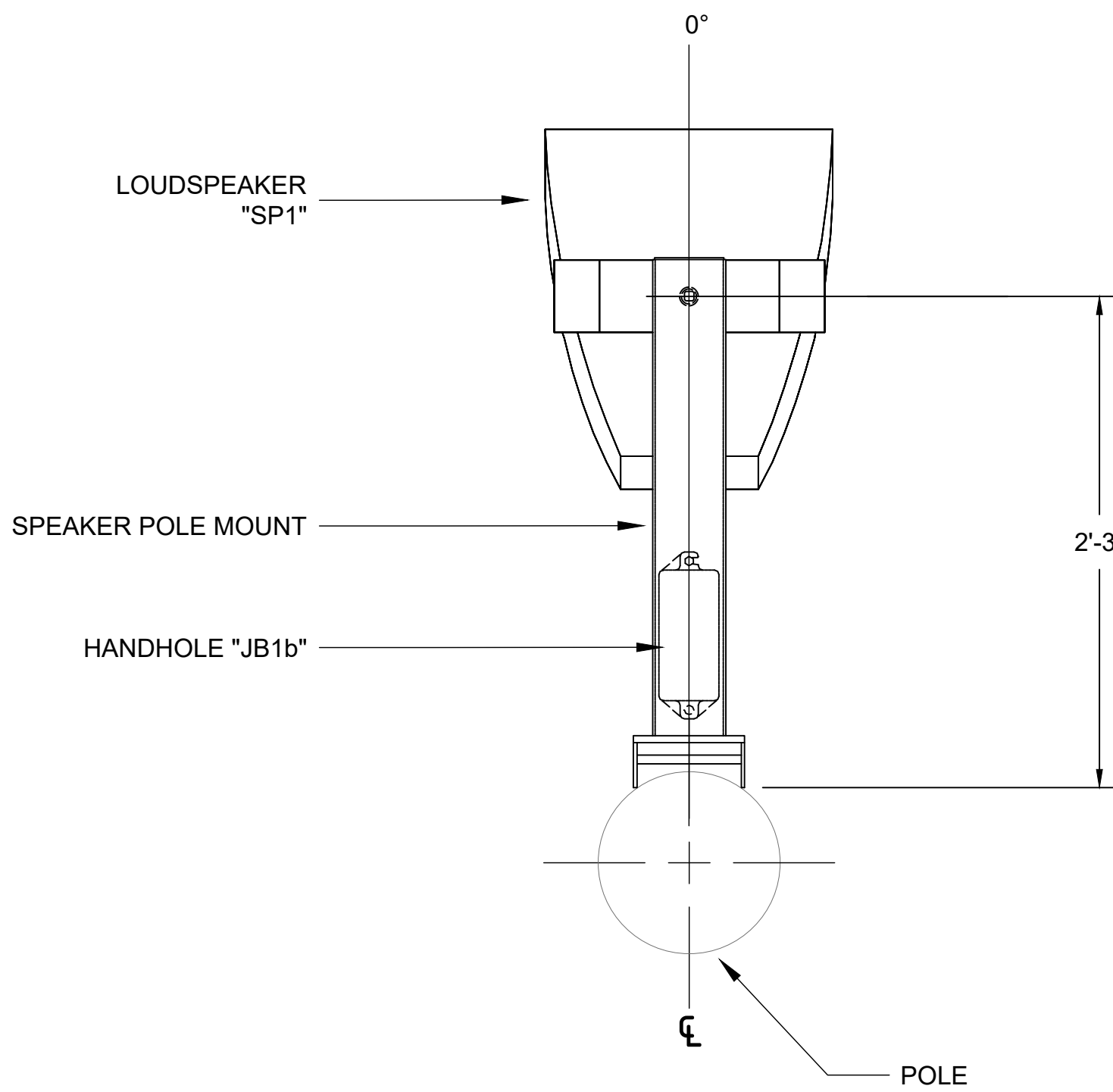
\*SEE DETAIL 1 /AV6.1

NOTE:  
ALL AIMING ANGLES ARE  
RELATIVE TO PLAN NORTH

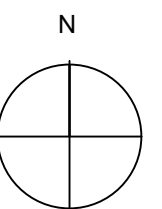
HOME POLE - LOWER LOUDSPEAKERS PLAN VIEW

SCALE:  
NTS

A



2  
AV6.1



\*SEE DETAIL 1 /AV6.1

NOTE:  
ALL AIMING ANGLES ARE  
RELATIVE TO PLAN NORTH

HOME POLE - UPPER LOUDSPEAKERS PLAN VIEW

SCALE:  
NTS

B

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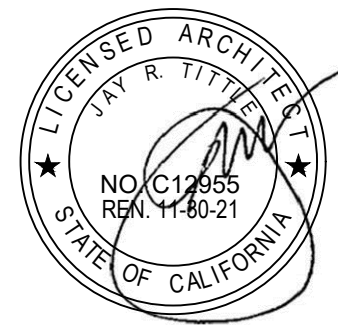
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PROJECT NAME

**ADOLFO CAMARILLO HIGH  
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SYSTEM**

PROJECT NO.

**6121235311**

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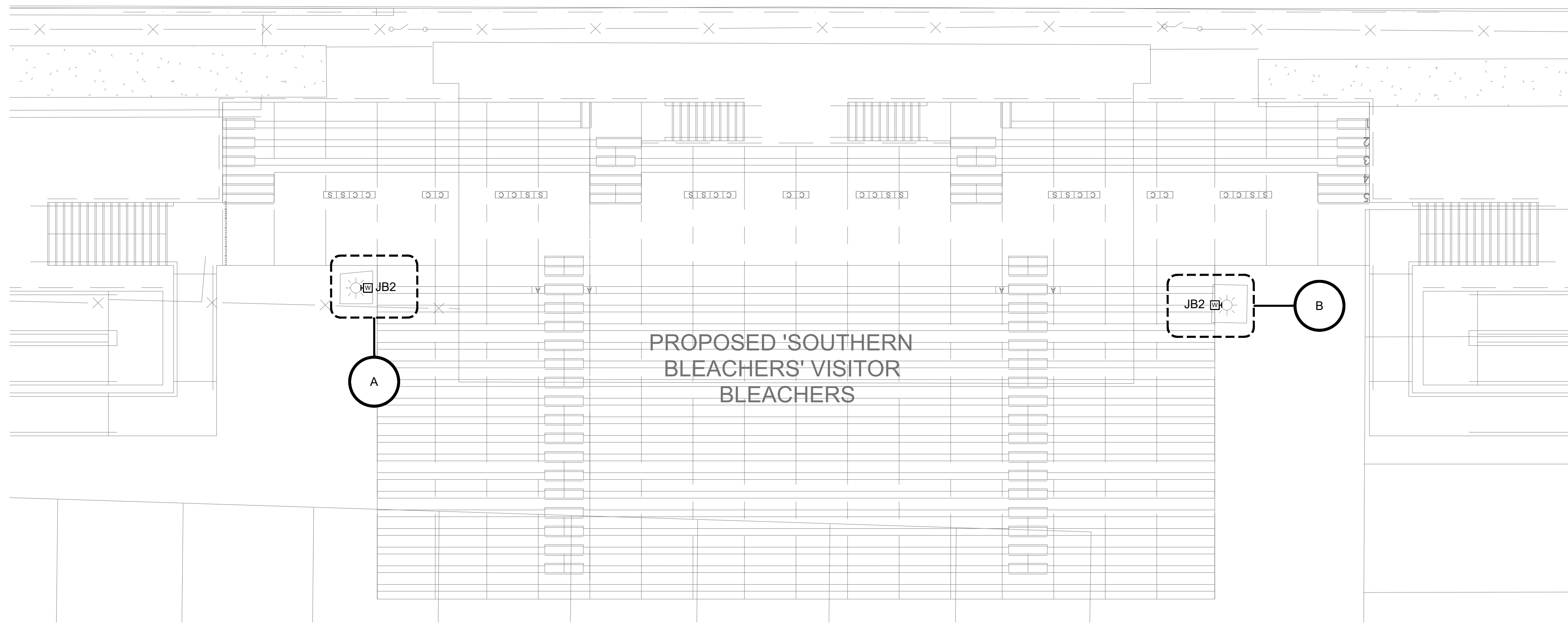
**AV ENLARGED PLANS**

SHEET NUMBER

**AV2.1**

**AD1-AV6**

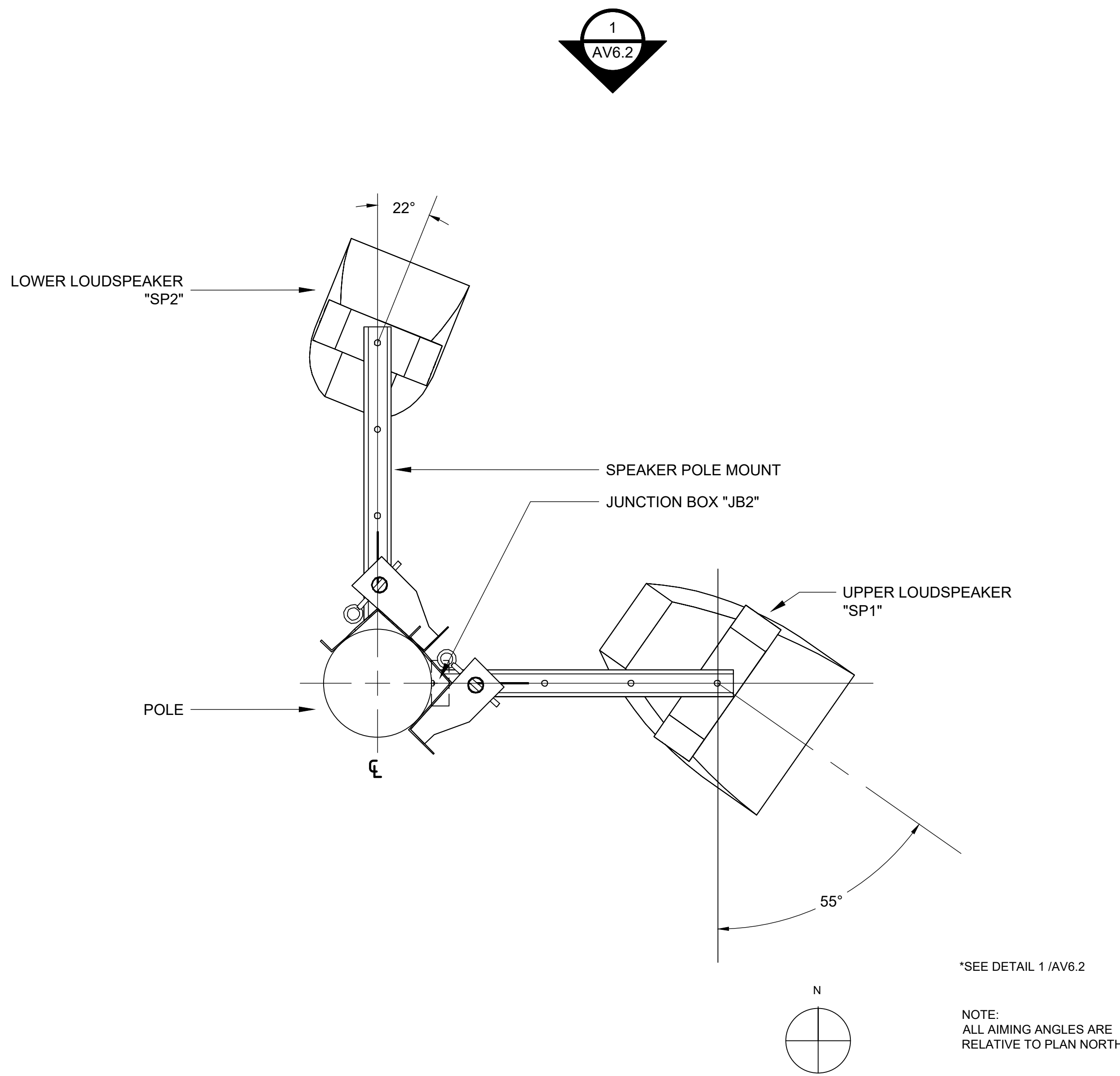




VISITOR BLEACHERS - ENLARGED AV PLAN

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

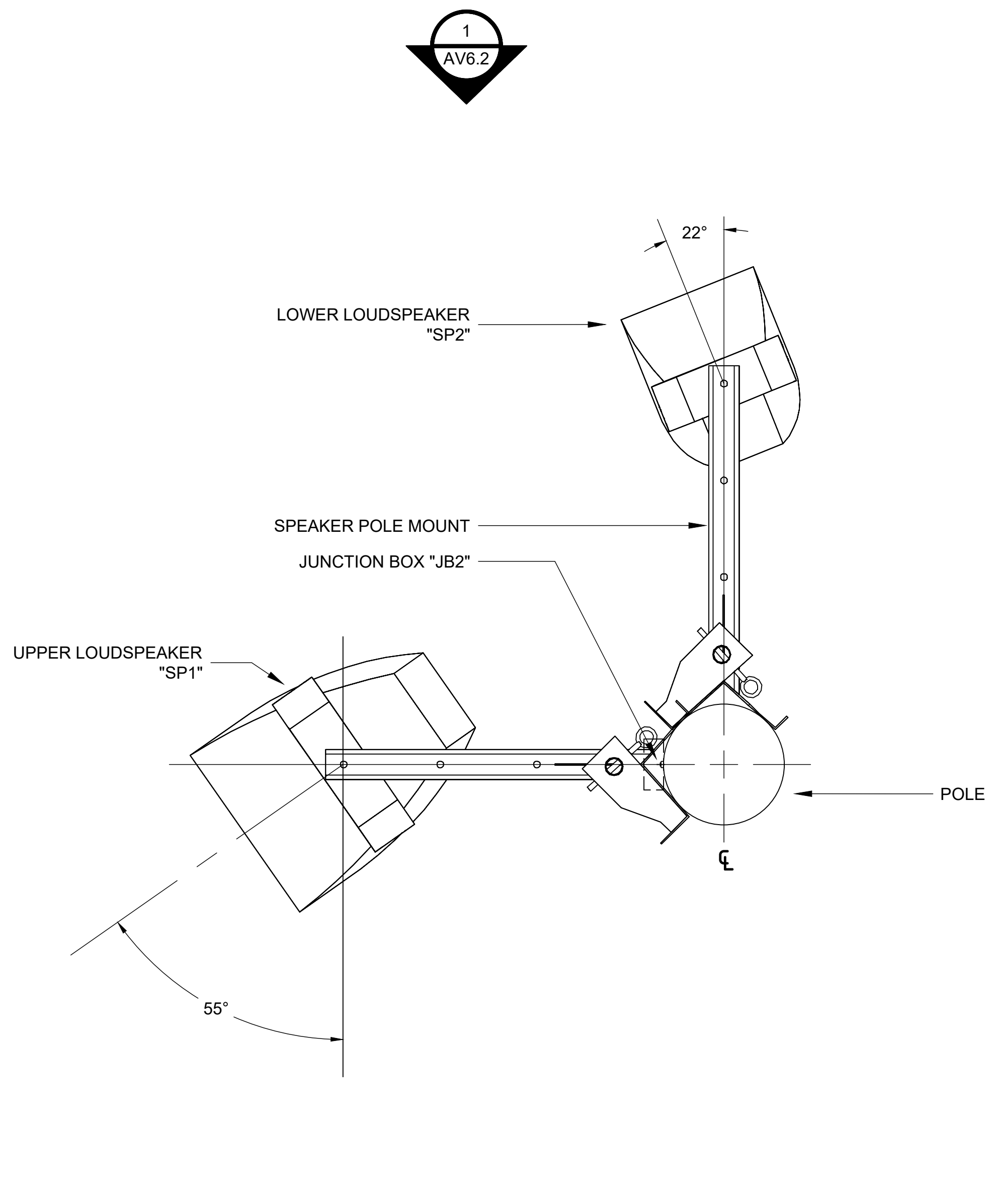
1



VISITORS WEST POLE - LOUDSPEAKERS PLAN VIEW

SCALE:  
NTS

A



VISITORS EAST POLE - LOUDSPEAKERS PLAN VIEW

SCALE:  
NTS

B

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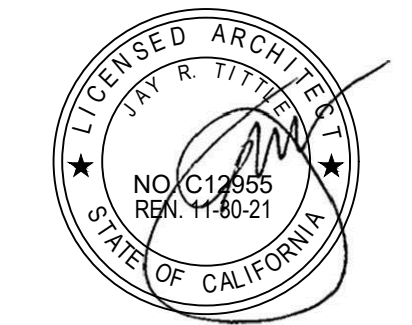
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PROJECT TEAM

PRINCIPAL IN CHARGE:

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DESIGN TEAM:

VENEKLASEN ASSOCIATES

PROJECT NAME

**ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM**

PROJECT NO.

**6121235311**

SHEET TITLE

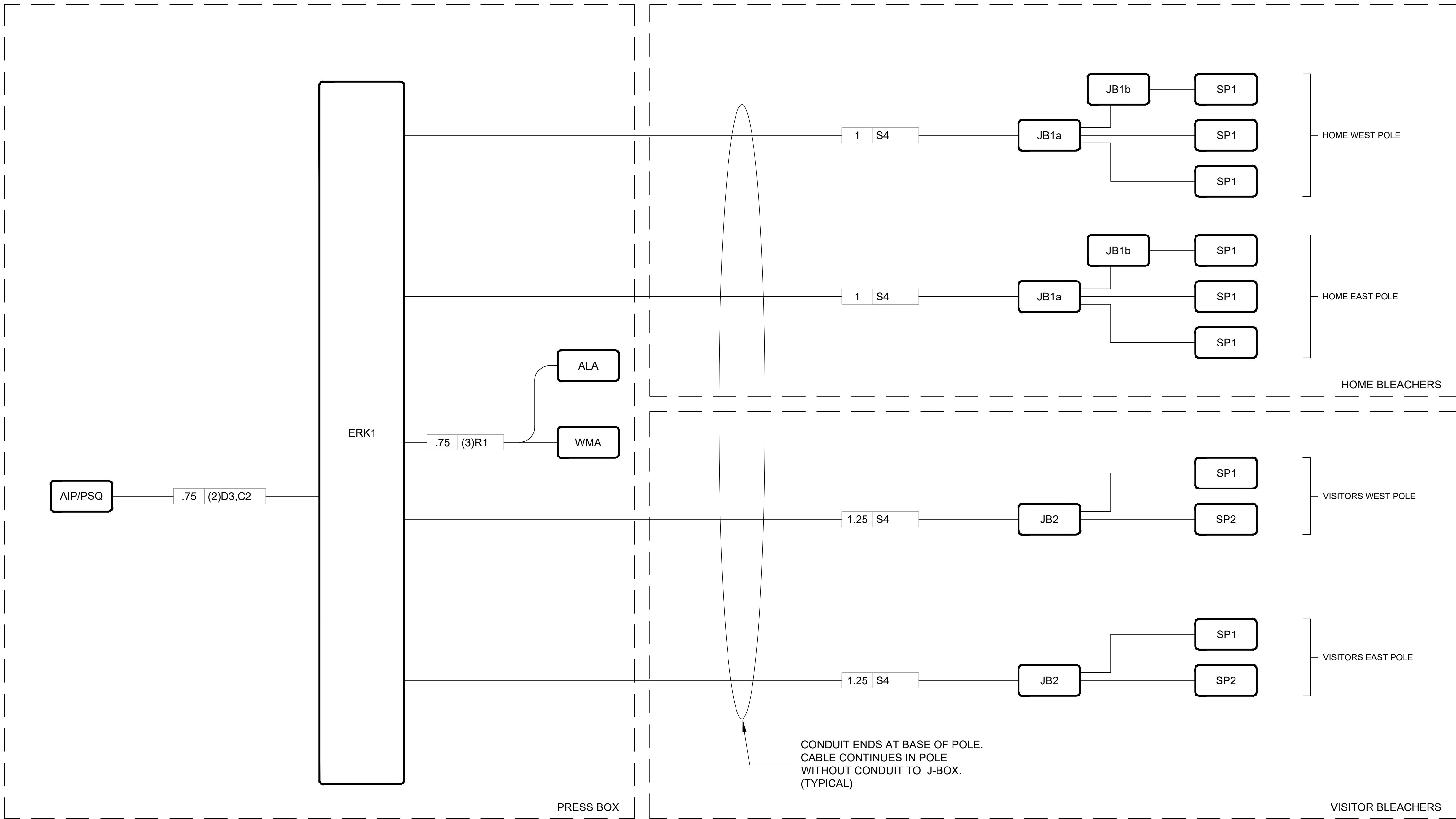
**AV ENLARGED PLANS**

SHEET NUMBERS

**AV2.2**







RISER DIAGRAM

SCALE:  
NTS

1

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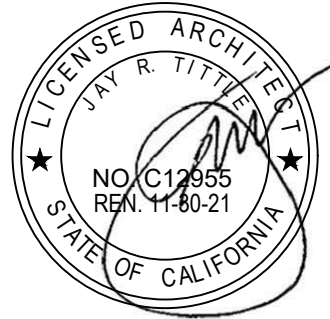
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PROJECT TEAM

PRINCIPAL IN CHARGE:

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VENEKLASEN ASSOCIATES

PROJECT NAME

**ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM**

PROJECT NO.

