CITY OF TORRANCE, CALIFORNIA

ADDENDUM NO. 1
Issued: September 12, 2017

TO

PROPOSAL, BOND AND AFFIDAVIT FOR CONSTRUCTION
OF THE
TORRANCE TRANSIT PARK AND RIDE REGIONAL TERMINAL, FEAP 764
B2017-39

Note the following clarifications; Substitution/Or Equal requests; Changes and/or Additions to the Bidder's Submittal, Plans and/or Specifications (Volume 1 and 2) for the project indicated above. The bidder shall execute the Certification at the end of this addendum, and shall **attach all pages of this addendum to the Contract Documents submitted with the Bid.** In addition, the bidder shall complete and submit the "Acknowledgment of Addenda Received" Form provided in Section C, page C-8 of the Specifications.

I. RESPONSES TO BIDDERS' REQUESTS FOR INFORMATION (RFIs)

RFI 1:

Please clarify if the intent of item F. (below) is for all subcontractors to maintain the same coverages/limits as the General Contractor. This would not be a typical requirement in the industry as it is highly unlikely that subcontractors will maintain or be able to obtain these coverages/limits. This would limit greatly the number of participating subcontractors in this bid process. Please clarify.

A1: The question relates to the City of Torrance Public Works Agreement in Appendix I of the Volume 1 bid document. All coverages for subcontractors must comply with Public Works Agreement Section 18 INSURANCE either by being included as insured under the Contractor's policies or with separate certificates and endorsements.

RFI2a:

The Table of Contents shows Division 27 as "Not Applicable" yet on the plans there are data symbols and rack systems. Please advise.

A2a: Electrical plans and Division 26 Specifications account for the low voltage and data backbone and infrastructure (conduit, boxes and cable tray) only. All cabling and equipment to be provided by City of Torrance's Information System (IT) Department.

RFI2b:

The Table of Contents shows a Specification Section of 115200 – AV Systems yet it is not included in the Bid Documents. Please provide.

A2b: Specification Section 115200 is provided in Section III E of this Addendum.

RFI3:

Please provide Signage Specification.

A3: This relates to Drawing #'s AG-01 to AG-11. Signage Specifications Section 10 13 00; Section 10 14 02 and Section 10 14 04 are provided in Section III E of this Addendum.

RFI4:

1) Please clarify if the response to our RFI # 1 will be posted to the City's project website as discussed during the site walk?

A4: Yes as part of Addendum #1.

RFI5:

1) Please provide a Finished Schedule to explain which ACT goes where.

A5: Refer to Drawing No. A2-31 Overall Reflected Ceiling Plan - West & Drawing No. A2-32 Overall Reflected Ceiling Plan – East. On each, refer to the "Ceiling Legend". Also refer to Volume 2 - Project Manual for finish specifications.

II. SUBSTITUTION/OR-EQUAL REQUESTS

The table below summarizes Substitution/Or-Equal Requests received to date.

Ref. Spec.	Specified Item	Proposed Substitution / Or Equal	Disposition	City Comment
07 1813	Elasto-Deck 5000 X2, Pacific Polymers	Eco-Flex Deck, Tennant	Incomplete documentation submitted. Not Approved.	May be resubmitted.
07 1900	Aquacrete Concentrate, Degussa	Protectosil Aquacrete Concentrate, Evonik Corporation	Manufacturer changed names. Same product. Approved.	See Section III E of this Addendum.
10 2813.14	Excel, XL-SB-ECO	Dyson, AB12 Quiet V	Incomplete documentation submitted. Not Approved.	May be resubmitted.
“AV System”	Crestron (Plates)	Extron	Incomplete documentation submitted. Not Approved.	May be resubmitted.

III. CHANGES AND/OR ADDITIONS TO THE BIDDERS' SUBMITTAL; PLANS; AND/OR SPECIFICATIONS VOLUME 1 OR VOLUME 2.

A. REFER TO SPECIFICATIONS, VOLUME 1, SECTION A – NOTICE INVITING BIDS.

On page A-1, the first paragraph is hereby deleted in its entirety and replaced with the following:

"Notice is hereby given that sealed bids for performing the following described work will be received at the Office of the City Clerk of the City of Torrance, California, ***until 3:00 PM on Wednesday, November 15, 2017*** *after which time they will be publicly opened and read at 3:15 p.m. in the Council Chambers of said City:"*

On page A-2, the second and third paragraphs are hereby deleted in their entirety and replaced with the following:

"A Bidder must submit any proposed substitution, "Or Equal" product, material and/or system at or before 4:00 p.m. on Friday, October 27, 2017, in accordance with Section 4-1.6 of the Special Provisions."

"Questions related to this bid will be considered only when submitted in writing at or before 4:00 p.m. on Friday, October 27, 2017. Submissions must be sent to Craig Bilezerian, Deputy Public Works Director/City Engineer at CBilezerian@TorranceCA.Gov"

B. REFER TO THE OFFICIAL BIDDER'S SUBMITTAL PACKET (obtained from the City Clerk) AND TO SPECIFICATIONS VOLUME 1 "SECTION C – BID DOCUMENTS". SEE PAGE C-3 OF EACH.

- Bid Item #43. The "Description" is hereby amended as follows

  DELETE: "Clearing/Grubbing/Rough grade – Widening Area"
  ADD: "Clearing/Grubbing/Rough grade – Widening Area, incl. subgrade prep"

- Bid Item #44. The "Description" is hereby amended as follows

  DELETE: "208th St./ Crenshaw Clearing/Grubbing/Rough grade"
  ADD: "208th St./ Crenshaw Clearing/Grubbing/Rough grade/Subgrade Prep."

- Bid Item #47. The "Description", "Quan" and "Unit" are hereby amended as follows

  DELETE: "208th St./ Crenshaw Subgrade Preparation"; "37,850 SF"
  ADD: "208th St./ Crenshaw Imported Borrow"; "3,643 CY"

- Bid Item #59. The "Quan" is hereby increased from 5 EA to 6 EA

- Bid Item #78. The item is hereby deleted

A Bidder must make these revisions to it Bidder's Submittal document to be submitted with its bid. See sample below of above-referenced amendments.

43	31 1000	300-1.1	Clearing/Grubbing/Rough grade - Widening Area, incl. subgrade prep	27,100	SF	$	$
44	31 1000	300-1.1	208th St./ Crenshaw Clearing/Grubbing/Rough grade/Subgrade Prep	37,850	SF	$	$
45	32 1206	302-1	Cold Milling	10,270	SF	$	$
46	31 2000	300-5.2	Imported Borrow	102	CY	$	$
47	31 2000	301-1	208th St./ Crenshaw ~~Subgrade Preparation~~ Imported Borrow	~~37,850~~ 3,643	~~SF~~ CY	$	$

59	-	307	Relocate Existing Streetlighting Poles	6 ~~5~~	EA	$	$

~~78~~	~~-~~	~~306~~	~~6" DI Pipe, CL 350~~	~~60~~	~~LF~~	~~$~~	~~$~~ DELETED

C. REFER TO SPECIFICATIONS VOLUME 1 "SECTION E – SPECIAL PROVISIONS". SEE SUBSECTION 9-3.7 BID ITEM DESCRIPTIONS. SEE PAGE E-56.

- Bid Item #43. The "Description" is hereby amended to:

  "Clearing/Grubbing/Rough grade – Widening Area, incl. subgrade prep"

- Bid Item #43. The "Pay Item Description" is hereby amended to:

  "Removals, clearing, grubbing, hauling and disposal, testing scarification, water conditioning, deleterious materials removal, processing, consolidating and finishing in place to the surface of the proposed street subgrade."

- Bid Item #44. The "Description" is hereby amended to:

  "208th St./ Crenshaw Clearing/Grubbing/Rough grade/Subgrade Prep"

- Bid Item #44. The "Pay Item Description" is hereby amended to:

  "Removals, clearing, grubbing, hauling and disposal, testing scarification, water conditioning, deleterious materials removal, processing, consolidating and finishing in place to the surface of the proposed street subgrade."

See below sample of above-referenced amendments.