**6121235311**

SHEET TITLE

**AV RISER DIAGRAM**

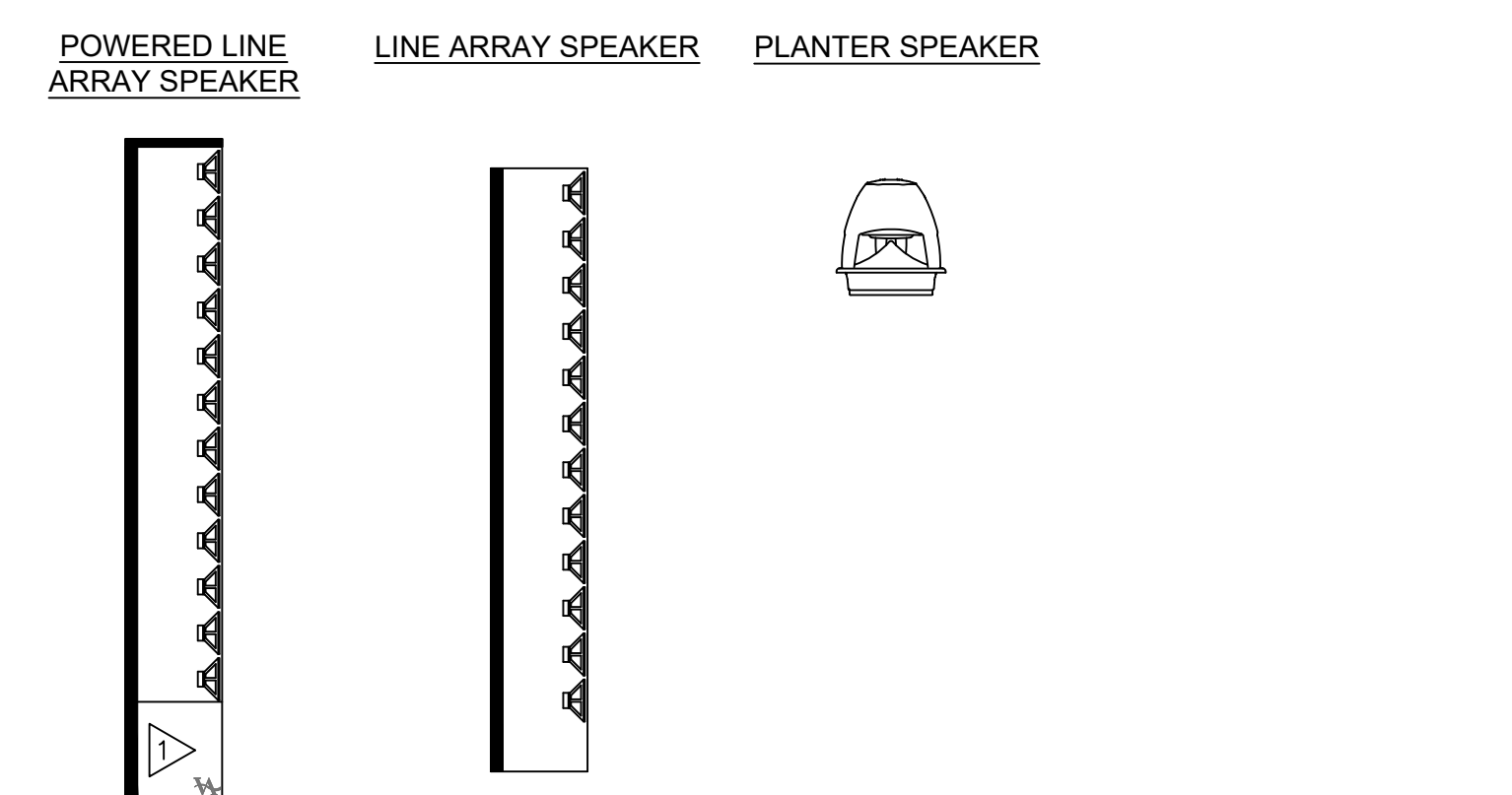
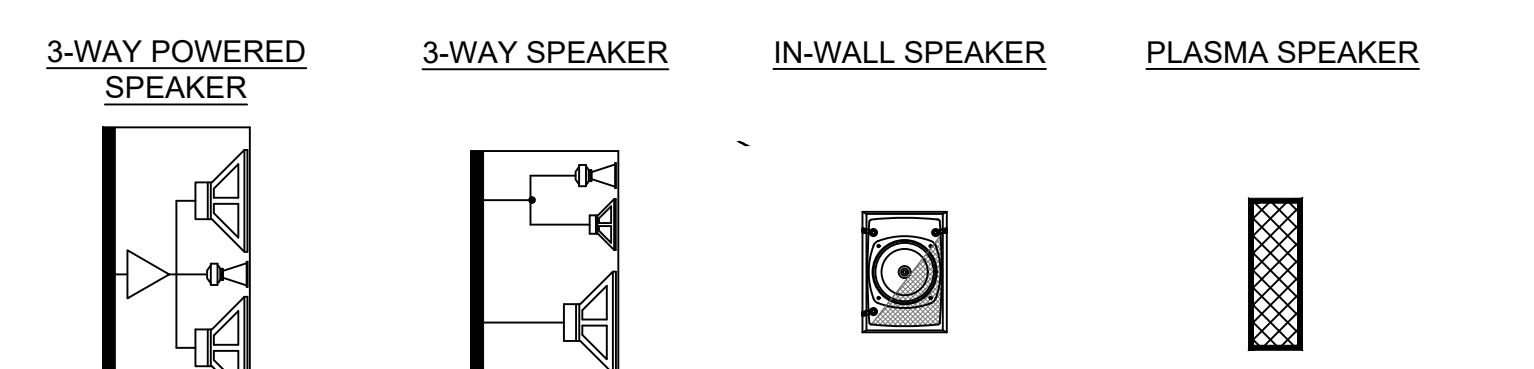
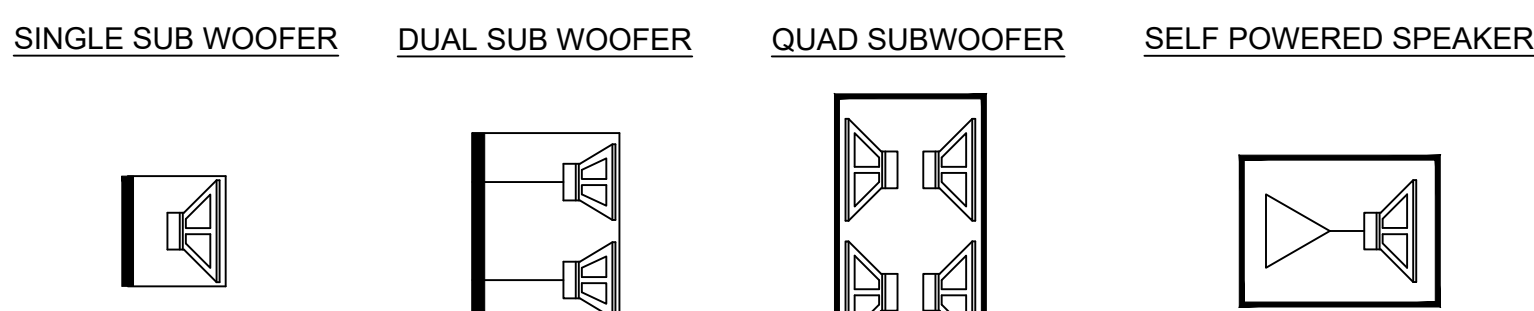
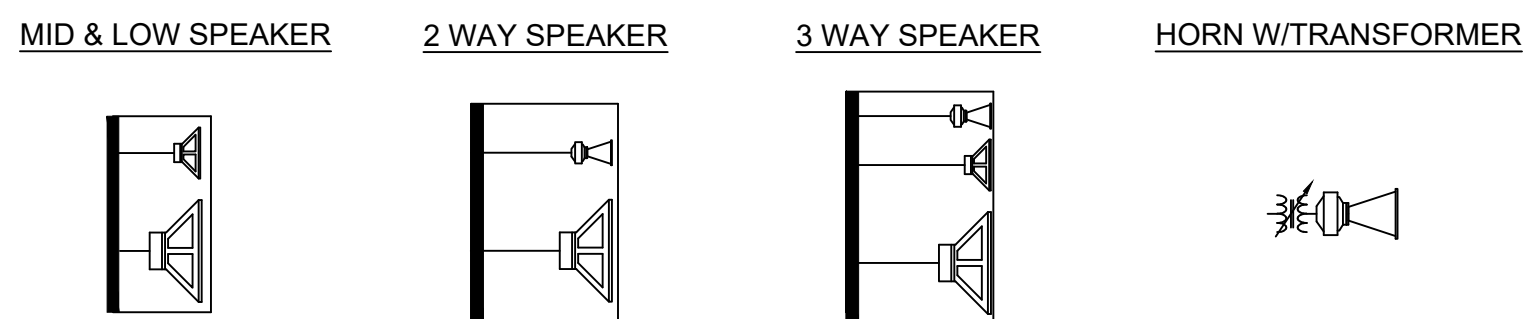
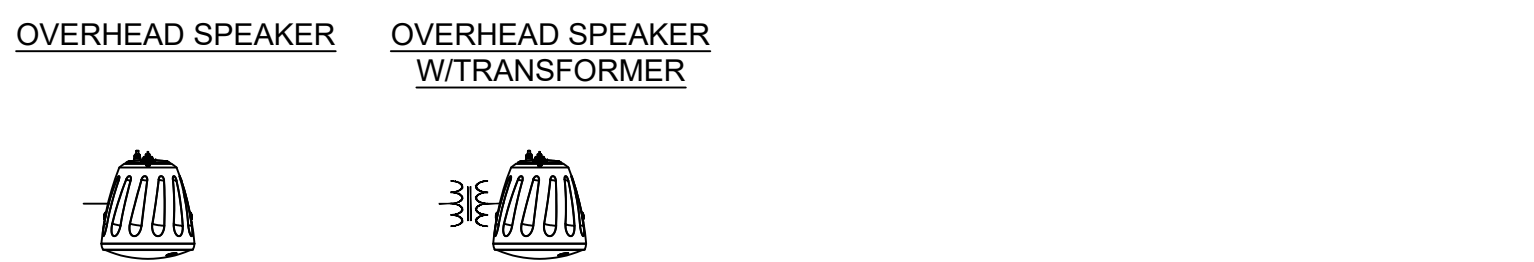
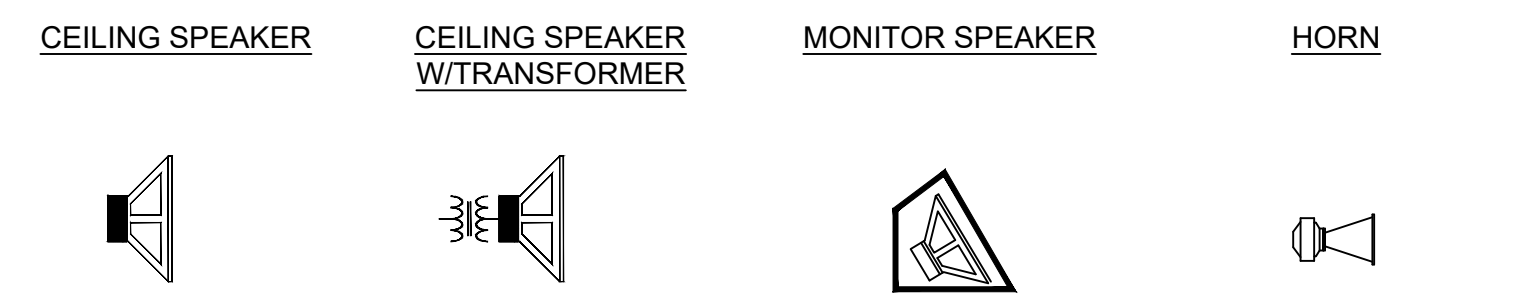
SHEET NUMBERS

**AV3.1**

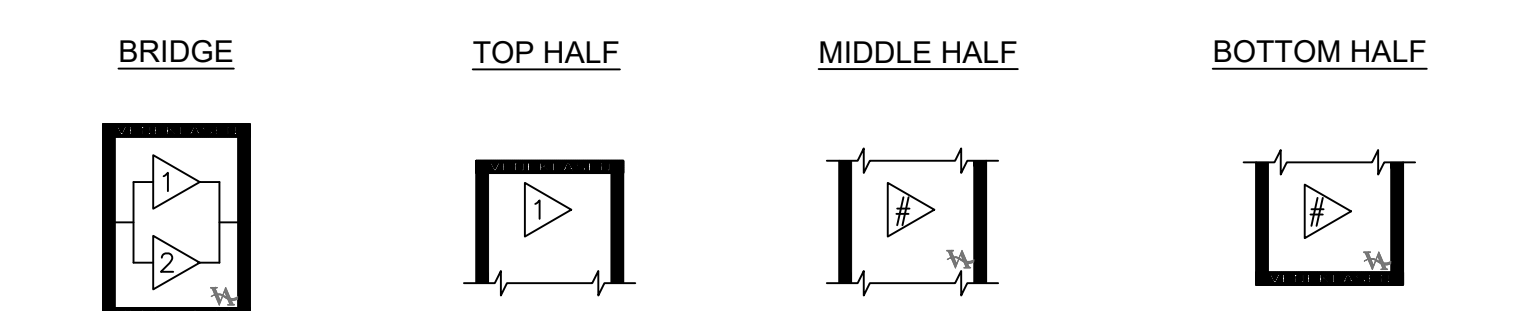
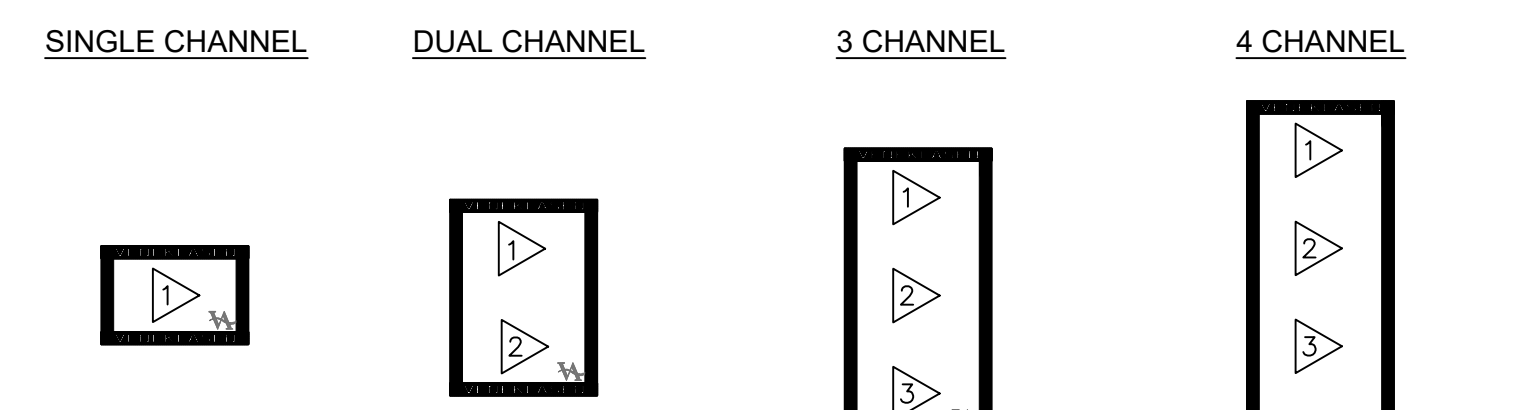




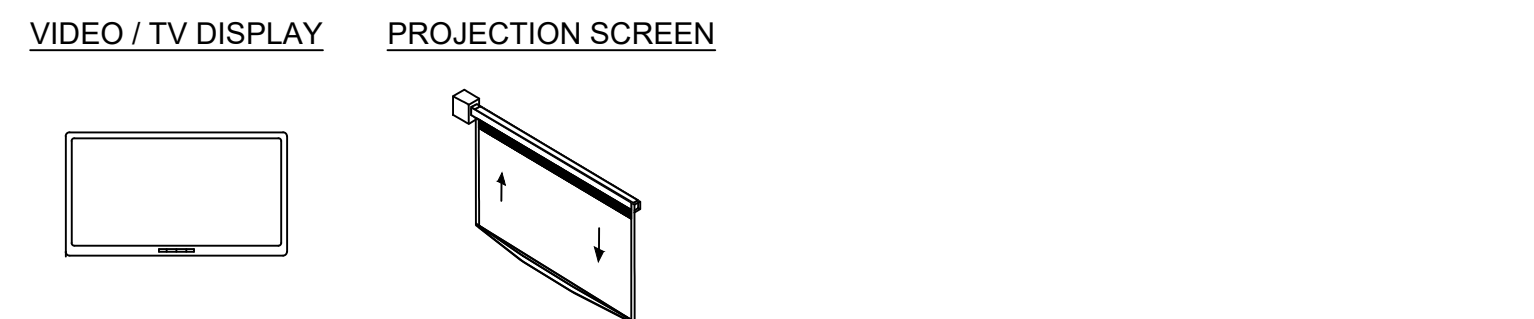
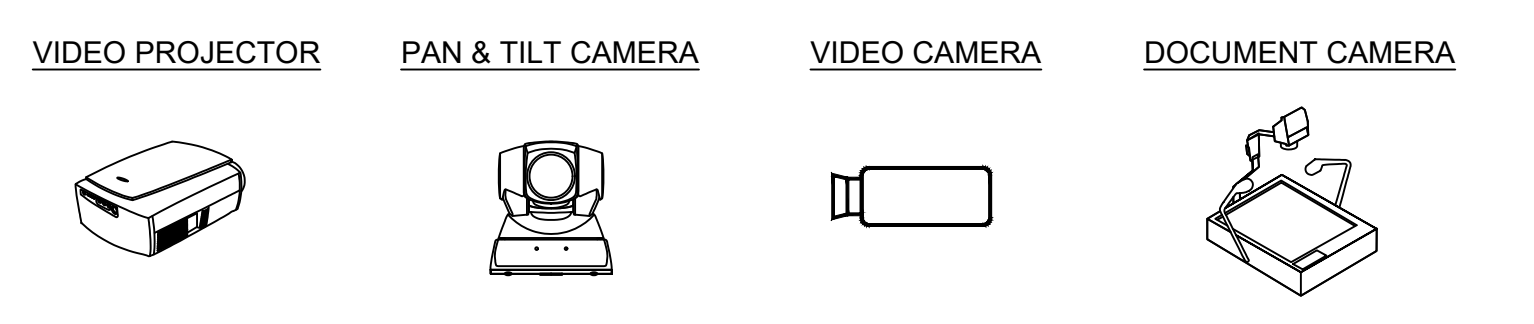
SPEAKERS



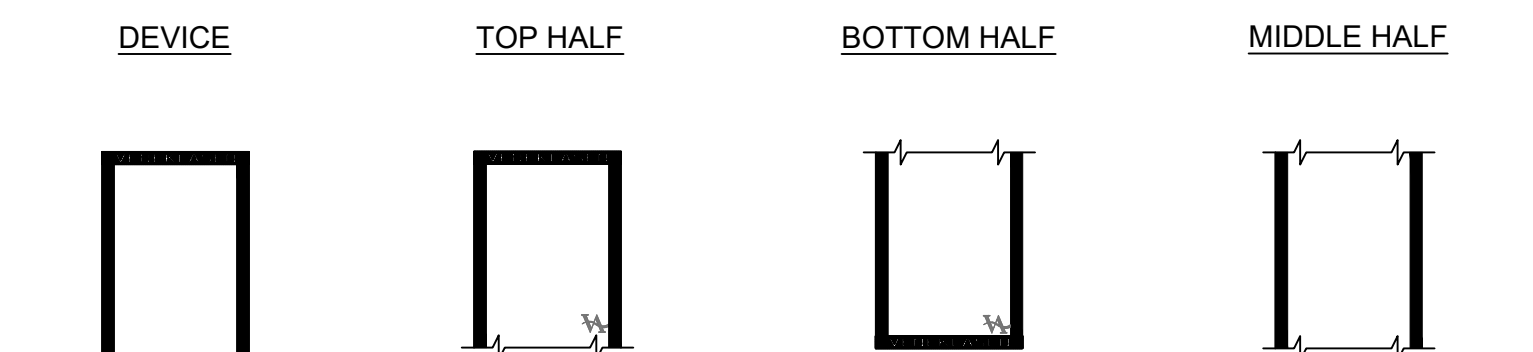
AMPLIFIERS



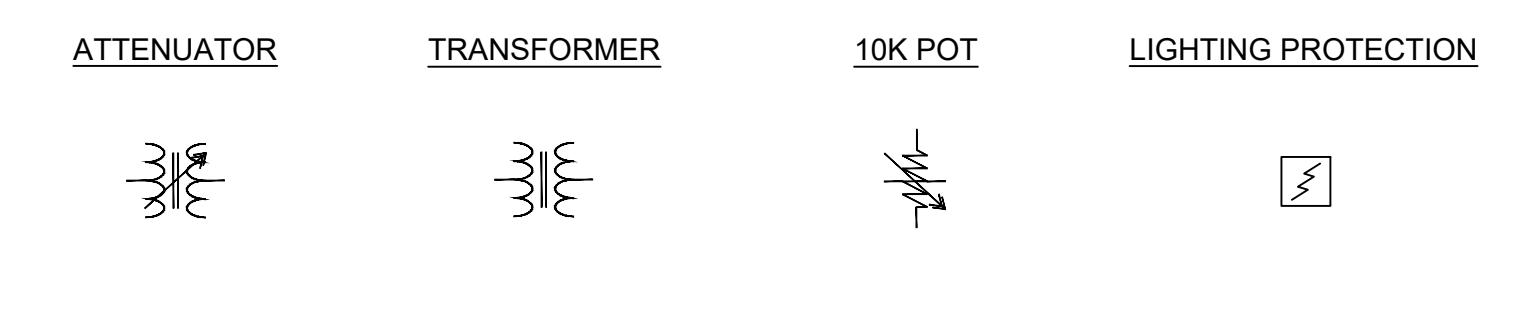
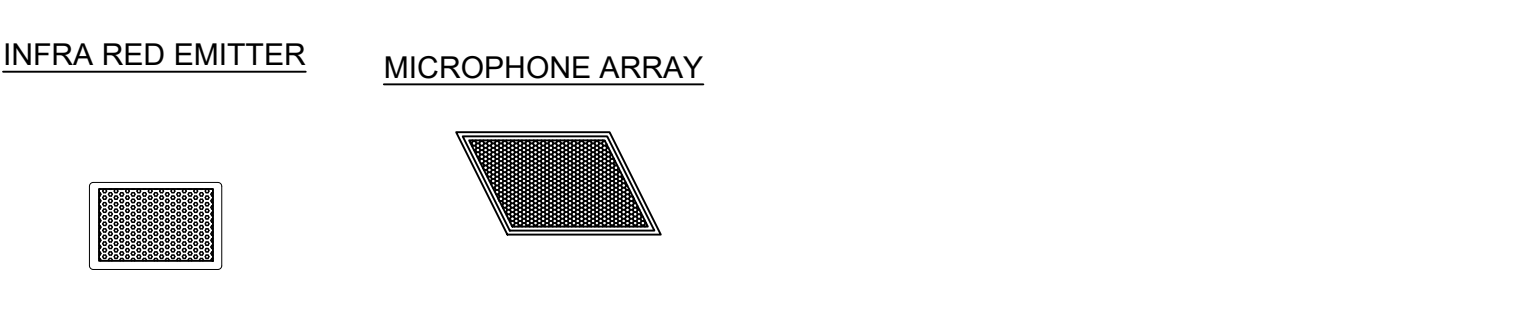
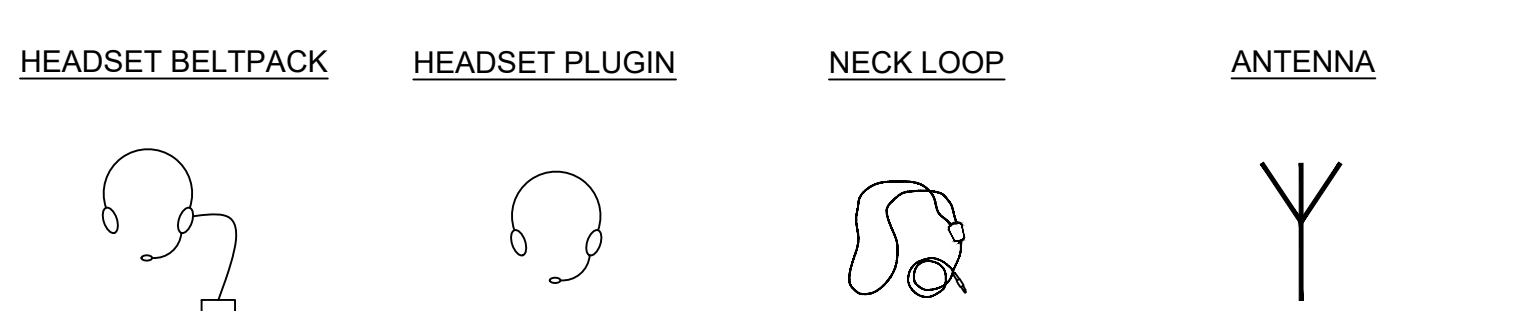
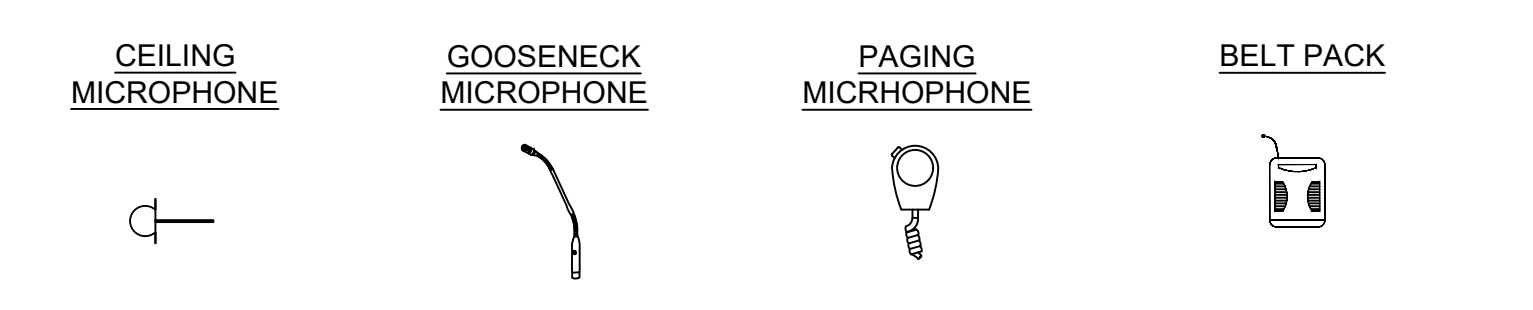
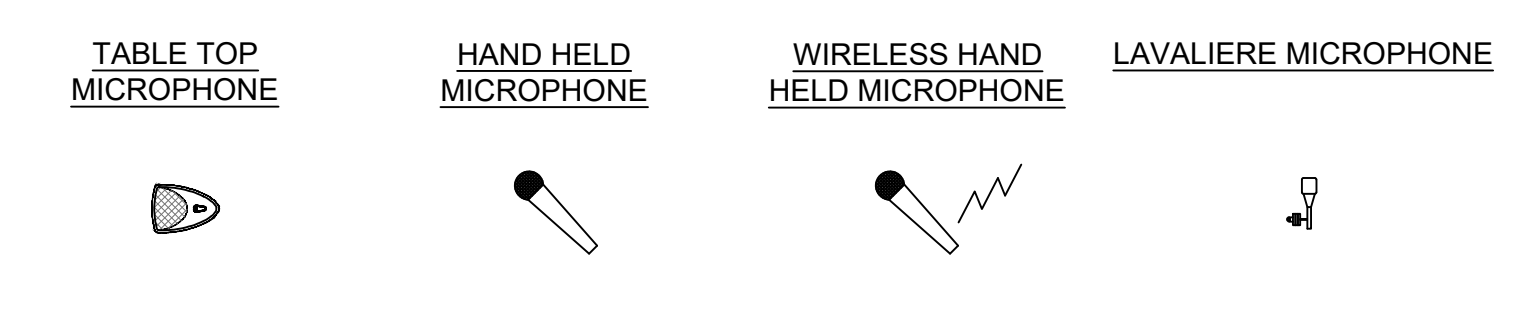
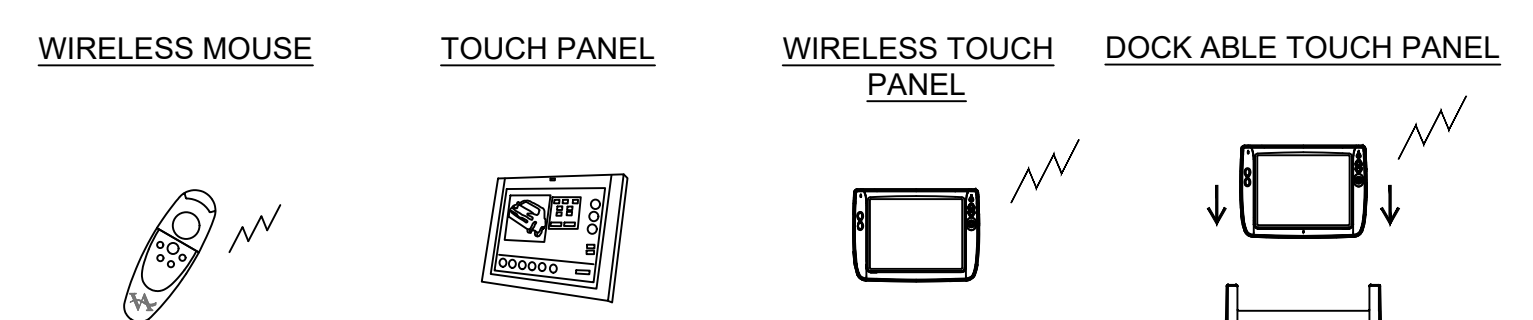
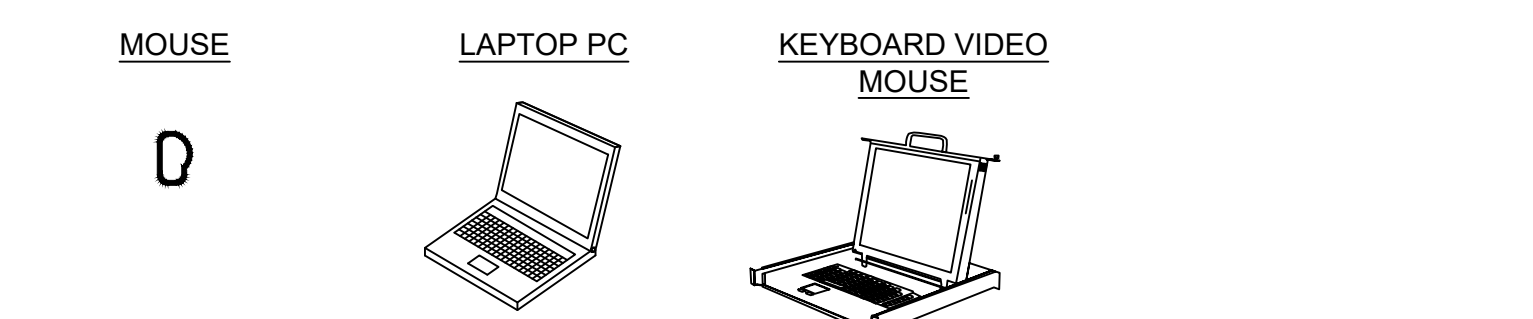
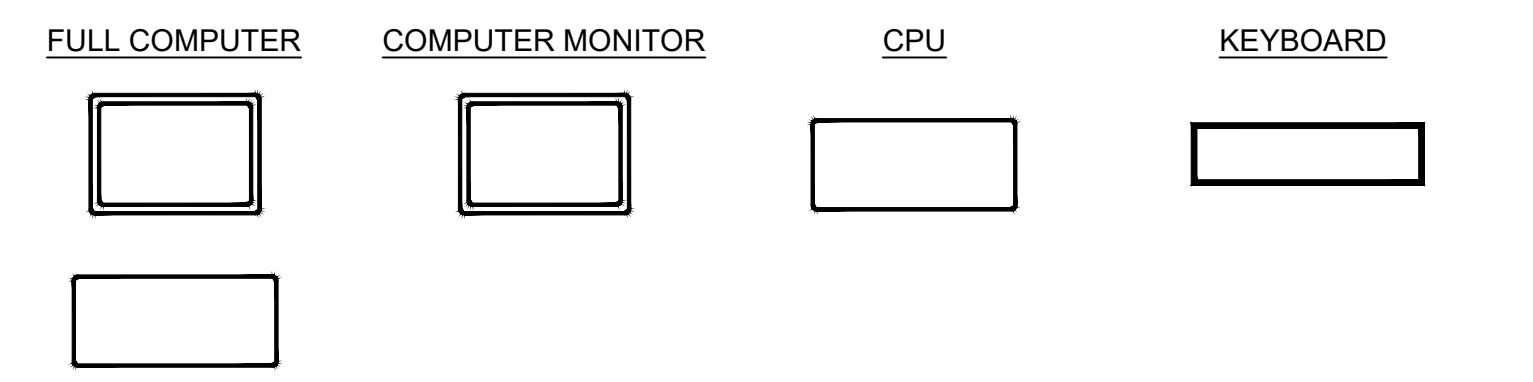
VIDEO