Item #	DESCRIPTION	UNIT	PAY ITEM DESCRIPTION
43	Clearing/Grubbing/Rough grade - Widening Area, incl. subgrade prep	SF	Removals, clearing, grubbing, hauling and disposal, testing scarification, water conditioning, deleterious materials removal, processing, consolidating and finishing in place to the surface of the proposed street subgrade
44	208th St./ Crenshaw Clearing/Grubbing/Rough grade/Subgrade Prep	SF	Removals, clearing, grubbing, hauling and disposal, testing scarification, water conditioning, deleterious materials removal, processing, consolidating and finishing in place to the surface of the proposed street subgrade

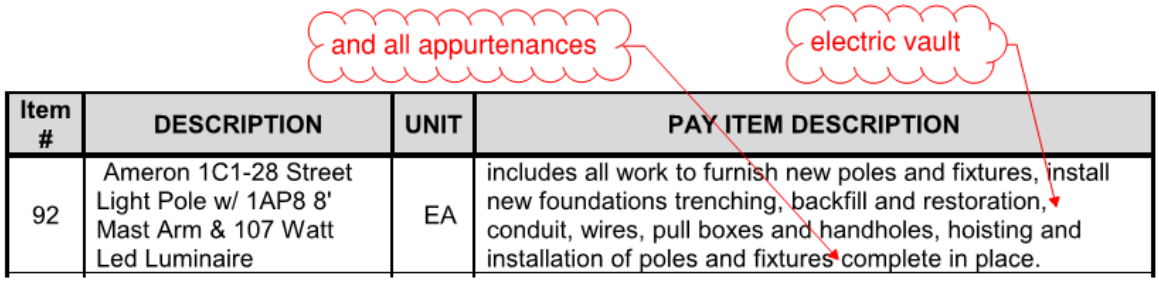
D. <u>REFER TO SPECIFICATIONS, VOLUME 1, SECTION E – SPECIAL PROVIONS, SUBSECTION 9-3.7 BID ITEM DESCRIPTIONS, PAGE E-61.</u>

On page E-61, the following amendments are made:

- <u>Bid Item #92. The "Pay Item Description" is hereby amended to:</u>

  "includes all work to furnish new poles and fixtures, install new foundations trenching, backfill and restoration, electric vault, conduit, wires, pull boxes and handholes, hoisting and installation of poles and fixtures and all appurtenances complete in place."

See below sample of above-referenced amendment.



Item #	DESCRIPTION	UNIT	PAY ITEM DESCRIPTION
92	Ameron 1C1-28 Street Light Pole w/ 1AP8 8' Mast Arm & 107 Watt Led Luminaire	EA	includes all work to furnish new poles and fixtures, install new foundations trenching, backfill and restoration, conduit, wires, pull boxes and handholes, hoisting and installation of poles and fixtures complete in place.

E. REFER TO SPECIFICATIONS, VOLUME 2, PROJECT MANUAL

- In Table of Contents Pg 00 0101-3, add the following subsections in DIVISION 10

    - 10 1300 Digital Signage
    - 10 1402 Exterior Signage
    - 10 1404 Interior Signage

    The three sections above are hereby added to and considered a part of the Volume 2 PROJECT MANUAL document and are attached to this Addendum.

- Refer to Section 07 1900, pg 07 1900-3; Part 2-PRODUCTS; Subsection A.1.

    In the first sentence, replace “Degussa” with “Evonik”.

- Section 11 5200 Audio Visual Systems was inadvertently omitted from the Volume 2 PROJECT MANUAL during publishing. Said Section is hereby added to and considered a part of the Volume 2 PROJECT MANUAL document and is attached to this Addendum.

By Order of the City Engineer

/S/ CRAIG BILEZERIAN

CRAIG BILEZERIAN
Deputy Public Works Director/City Engineer

Enclosures

BIDDER'S CERTIFICATION

I acknowledge receipt of the foregoing Addendum No. 1 and accept all conditions contained therein.

_____
Bidder

_____ _____
By Date

******* Submit this executed form with the bid *******

Please fill out and submit the
"Acknowledgment of Addenda Received" form
provided in Section C of the Specifications.

SECTION 10 13 00
DYNAMIC DIGITAL DISPLAYS (LCD, LED, PLASMA & TOUCH SCREEN)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Provide Project Digital Displays, consisting of the following:

1. Sign Type 9: Dynamic Bus Information.

B. Related Requirements:

1. Section 101402 “Exterior Signage.”
2. Section 101404 “Interior Signage.”

C. Additional Inclusions:

1. Bidder to provide Pre-Bid qualification demonstration of vendor LCD, LED, Plasma or touch screen display product capability, utilizing units that have been in continuous operation /service for a minimum of 2 consecutive years.
2. New LCD, LED, Plasma or touch screen controller hardware, operating software and video processor.
3. System training and Technical support.
4. Projections of annual operating costs.
5. Provide cost of 5-year maintenance contract commencing at the beginning of year 2.