DEVICES



MISCELLANEOUS SYMBOLS

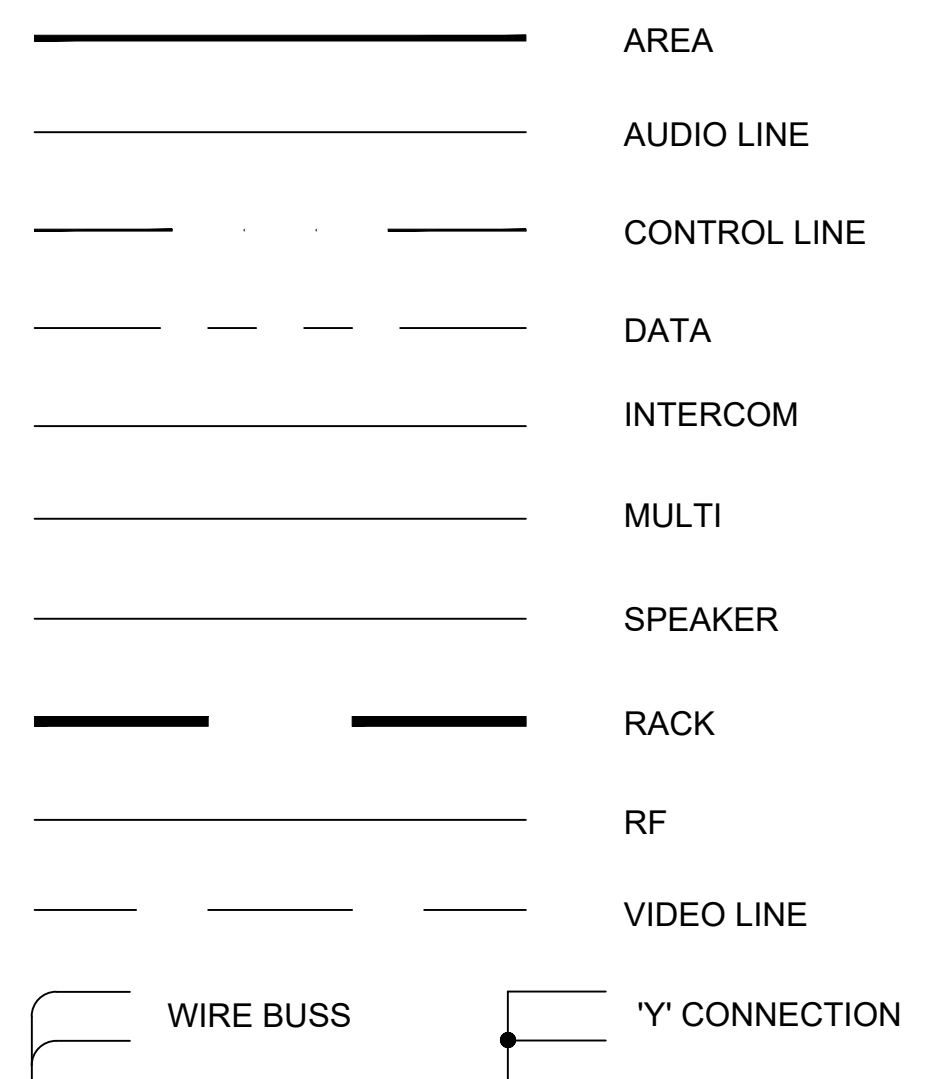


SYMBOL KEY

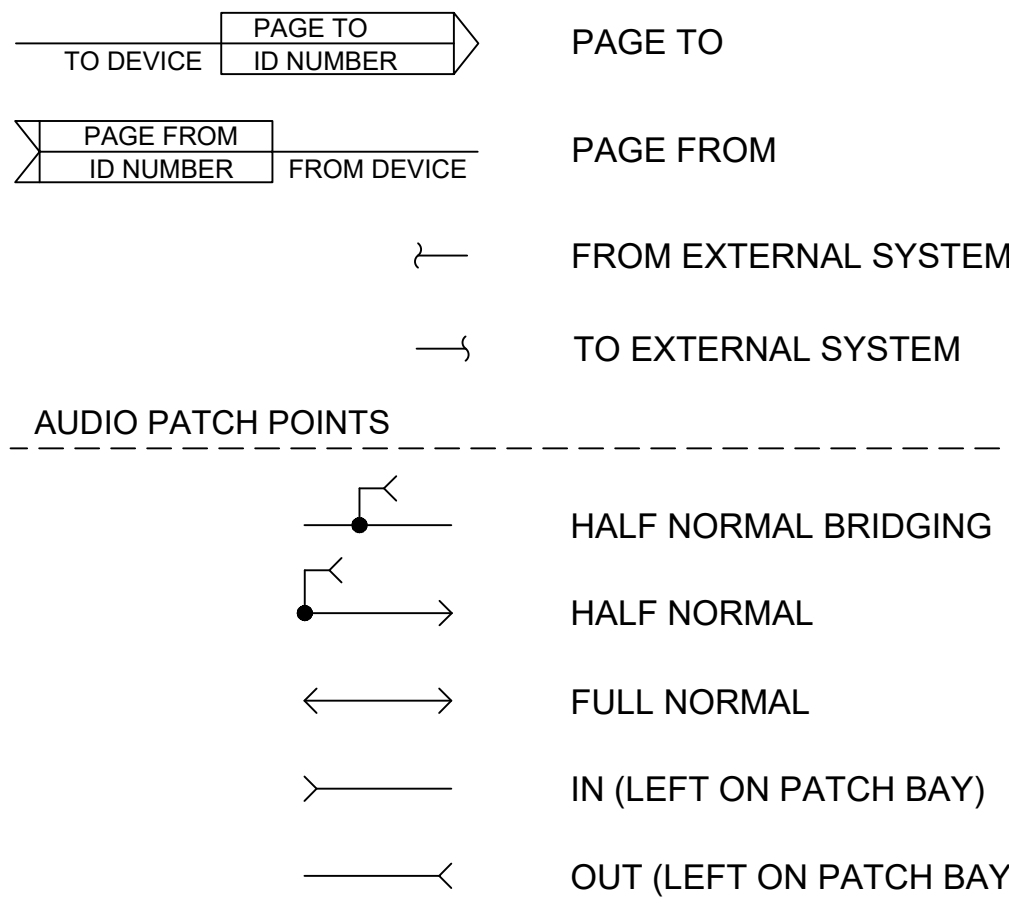
SCALE:  
NTS

1

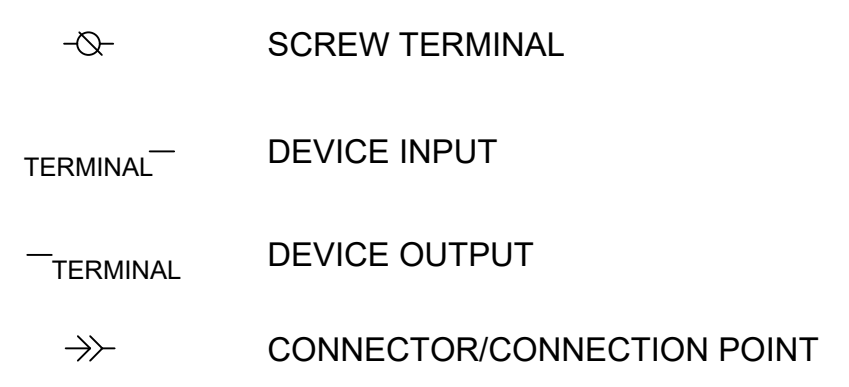
LINE CONVENTIONS



DRAWING AND SIGNAL NAVIGATION



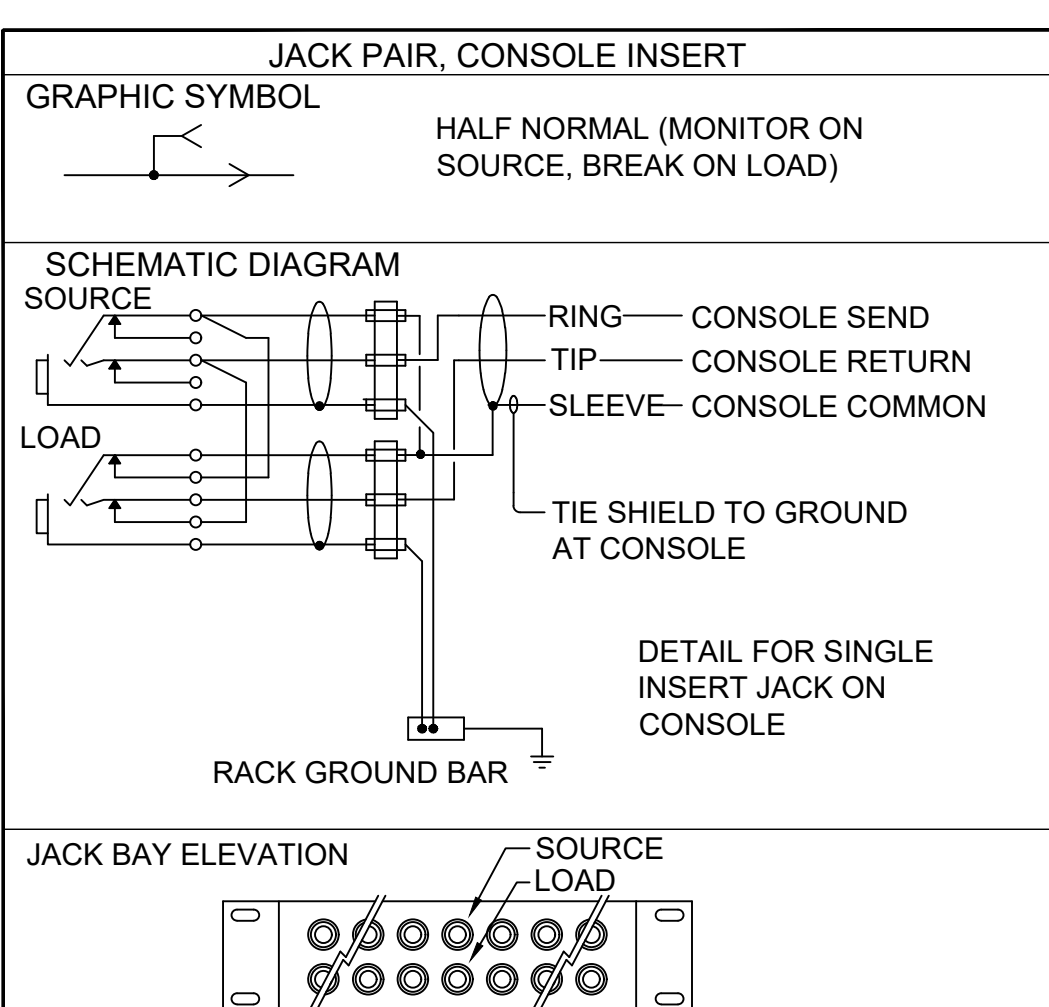
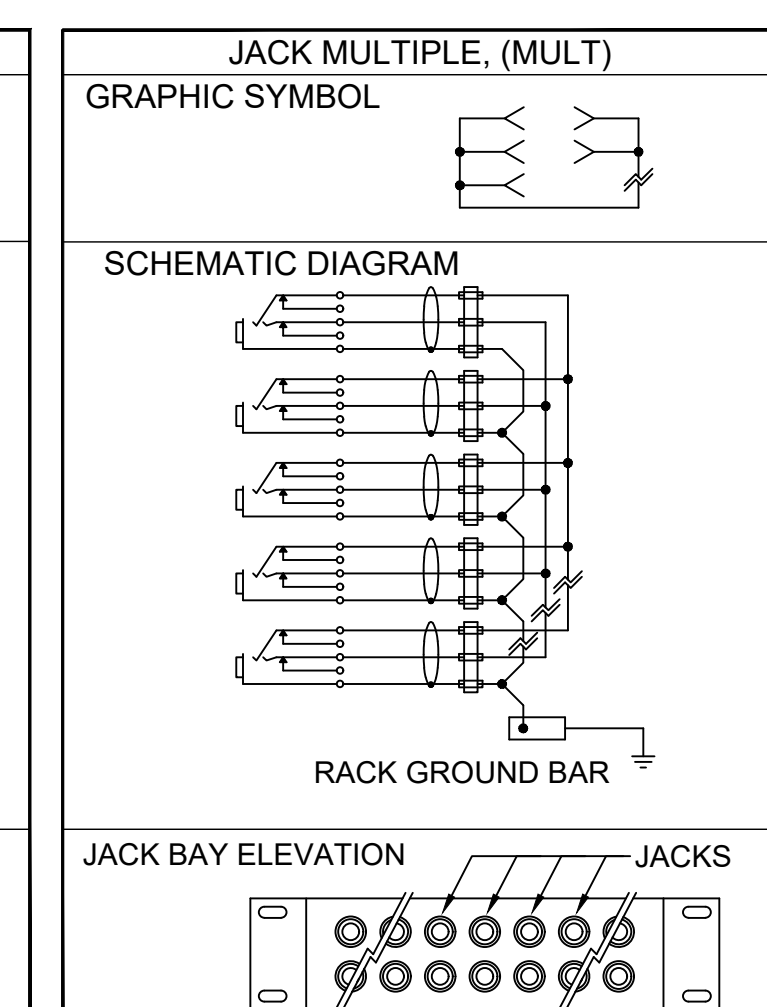
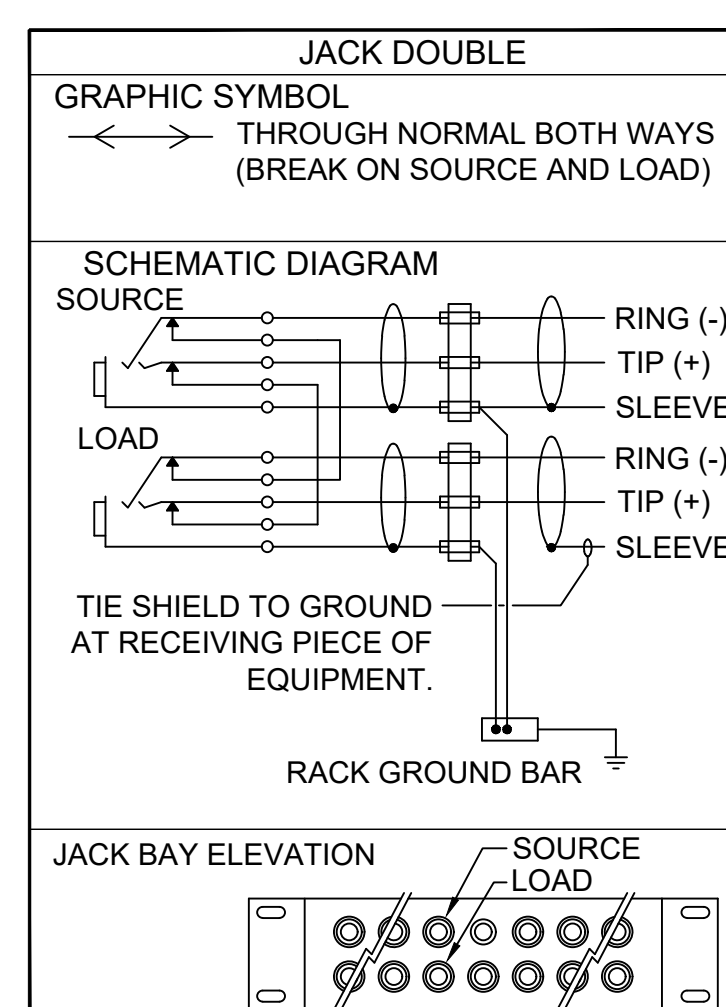
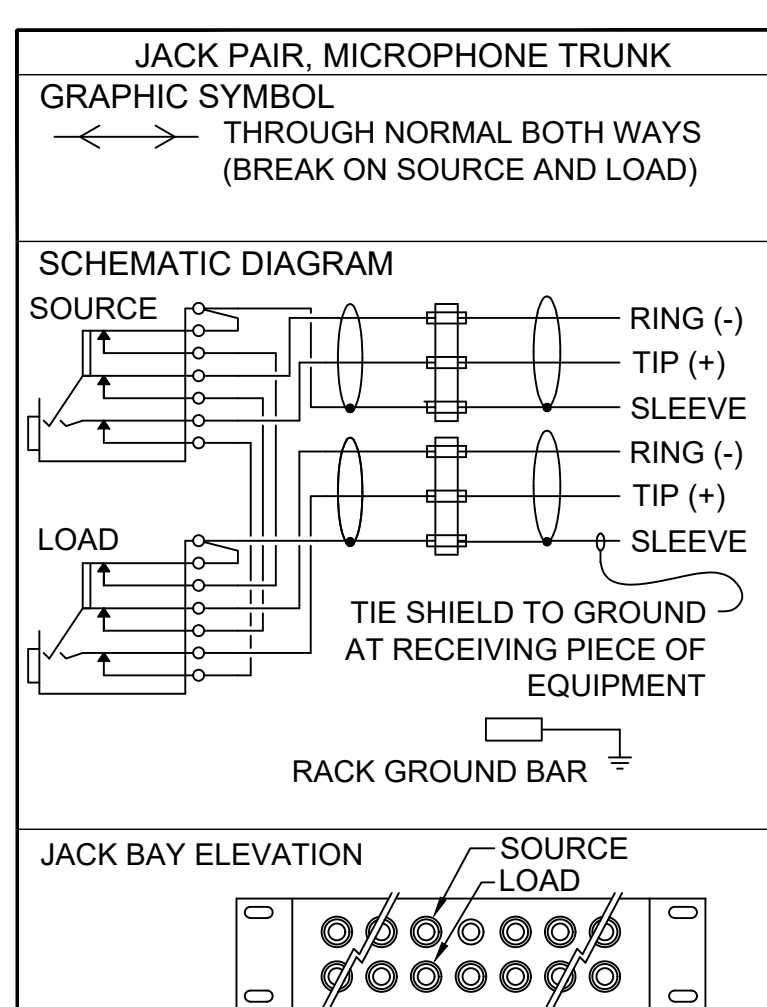
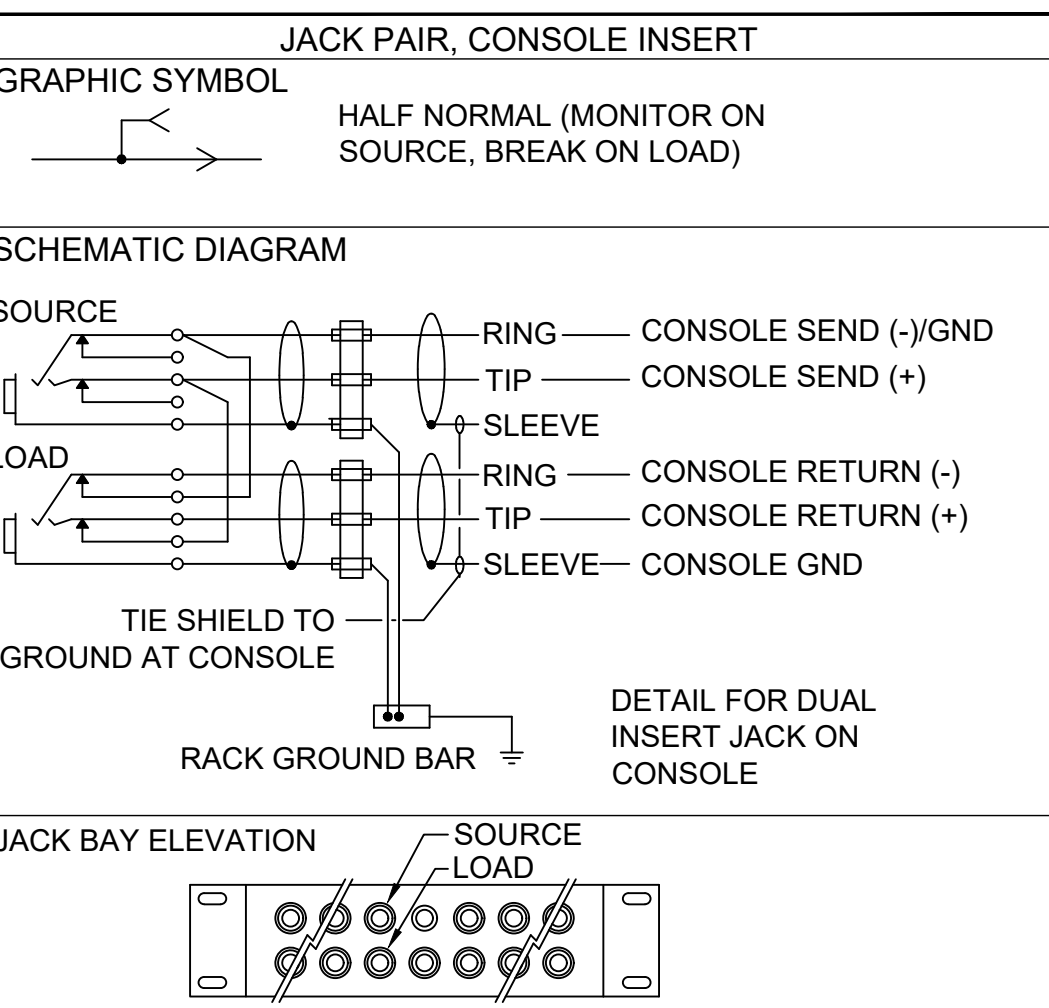
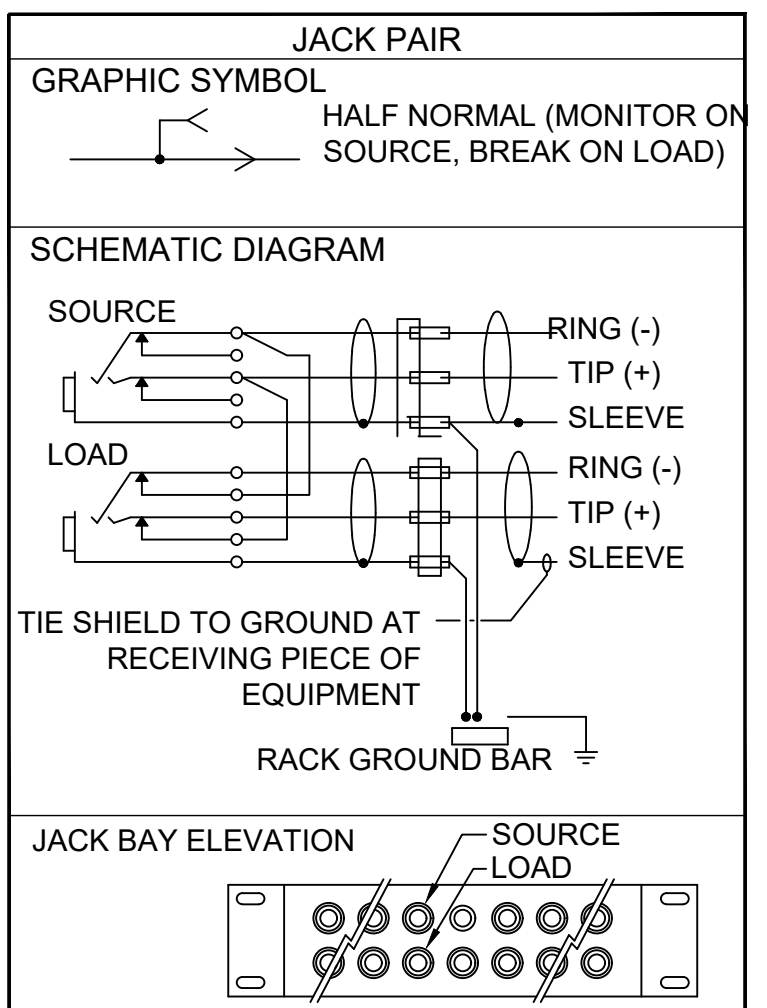
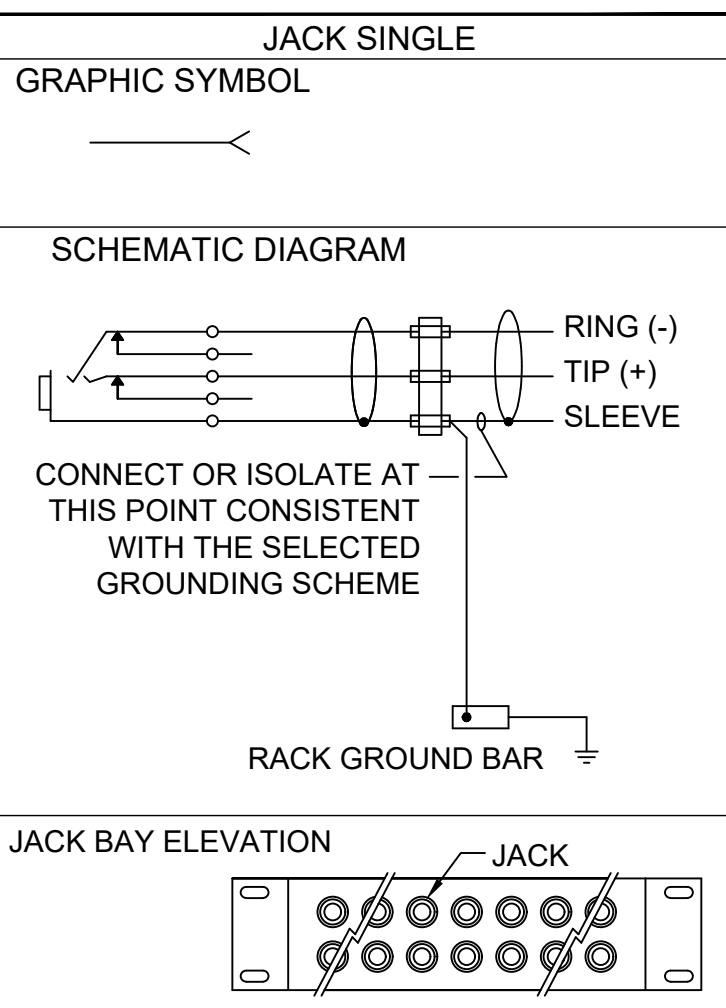
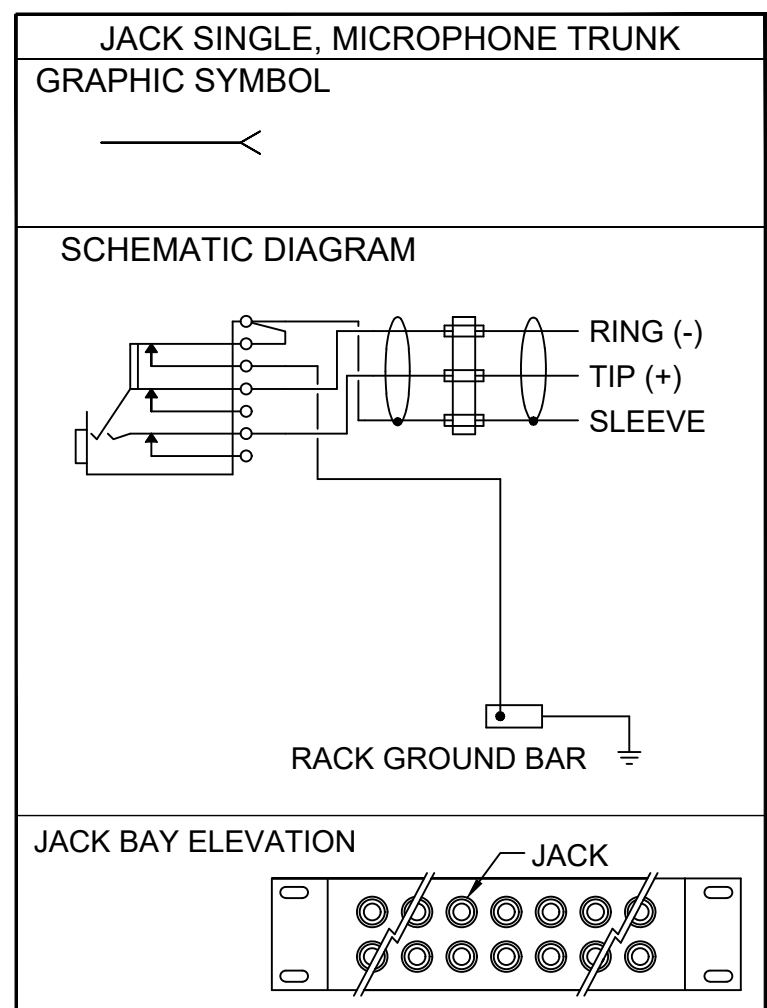
I/O CONNECTIONS