1.3 REFERENCES

A. ADA/ADAAG/SAD – Standards for Accessible Design.

B. California Public Safety Codes – Title 19.

C. California Title 24.

D. Federal Communications Commission Regulation, Part 15.

E. Green Seal Standard GS 11 “Paints and Coatings.”

F. International Building Code (IBC 2012), unless instructed to use or reference an earlier IBC dated code by the Project Architect.

G. City of Torrance Municipal Sign Code.

H. National Electrical Code (NEC).

I. National Fire Protection Association (NFPA).

J. Office of Statewide Health Planning and Development (OSHPD) – Seismic and Life Safety Standards specific to California.

K. South Coast Air Quality Management District (SCAQMD):

1. Rule #1168 “Adhesive and Sealant Applications.

L. Standard for CAN/CSA C22.2.

M. Underwriter’s Laboratories (UL):

1. UL Standard 48 – Signs.
2. UL Standard 1433- Control Centers for Changing Message Type Signs.
3. UL Standard 1570 – Fixtures.

N. Uniform Sign Code.

O. U.S. Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED).

1.4 COORDINATION

A. Provide CAT5 Data cable/s and any conduit or shielded conduit (as required), for the installation of LCD, LED, Plasma, or Touch screen displays as described by the Project scope.

1.5 ACTION SUBMITTALS

A. General: Except as otherwise indicated, comply with requirements of Section 013300 “Submittal Procedures.”

B. Product Data: For each type of product.

1. Submit manufacturers product illustrations, data and literature that describe the digital display (LCD, LED, Plasma, or Touch screen) and accessories required to deliver a turnkey installation.
2. Include Installation details, material descriptions, overall dimensions, and dimensions of individual components.
3. Include rated capacities, operating characteristics, air circulation and / or cooling requirements, electrical characteristics, and furnished specialties and accessories.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Manufacturer.

B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For Dynamic Digital Displays - (LCD, LED, Plasma or Touch screen Displays / Monitors); Digital Displays and signage information to be included in emergency, operations, and maintenance manuals.

1. Provide complete electrical schematics for display product.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm regularly engaged in the manufacture of Digital Displays such as LCD, LED, Plasma or Touch Screens, and similar to the products as specified for this Project, and that have been in satisfactory service for a minimum of 2 years.

1. Manufacturer shall demonstrate previous experience with Branding and Wayfinding signage programs for Transit Facilities.
2. Manufacturer shall provide examples of 3 Dynamic Signage programs successfully completed over past 5 years.
3. Digital Display units to be sourced for Interior and Exterior applications where applicable.
4. Source Limitations: Obtain Digital Displays and related equipment from a single manufacturer.
5. Displays shall meet UL Standards 48 and 1433.
6. Displays shall be both NEC and FCC compliant.

B. Installer Qualifications: Manufacturer or an entity that employs installers and supervisors who are trained and approved by the manufacturer.

C. Professional Engineer Qualifications: A professional Electrical engineer, who is legally qualified to practice in jurisdiction where Project is located and who are experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for the electrification of the systems, assembly, and the routing of data cables or conduit, and products that are similar in material, design, and extent to those indicated for this Project.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with Sign Contractor’s’ ordering instructions and lead-time requirements to avoid construction delays.

B. Submit detailed description of crating methods and materials used for shipment of large scale, Digital Displays to Project team for review and approval prior to actual crating and shipping. Secure finished Digital Display components within crate and protect from shipping or weather related damage.

C. Product to be delivered on site and installed in operational condition.

D. Deliver to job site or Contractor in manufacturer’s original unopened and undamaged packaging with identification labels intact for installation into the completed support structure, signage cabinet / housing, all under controlled, in-shop conditions.

E. Store in lockable, clean, dry area protected from weather, temperature, and other harmful conditions in accordance with Contractor's written instructions.