WIRING KEY

SCALE:  
NTS

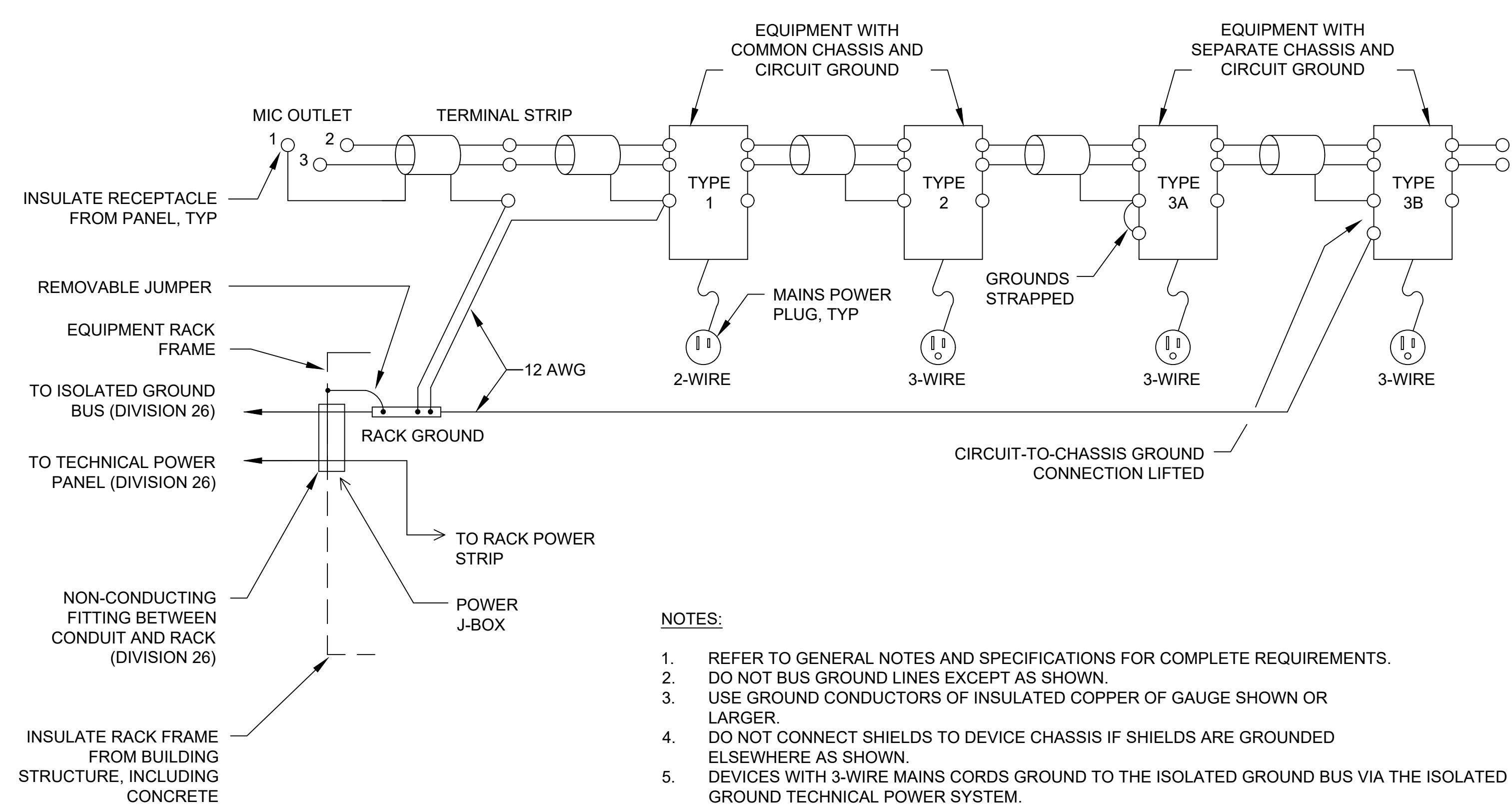
2



GROUNDING DIAGRAM SCHEMES

SCALE:

3



GROUNDING DETAIL

SCALE:  
NTS

4

AGENCY REVIEW

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HIGH SCHOOL  
DISTRICT**

PROJECT NAME

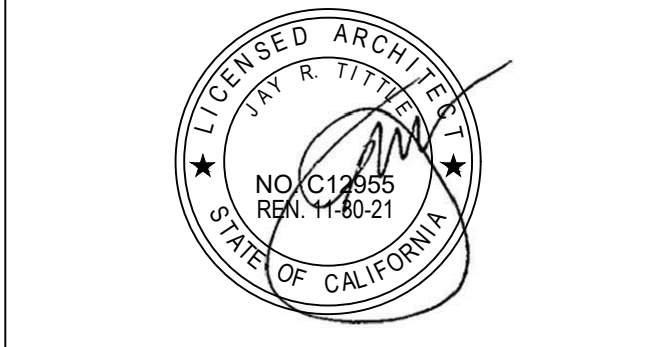
**ADOLFO CAMARILLO HIGH SCHOOL  
STADIUM SOUND SYSTEM**

4660 MISSION OAKS BLVD,  
CAMARILLO, CA. 93012

CONSULTANT

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Δ 08/07/2020	ADDENDUM 1

PROJECT TEAM  
PRINCIPAL IN CHARGE:  
JACK SHIMIZU

PROJECT LEADER:  
PABLO AMEZQUITA

DESIGN TEAM:  
VENEKLASSEN ASSOCIATES

PROJECT NAME

ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM

PROJECT NO.

6121235311

SHEET TITLE

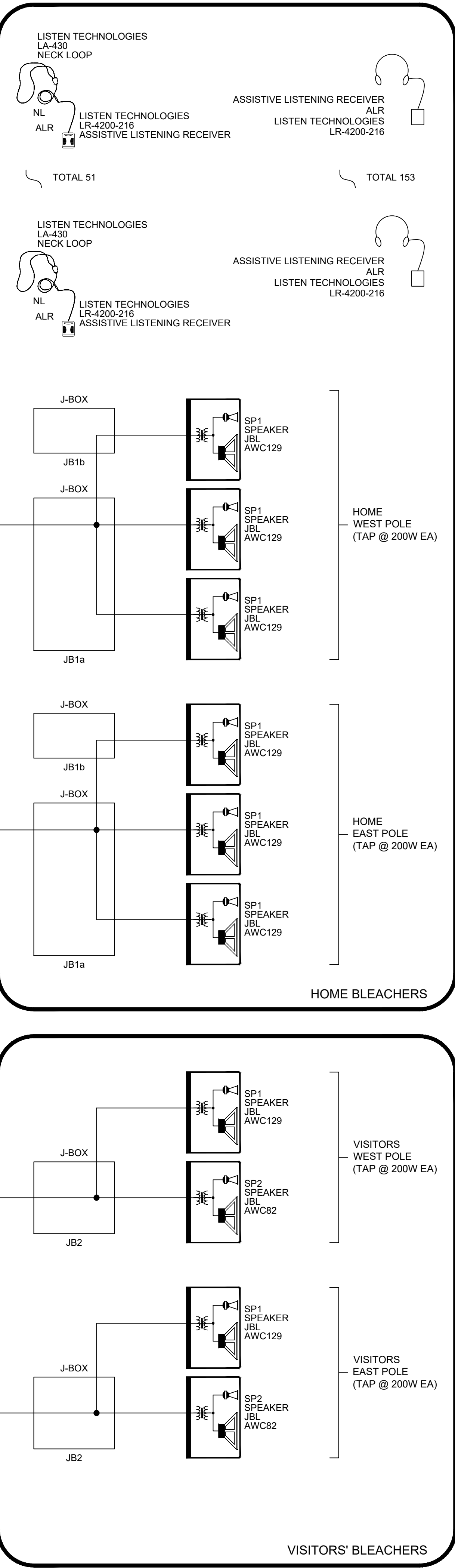
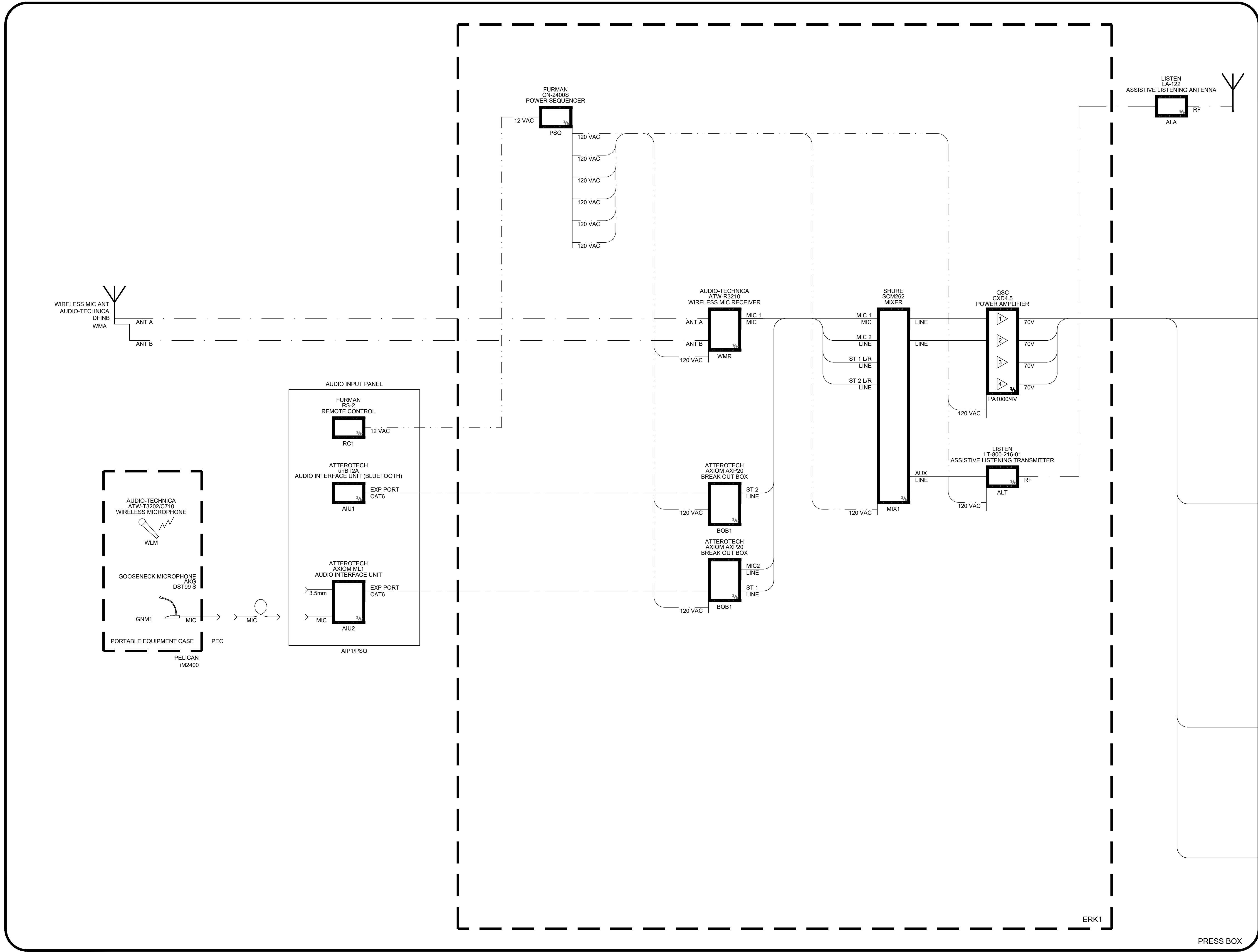
WIRING SCHEME AND  
SYMBOL KEY

SHEET NUMBER

AV4.0

AD1-AV9





ONLINE DIAGRAM

SCALE:  
NTS

1

AV4.1

ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM

6121235311

ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM

PROJECT TEAM:  
PRINCIPAL IN CHARGE:  
JACK SHERIDAN

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CONSULTANT

ADOLFO CAMARILLO HIGH SCHOOL  
STADIUM SOUND SYSTEM

PROJECT NAME

OXNARD UNION  
HIGH SCHOOL  
DISTRICT

CLIENT NAME

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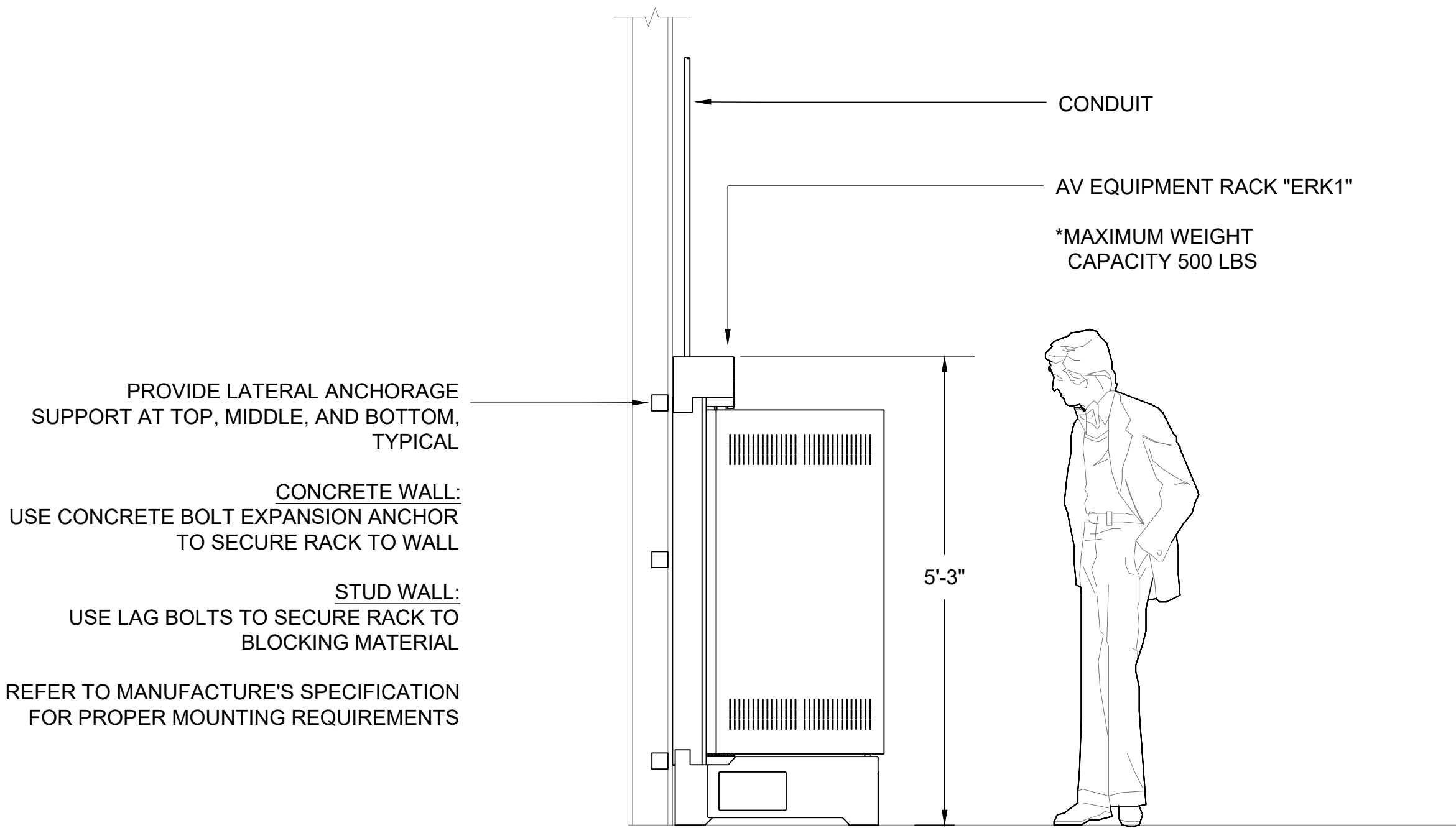
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NOTE:  
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TYPICAL WALL MOUNTED AV EQUIPMENT RACK DETAIL

SCALE:  
NTS

1

AV EQUIPMENT RACK "ERK1" ELEVATION

SCALE:  
NTS

2

AGENCY REVIEW

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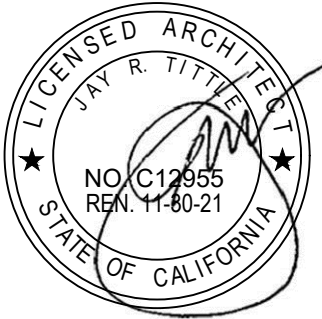
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PROJECT TEAM

PRINCIPAL IN CHARGE:  
JACK SHIMBO

PROJECT LEADER:  
PABLO AMEZQUITA

DESIGN TEAM:  
VENEKLASEN ASSOCIATES

PROJECT NAME

**ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM**

PROJECT NO.

**6121235311**

SHEET TITLE

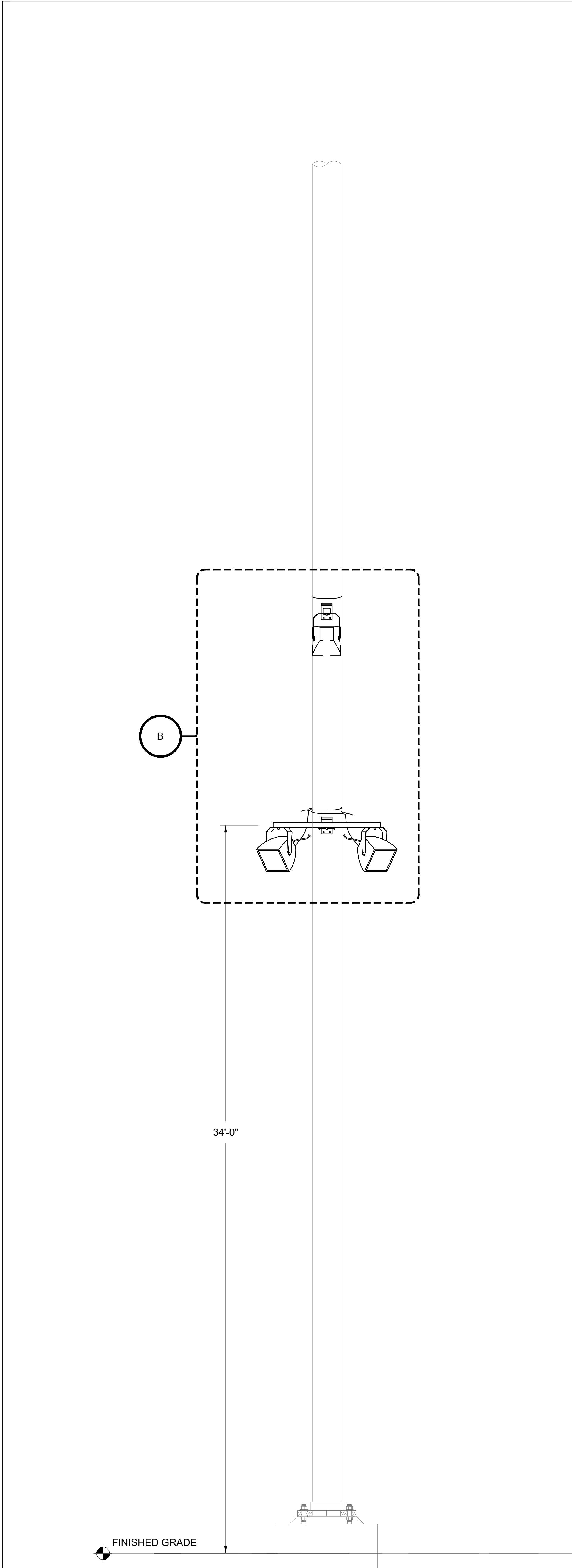
**AV TYPICAL SEISMIC AND  
GROUNDING DETAILS**

SHEET NUMBERS

**AV5.0**



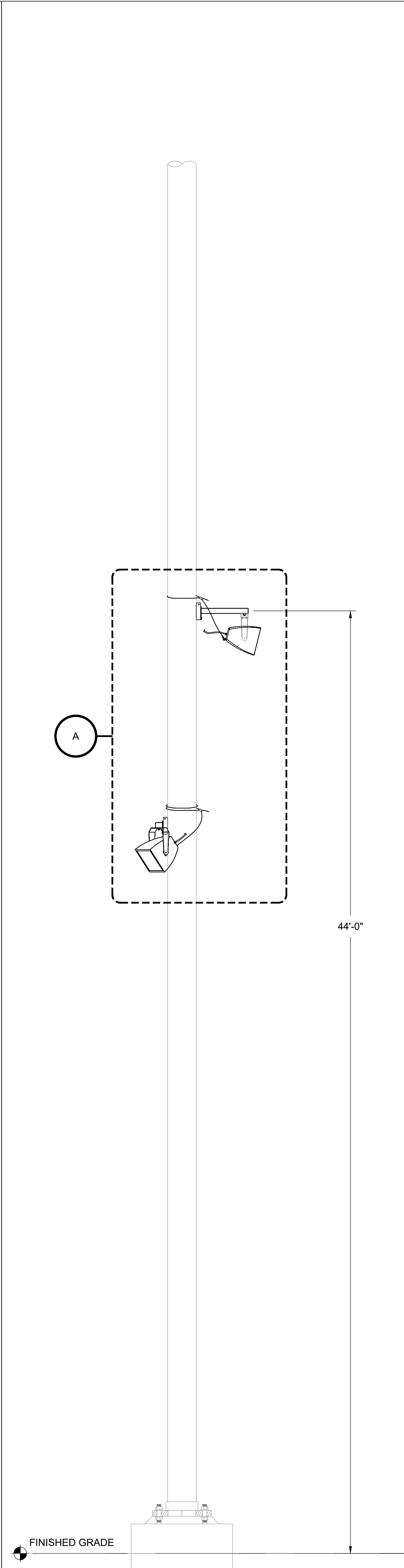




HOME POLE - FRONT VIEW

SCALE:  
3/8" = 1'-0"

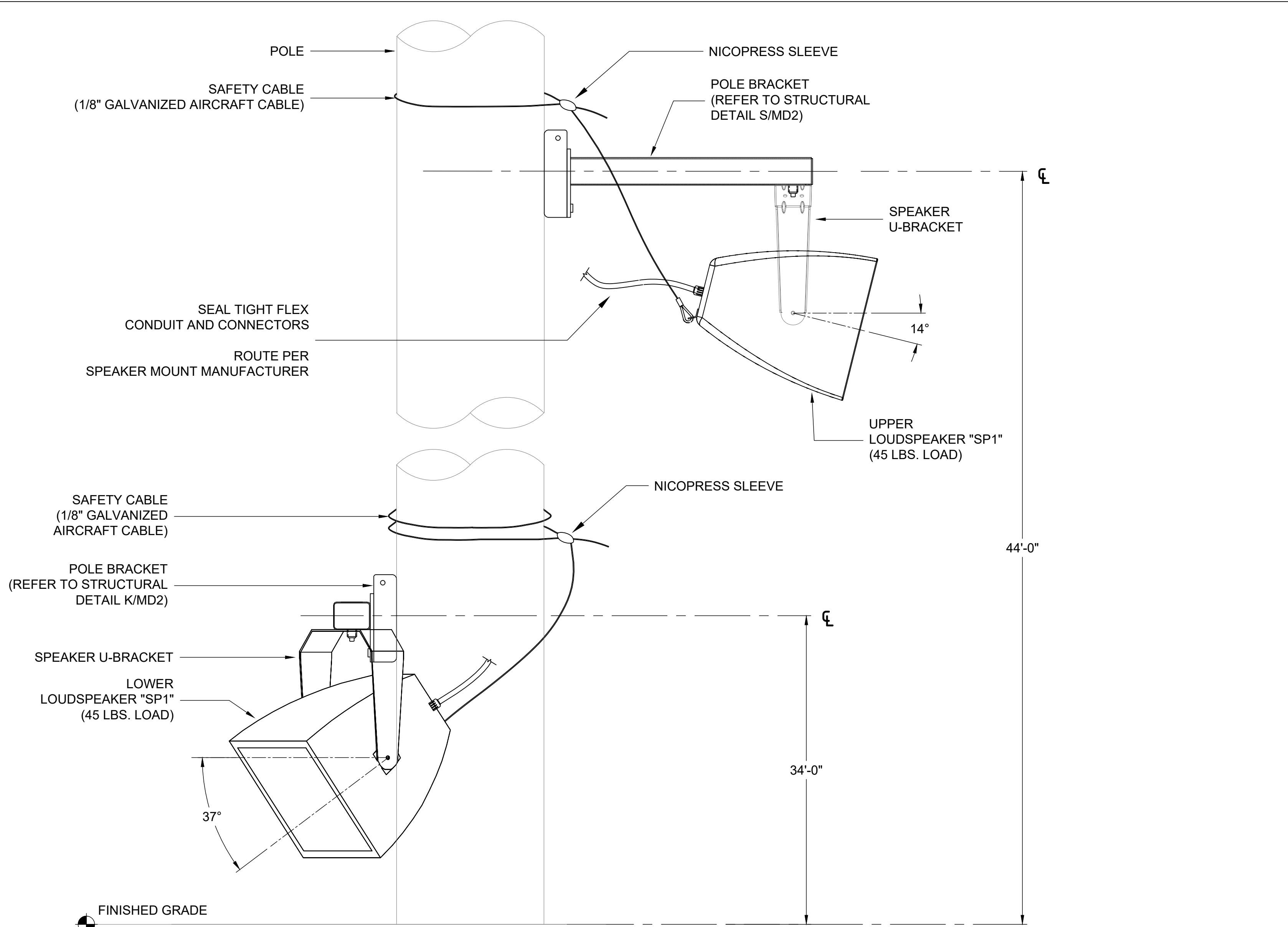
1



HOME POLE - SIDE VIEW

SCALE:  
3/8" = 1'-0"

2

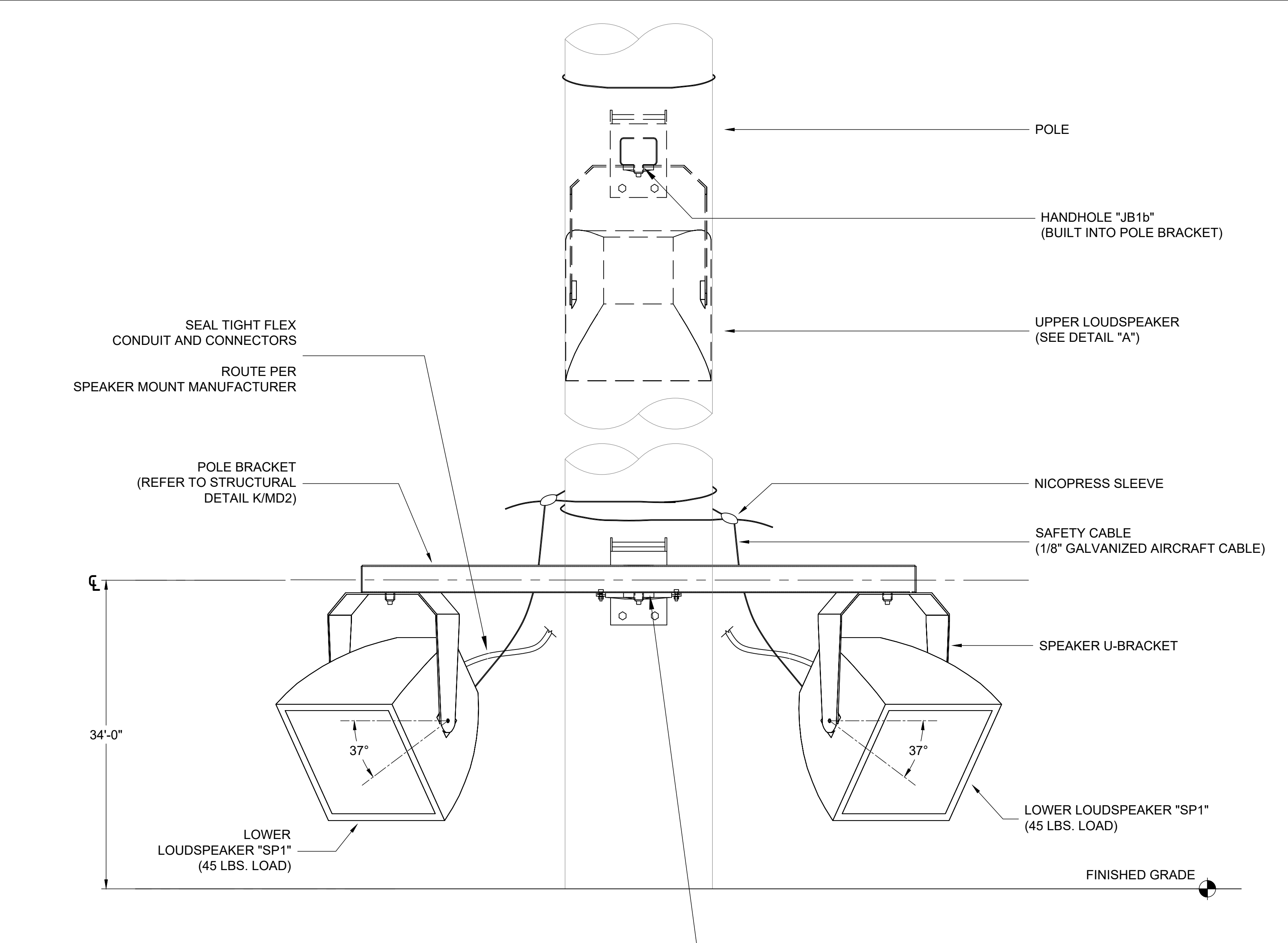


NOTE:  
THESE PLANS ARE CONCEPTUAL ONLY. THEY MUST BE  
FULLY ENGINEERED BY A LICENSED STRUCTURAL ENGINEER

UPPER LOUDSPEAKER POLE MOUNT DETAIL - SIDE VIEW

SCALE:  
NTS

A



NOTE:  
THESE PLANS ARE CONCEPTUAL ONLY. THEY MUST BE  
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LOUDSPEAKER POLE MOUNT DETAIL - FRONT VIEW

SCALE:  
NTS

B

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OXNARD UNION  
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DISTRICT

PROJECT NAME

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STADIUM SOUND SYSTEM

CONSULTANT

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08/07/2020

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PROJECT TEAM

PRINCIPAL IN CHARGE:  
JACK SHIMIZU

PROJECT LEADER:  
PABLO AMEZQUITA

DESIGN TEAM:  
VENEKLASSEN ASSOCIATES

PROJECT NAME

ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM

PROJECT NO.

6121235311

SHEET TITLE

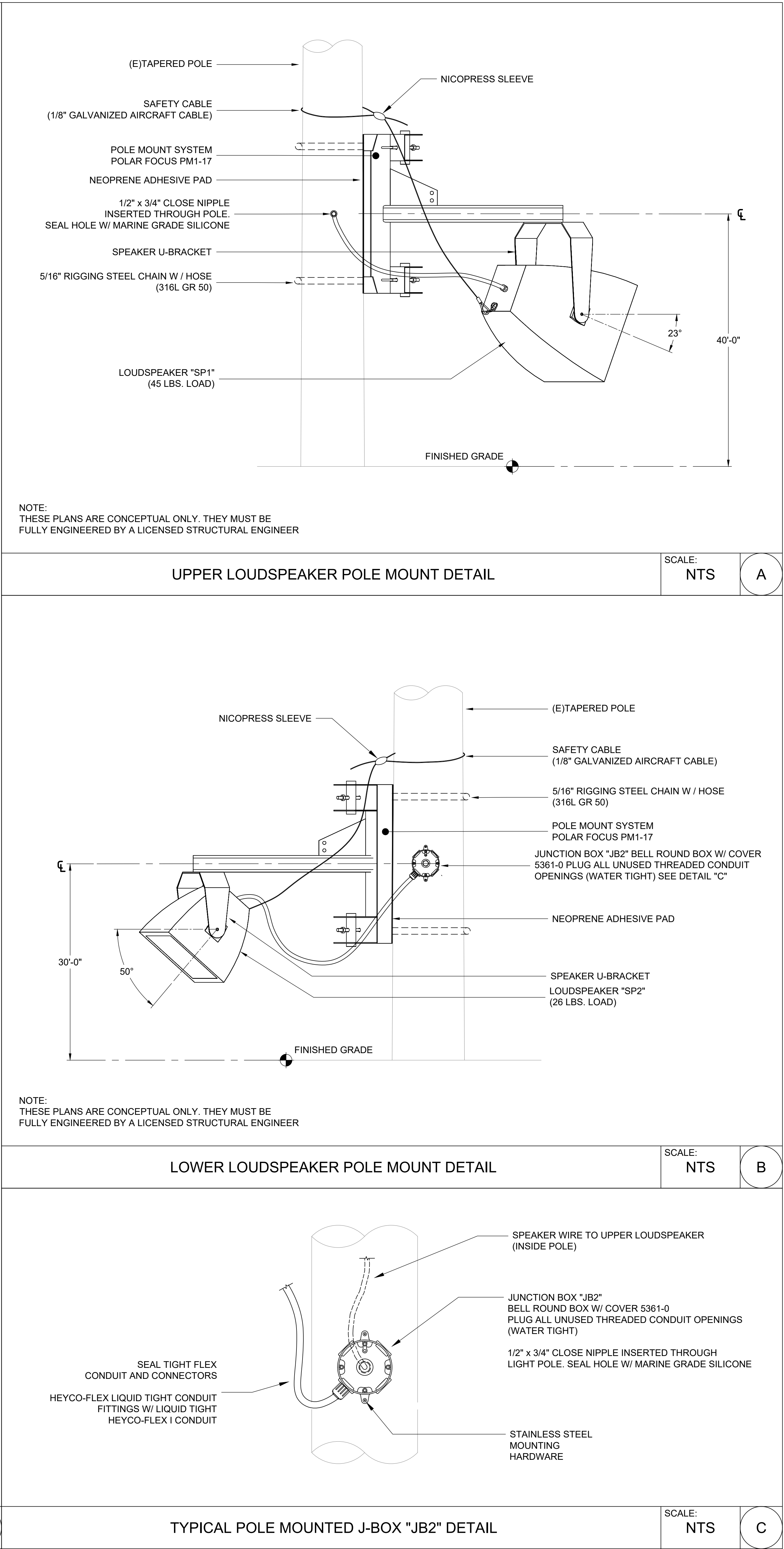
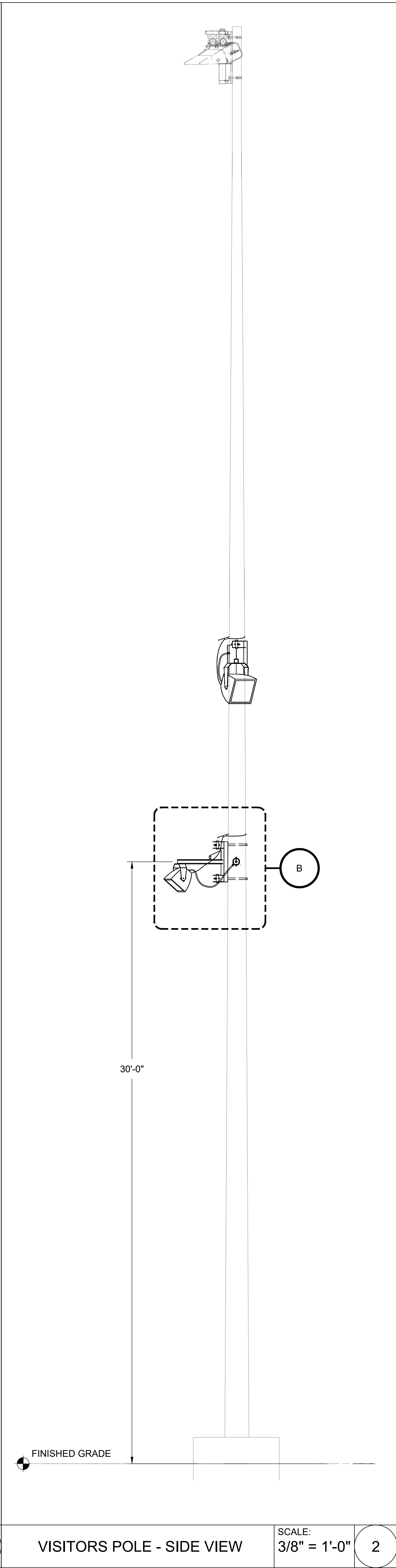
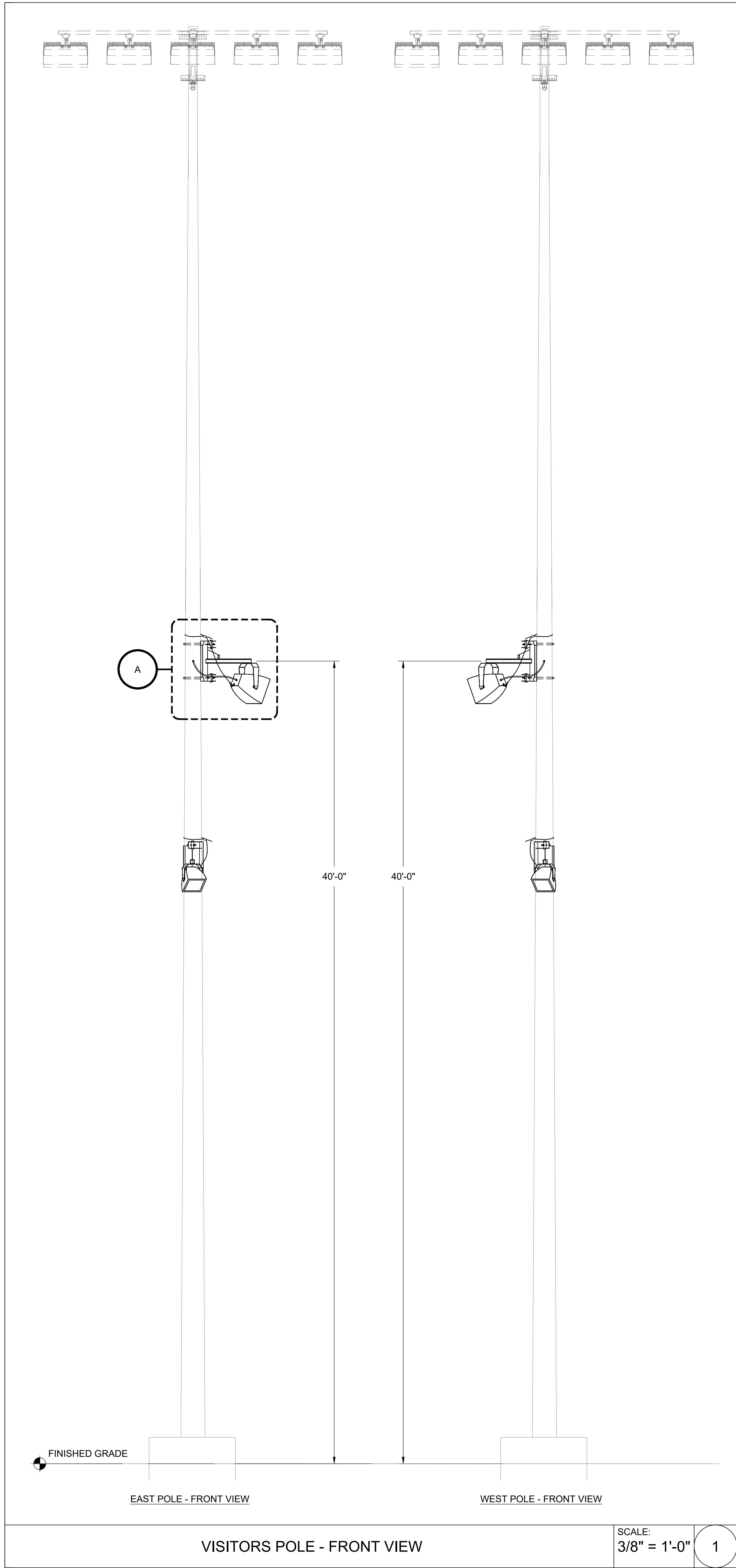
AV DETAILS