F. Handle products in accordance with Contractor's written instructions.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of Digital Display system / signage, that fail in function, materials or workmanship within the specified warranty period.

1. Failures include, but are not limited to the following, as applicable to each sign type:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of Digital Display components.
c. Electrical failure.
d. Hardware failure.

2. Warranty Period: One year from date of Substantial Completion:

a. Provide one (1) year of on -site labor as required.
b. Provide coverage for the operation of all electronic equipment.
c. Provide display equipment that affords optimum maintenance / service accessibility to digital display units at each location, regardless of the installation constraints.
d. Provide exchange program for component failure replacements during warranty period. Exchange parts shall ship the same day the order is received, or on the following day. The manufacturer shall enclose an air bill for the return of any defective components.
e. Provide for help center technical support, staffed by technicians and product coordinators, thoroughly versed in digital display technologies, to assist with technical difficulties. After hours technical support (including evenings and weekends), shall be provided to the customer at no additional costs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into Work include, but are not limited to:

1. 3M Touch Systems.
2. Daktronics.
3. NEC.
4. Panasonic.
5. Salitek/Orion.
6. Samsung.
7. SNA, LLC.
8. Sony.

9. TRANSLUX.

2.2 PERFORMANCE REQUIREMENTS

A. Design Rights: Contractor is hereby granted limited right to designs as indicated on Design Drawings and specified in this Section for sole purpose of completing contractual obligations to fabricate and install the Dynamic Digital Displays. Contractor may not manufacture, reproduce, or exhibit designs or modify designs for any other purpose without prior written consent.

B. Substitutions: No substitutions to Digital Display type, function, or resolution shall be allowed unless approved by Architect / Designer in writing prior to fabrication.

C. Manufacturer's Responsibilities:

1. Provide design and programming support of digital content to be utilized for the Digital Display units.
2. Provide support and coordination, as required, throughout the following phases:

a. On-site field surveys.
b. Oversee all systems testing and trouble shooting, prior to the Digital Displays final, in- field installation.
c. RFI process.
d. Coordination of shipping & delivery of finished Dynamic Digital Displays to Contractor's facilities or job site.
e. Participation in the final punch-list site walk.
f. Correction of any identified deficiencies noted by project Design team and/or Client.

D. Delegated Design:

1. Engage a qualified Professional Digital Media Consultant for the creation of all digital content and its interaction with the final display.

a. As an alternate, choose from one of the following:

1) Four Winds Interactive.
2) Spinitar.
3) Or approved equal.

b. Provide complete electrical schematic drawings sealed and signed by responsible engineers.

E. Accessibility Standard: Comply with applicable provisions in U.S. Architectural & Transportation Barriers Compliance Board's ADA/ADAAG Accessibility Guidelines for Buildings and Facilities, SAD (Standards for Accessible Design), and ICC A117.1 for signs.

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

2.3 MANUFACTURED UNITS

A. LCD Digital Display: Subject to compliance with Title 24 requirements (for watts per foot and power supply) or Exempt, provide product by one of following manufacturers, or equal product meeting or exceeding performance requirements of a named manufacturer:

1. Manufacturers:

   a. Four Winds Interactive (FWI).
   b. NEC.
   c. Panasonic.
   d. Windsor Displays.

2. Description: 1080 p, Full HD, LCD / Flat screen display systems shall be rated as Commercial / Professional grade, and specified for either Interior or Exterior applications.

   a. For Interior and Exterior applications, the LCD flat screen display/s shall be selected from the following, available size range: **<Specify LCD flat screen size >TBD,** measured diagonally.
   b. Display shall feature wide display angle (i.e. 178 degree viewing angle).
   c. Display panel life shall be rated at 50,000 hours.

3. Display screens shall be designed to withstand physical wear and tear from use, as well as any exposure to the elements / weather for all exterior applications.
4. LCD Displays shall conform to Underwriters Laboratory Specifications UL 48 and bear a UL label as required by said code.
5. LCD display shall feature a narrow profile bezel to allow for use of multi screen, video wall applications where specified.
6. LCD displays shall comply with the National Electric Code (NEC).

B. LED Digital Display: Subject to compliance with Title 24 requirements (for watts per foot and power supply) or Exempt, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer.