SHEET NUMBERS

AV6.1

AD1-AV12





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DISTRICT**

PROJECT NAME

**ADOLFO CAMARILLO HIGH SCHOOL  
STADIUM SOUND SYSTEM**

4660 MISSION OAKS BLVD,  
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1	08/07/2020	ADDENDUM 1

PROJECT TEAM

PRINCIPAL IN CHARGE:  
JACK SHIMIZU

PROJECT LEADER:  
PABLO AMEZQUITA

DESIGN TEAM:  
VENEKLASSEN ASSOCIATES

PROJECT NAME

**ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM**

PROJECT NO.

**6121235311**

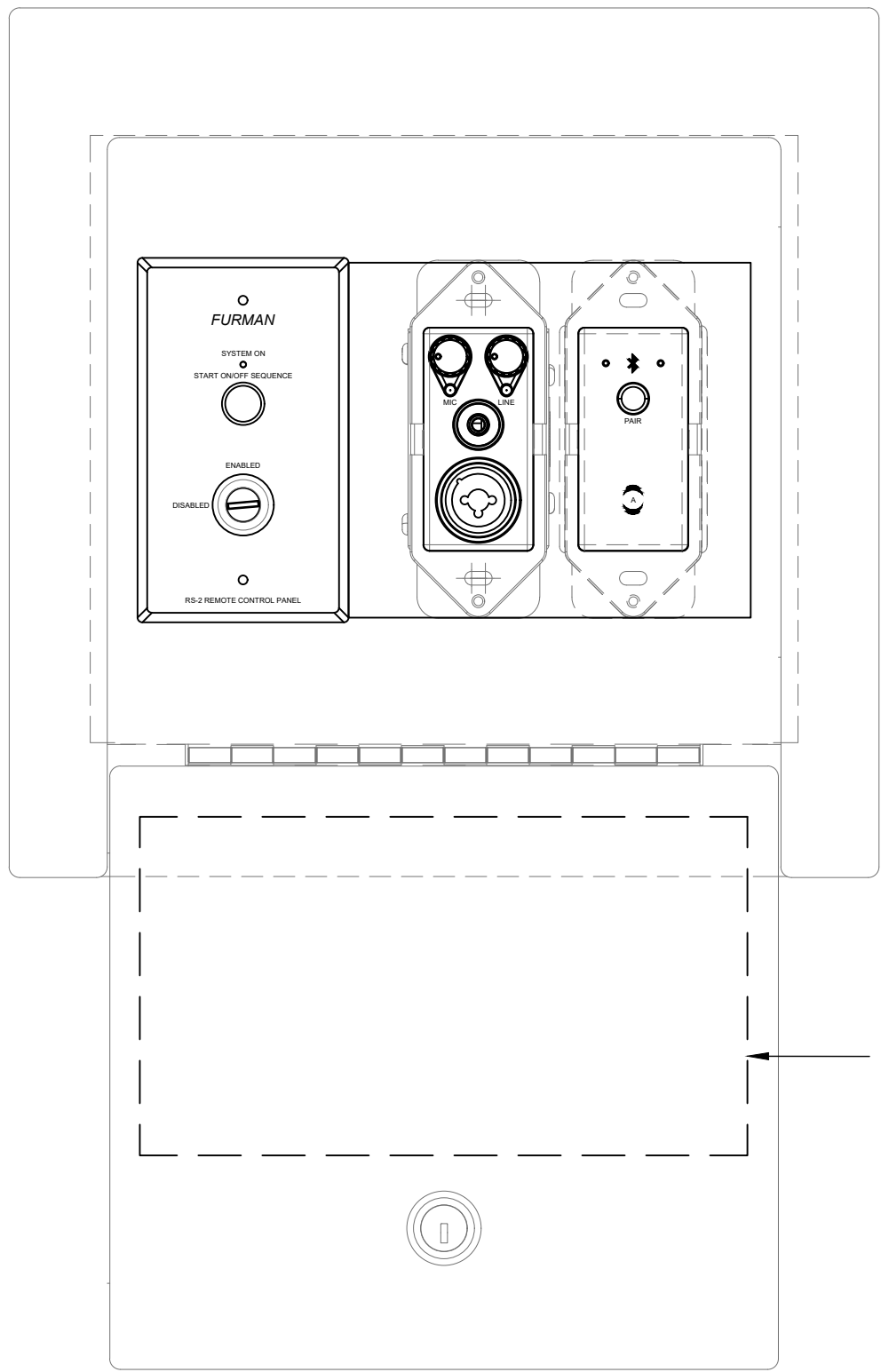
SHEET TITLE

**AV DETAILS**

SHEET NUMBERS

**AV6.2** AD1-AV13





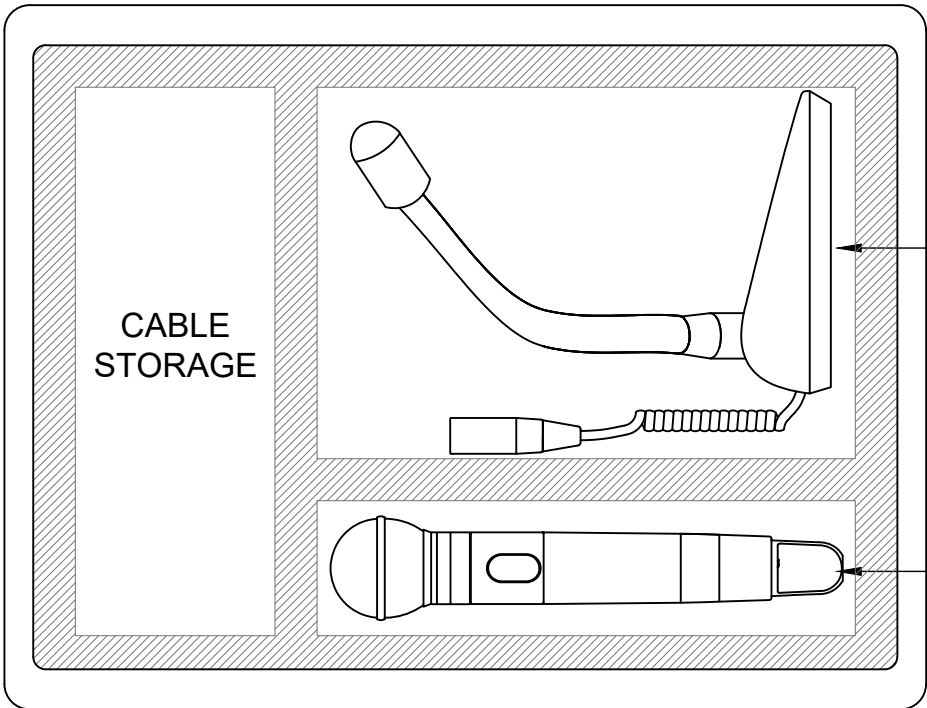
- INSTRUCTIONS TO THE THE SYSTEM ARE TO BE LAMINATED ON INSIDE COVER:
- To turn system ON
1. Connect desktop microphone to microphone panel.
  2. (Optional) Connect portable audio player via 3.5mm cable.
  3. Turn key to "ENABLE."
  4. Press "START ON/OFF SEQUENCE"
  5. (Optional Bluetooth) Connect portable audio player by holding down the "Pair" button.
  6. Adjust mic volume via upper left knob.
  7. Adjust portable device volume via upper right knob.
  8. Adjust Bluetooth device's volume accordingly.
- To turn system OFF
1. Press "START ON/OFF SEQUENCE"
  2. Turn key to "DISABLE."

NOTE:  
VERIFY THE LOCATION OF THIS CONTROL  
PANEL WITH HIGH SCHOOL STAFF.  
MUST BE LOCATED AT ANNOUNCER POSITION.

AUDIO INPUT PANEL "AIP/PSQ" DETAIL

SCALE:  
NTS

1

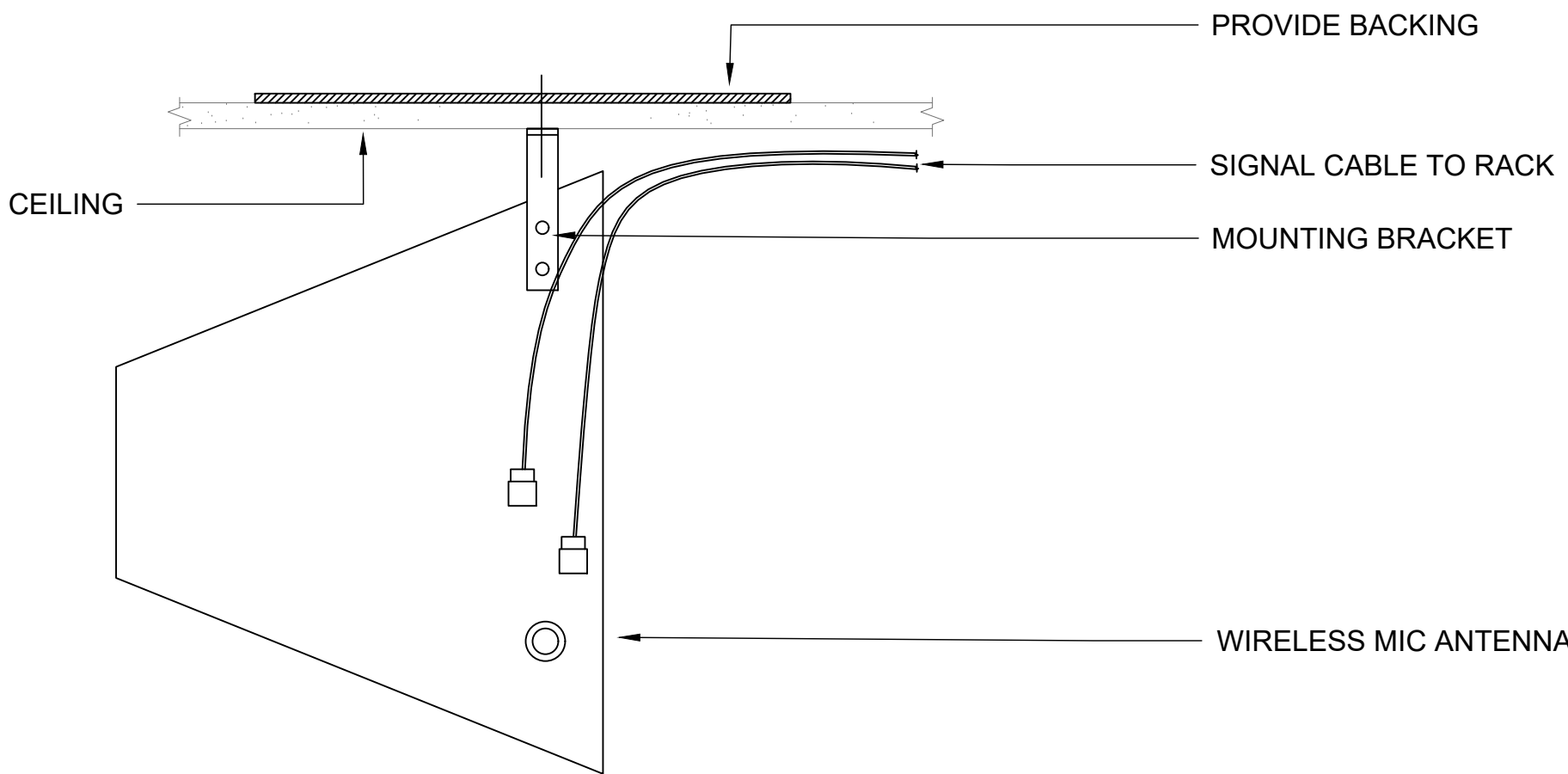


TOP VIEW

PELICAN CASE  
IM2400

GOOSENECK MICROPHONE

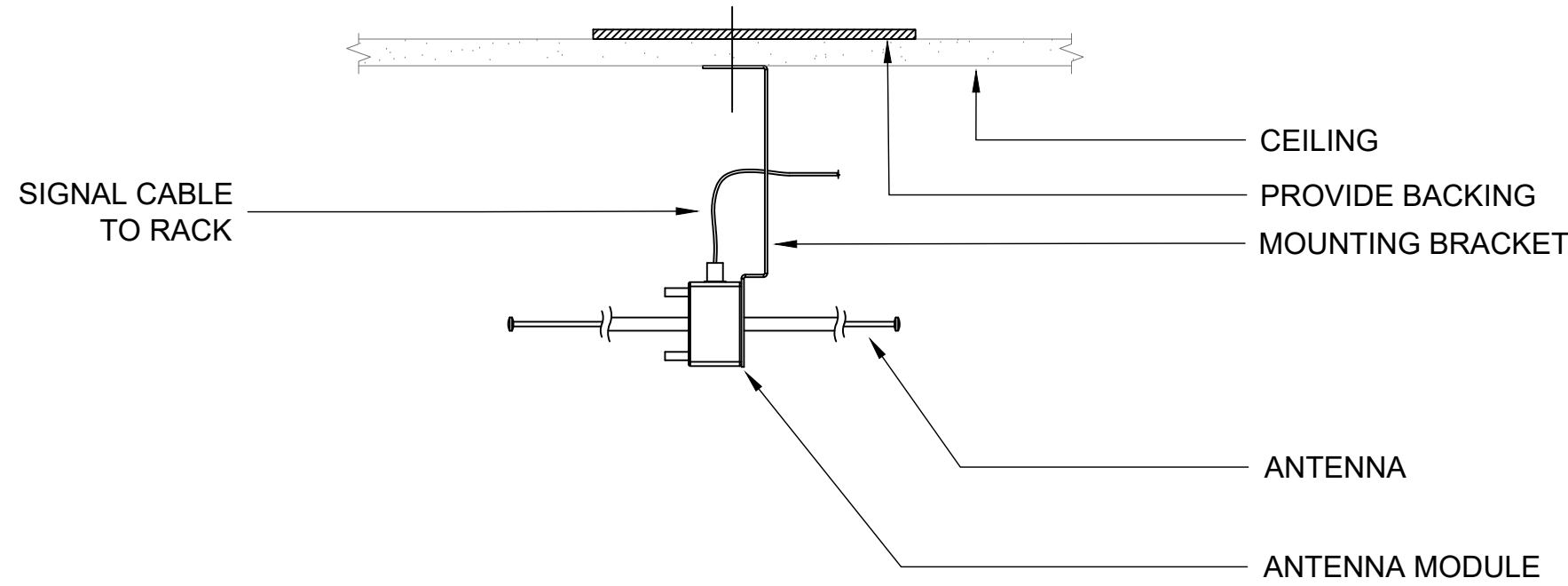
WIRELESS MICROPHONE



TYPICAL WIRELESS MIC ANTENNA "WMA" MOUNTING DETAIL

SCALE:  
NTS

3



TYPICAL ASSISTIVE LISTENING ANTENNA "ALA" MOUNTING DETAIL

SCALE:  
NTS

4

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PROJECT NAME

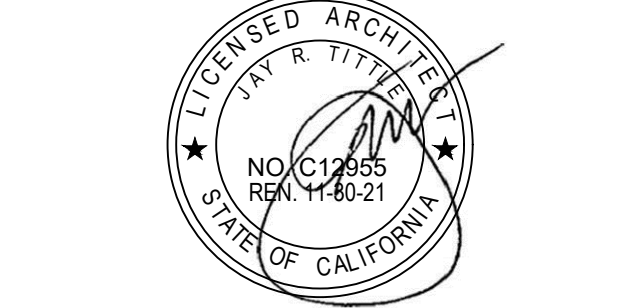
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STADIUM SOUND SYSTEM**

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PROJECT TEAM

PRINCIPAL IN CHARGE:  
JACK SHIMIZU

PROJECT LEADER:  
PABLO AMEZQUITA

DESIGN TEAM:  
VENEKLASEN ASSOCIATES

PROJECT NAME

**ADOLFO CAMARILLO HIGH  
SCHOOL STADIUM SOUND  
SYSTEM**

PROJECT NO.

**6121235311**

SHEET TITLE

**AV DETAILS**

SHEET NUMBERS

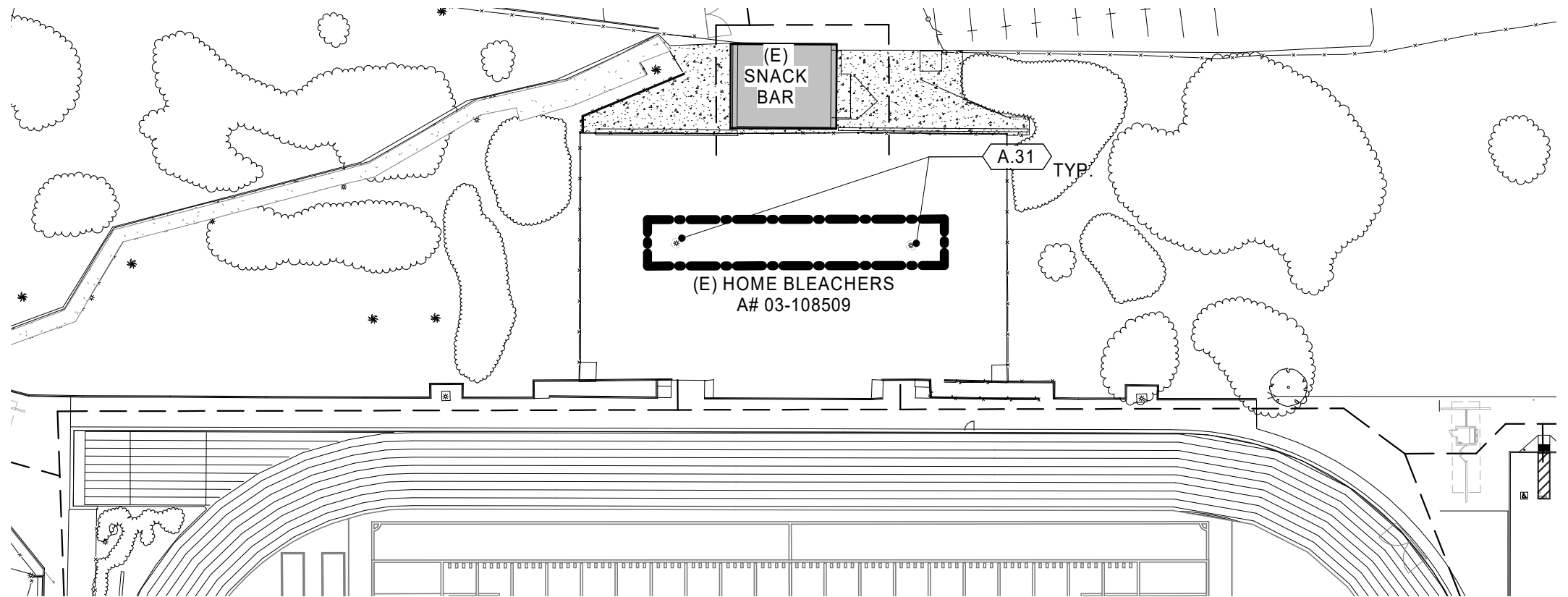
**AV6.3**





DEMOLITION NOTES

1. THE CONTRACTOR SHALL DELIVER ALL REMOVED LIGHT FIXTURES AND SPEAKERS TO DISTRICT.
2. THE CONTRACTOR SHALL REMOVE SUCH EXISTING WORK AS CALLED FOR IN CONTRACT OR AS REQUIRED TO CLEAR THE AREAS FOR NEW CONSTRUCTION.
3. ALL DEMOLITION WORK SHALL BE PREFORMED WITH "DUE CARE AND DILIGENCE" AS TO PREVENT THE ARBITRARY DESTRUCTION OR INTERRUPTION OF CONCEALED UTILITIES WHICH ARE INTENDED TO REMAIN IN USE AND THE ROUTING OF WHICH COULD NOT BE PREDETERMINED UNTIL DEMOLITION WAS STARTED. ALL SUCH DISCOVERIES OF UTILITIES DURING THE DEMOLITION PROCESS WHICH ARE IN A LOCATION DIFFERENT FROM THAT INDICATED, OR ARE UNIDENTIFIED, SHALL BE REPORTED TO THE ARCHITECT PRIOR TO REMOVAL FOR FINAL DISPOSITION.
4. WORK DESIGNATED TO REMAIN SHALL BE PROTECTED FROM DAMAGE AND PATCHED OR REPAIRED SHOULD DAMAGE OCCUR.
5. WHERE EXISTING EQUIPMENT IS TO BE RELOCATED, EXTREME CARE SHALL BE TAKEN TO PREVENT DAMAGE DURING THE REMOVAL. WHERE DAMAGE OCCURS, THE EQUIPMENT SHALL BE REPLACED OR REPAIRED TO THE SATISFACTION OF THE OWNER AT NO ADDITIONAL COST.
6. ALL DEBRIS BECOMES THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED DAILY FROM THE PREMISES AT THE CONTRACTOR'S EXPENSE AND BE DISPOSED OF ACCORDING TO LOCAL CODES AND GOVERNING AUTHORITIES. VERIFY SALVAGE MATERIALS WITH THE OWNER'S REPRESENTATIVE.
7. WHERE EXISTING ELECTRICAL WORK INTERFERES WITH NEW WORK AND WHERE SUCH INSTALLATIONS ARE TO REMAIN IN USE, THE INSTALLATIONS SHALL BE DISCONTINUED AND RELOCATED AND/OR RECONNECTED TO COORDINATE WITH NEW ELECTRICAL WORK.
8. CONTRACTOR SHALL CONSULT OTHER TRADES PRIOR TO COMMENCING DEMOLITION WORK, TO AVOID CONFLICT.
9. DEMOLITION DRAWINGS ARE DIAGRAMMATIC AND SHOW INTENT OF WORK TO BE DONE. CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT, LABOR REQUIRED AND COST FOR REMOVAL OF ALL SYSTEMS CALLED FOR IN CONTRACT.
10. ALL EXISTING CONSTRUCTION SHALL REMAIN UNLESS NOTED OTHERWISE.
11. CONTRACTOR TO PATCH AND REPAIR ALL AREAS AFFECTED BY THE DEMOLITION.



AGENCY REVIEW

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PRINCIPAL IN CHARGE: JT

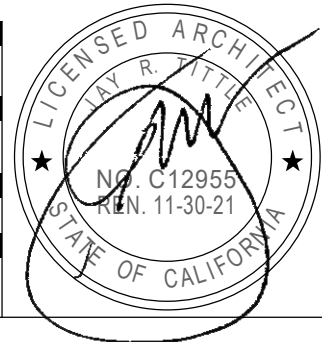
PROJECT MANAGER: FM

DESIGN TEAM: FM

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PROJECT NAME	PROJECT NO.
ADOLFO CAMARILLO HIGH SCHOOL STADIUM LIGHTING	6121235301
ADDENDUM 1	ISSUE DATE
	08/07/2020
DESCRIPTION	REFERENCE
DEMOLITION SITE PLAN	BULLETIN DRAWING
	AD1-A1

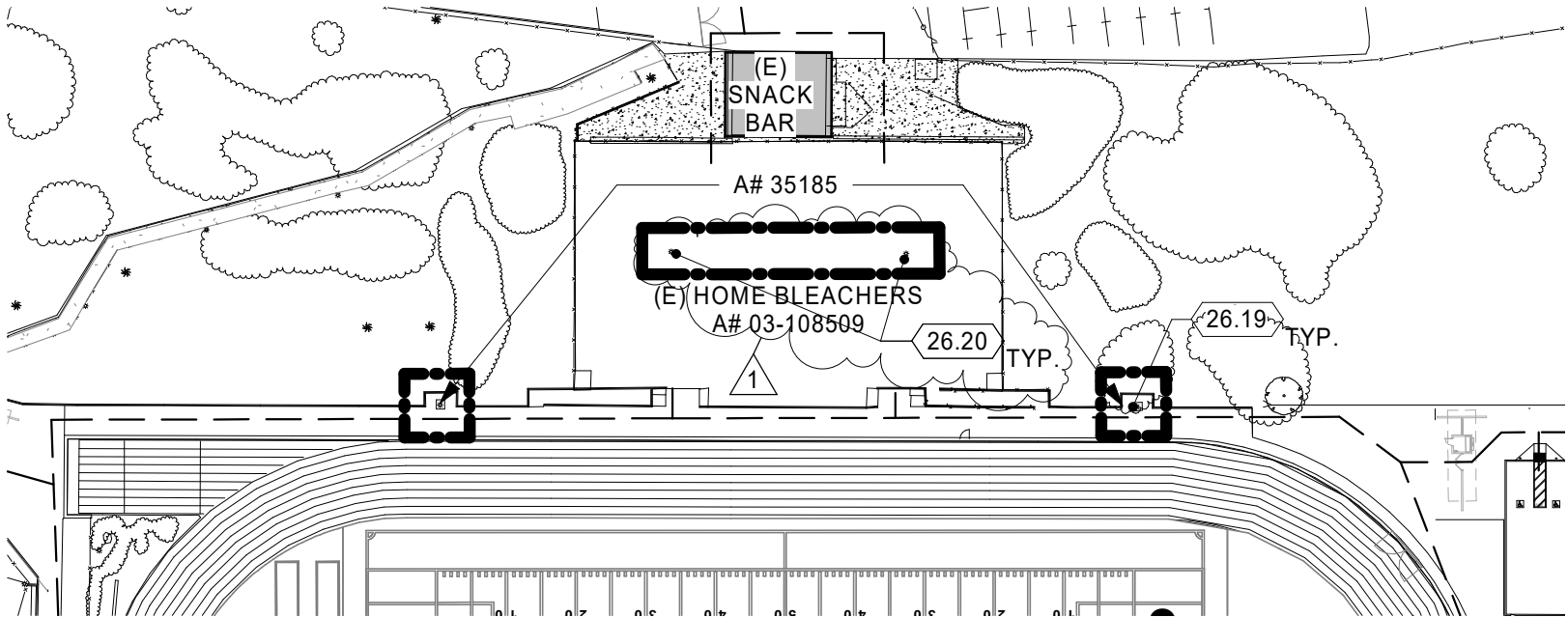


KEYNOTES

A.31

REMOVE EXISTING STADIUM LIGHT POLE, LIGHT BASE, FOOTING, FIXTURES AND WIRING. THE CONDUITS ARE EXISTING TO REMAIN. TYP OF (2)





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PROJECT NAME	PROJECT NO.
ADOLFO CAMARILLO HIGH SCHOOL STADIUM LIGHTING	6121235301
ADDENDUM 1 	ISSUE DATE
	07/30/20
DESCRIPTION	REFERENCE
PARTIAL SITE PLAN	A1.1
	BULLETIN DRAWING
	AD1-A2

KEYNOTES

1

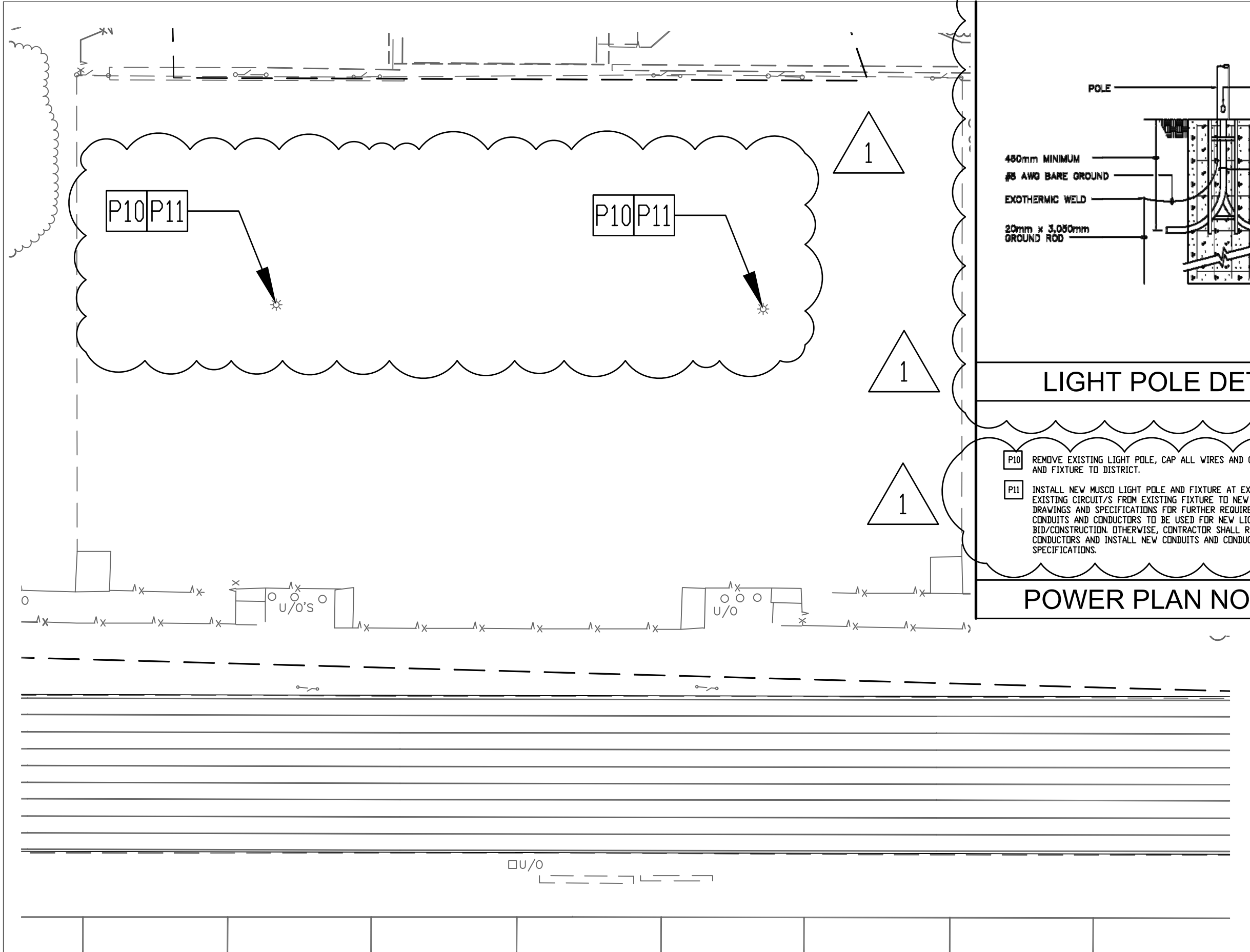
26.19

(E) STADIUM LIGHT POLE TO REMAIN, TYP. OF (6).  
RETROFIT FIXTURES PER MUSCO DRAWINGS

26.20

NEW STADIUM LIGHT POLE AND FIXTURES PER MUSCO DRAWINGS, TYP. OF (2)

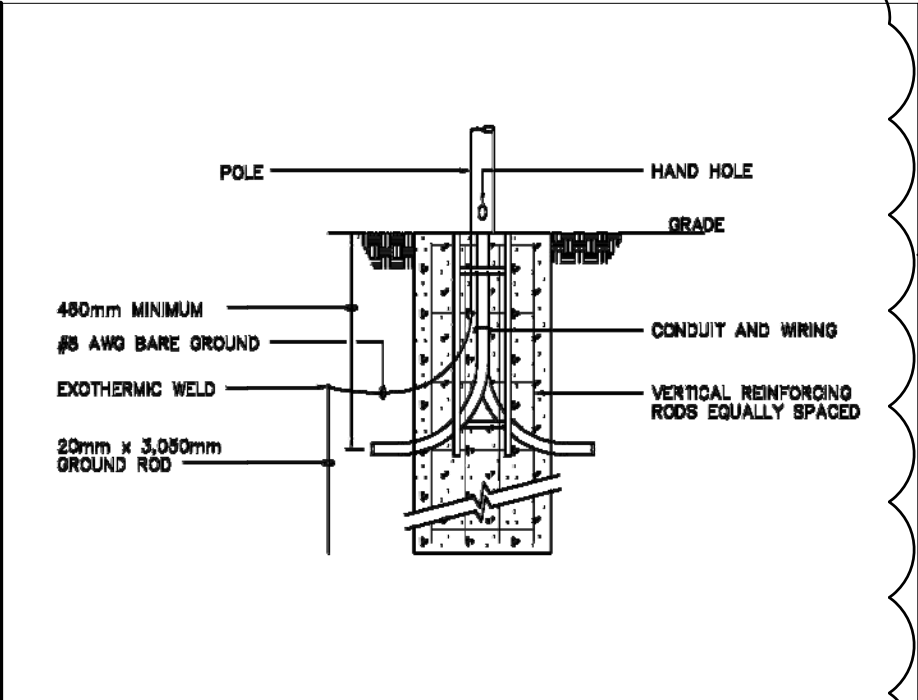




1

1

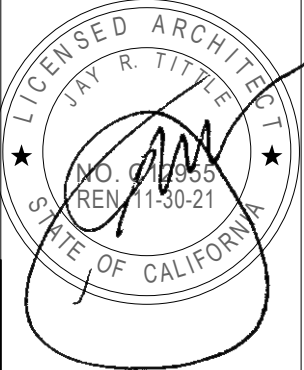
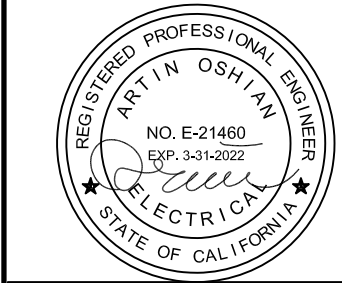
1



LIGHT POLE DETAIL SCALE: NONE 3

- P10 REMOVE EXISTING LIGHT POLE, CAP ALL WIRES AND CONNECTIONS. DELIVER REMOVED LIGHT POLE AND FIXTURE TO DISTRICT.
- P11 INSTALL NEW MUSCO LIGHT POLE AND FIXTURE AT EXISTING LIGHT POLE LOCATION. RECONNECT EXISTING CIRCUIT/S FROM EXISTING FIXTURE TO NEW LIGHT POLE FIXTURE. REFER TO MUSCO DRAWINGS AND SPECIFICATIONS FOR FURTHER REQUIREMENTS. CONTRACTOR SHALL VERIFY EXISTING CONDUITS AND CONDUCTORS TO BE USED FOR NEW LIGHT POLE, AND IF POSSIBLE REUSE, PRIOR BID/CONSTRUCTION. OTHERWISE, CONTRACTOR SHALL REMOVE AND REPLACE EXISTING CONDUITS AND CONDUCTORS AND INSTALL NEW CONDUITS AND CONDUCTORS TO MATCH NEW LIGHT POLE SPECIFICATIONS.

POWER PLAN NOTES SCALE: NONE 2



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PRINCIPAL IN CHARGE: B.E.S.  
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6121235311	ADOLFO CAMARILLO HIGH SCHOOL STADIUM SOUND SYSTEM	08/07/2020	1/E-200	AD1-E1
ADDENDUM 1		ENLARGED SITE PLAN		

ENLARGED SITE PLAN SCALE: 1" = 20'-0" 1