1. Manufacturers:

   a. BARCO.
   b. Daktronics.
   c. TRANSLUX.

2. Description: LED, flat screen display, specified for either Interior or Exterior application.

   a. Interior Installation:

      1) Resolution: Appropriate to ensure optimum viewing at specified distance.
      2) Color: RGB.

   b. Exterior Installation:

      1) Resolution: Appropriate to ensure optimum viewing at specified distance based upon the display's physical location and placement.
      2) Color: RGB, except where specified as Red or Amber.
      3) Screen Brightness: Adjustable to natural lighting conditions.

c. Finished LED display packaging (for Interior or Exterior applications) shall also include a 2 percent spare parts allowance.
d. Provide dedicated controller board with software and multi channel video display processor, capable of providing specified video effects and with the capability of delivering messages, still imagery, video content or any combination thereof, from a primary control board located on the project site where specified.
e. Provide a means of display connectivity, control and content conversion capability, from an existing facility provided communications system.

3. General Information:

a. LED resolution shall be noted in MM on center.
b. Pixel configuration shall be 1 red, 1 green and 1 blue LED (RGB), unless otherwise noted.
c. LED displays to possess the capability of 16 bit processing.
d. Displays (for exterior application) shall be housed in weather resistant, fabricated and painted aluminum cabinets, with means of attachment to the required support structures where specified.
e. LED Displays to perform ongoing, self- diagnostic testing of all systems.
f. LED display to incorporate an integral cooling system to prevent overheating.

4. Web based Display Management Solution and Controller Requirements:

a. LED Display to be capable of being controlled from remote LAN server hosted, web based system.
b. Software license, server updates, telephone and on-line technical support and user fees shall be included for at least ten (10) years from date of installation.
c. LED Display to be capable of being controlled using secure wireless or other secure communication protocols through Internet access using secure passwords.
d. On -site controller shall have capacity for hardware diagnostics and software editing.

5. LED Display lifecycle shall be a minimum of 100,000 hours at a 0.5 brightness level.
6. LED Display shall conform to Underwriters Laboratory Specifications UL 48 and bear a UL label as required by said code.
7. LED displays to comply with the National Electric Code (NEC).

C. LED Ribbon Board Display: Subject to compliance with Title 24 requirements (for watts per foot and power supply) or Exempt, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer.

1. Manufacturers:

a. BARCO
b. Daktronics.

2. Description: LED, Ribbon Board system, which allows for curved displays (up to a 360 degree display), in addition to irregular, unusual shapes.

a. Resolution: **<Specify pixel pitch>**, and LED color.
b. LED Product lifecycle shall be a minimum of 100,000 hours at a 0.5 brightness level.

3. LED Displays shall conform to Underwriters Laboratory Specifications UL 48 and bear UL label as required by said code.
4. LED Displays shall comply with National Electric Code (NEC).

D. LED “Space Availability” Display: Subject to compliance with Title 24 requirements (for watts per foot and power supply) or Exempt, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer.

1. Manufacturer:

   a. Daktronics.
   b. Directional Systems.
   c. Transportation-Tech.

2. Description: LED, “Space Availability Display”, as intended for Parking Garage applications. Available with dual color LED’s (Red and Green), and designed to accommodate either 5 inch or 7 inch high characters. Display components (LED’s and cabinet) to be exterior rated. Protection for the dual colored LED arrays and internal components to be provided by a clear polycarbonate face. Maintenance / service access to be provided. The LED display requires a 120VAC, 60 Hz power source, and compatibility with the following Network communication options: **[RS422], [Ethernet/TCP/IP], [Switch input}<Specify Network option> TBD,** and third party options.
3. LED product lifecycle to be a minimum of 100,000 hours.
4. Display unit to possess a photocell, for nighttime dimming.
5. Space availability displays shall conform to Underwriters Laboratory Specifications UL 48, and bear a UL label as required by said code, as well as be FCC compliant.
6. Space availability Displays shall comply with National Electric Code (NEC).

E. Plasma Display: Subject to compliance with Title 24 requirements (for watts per foot and power supply) or Exempt, provide product by one of following manufacturers or equal product, meeting or exceeding performance requirements of a named manufacturer:

1. Manufacturers:

   a. NEC.
   b. Panasonic.
   c. Windsor Displays.

2. Description: 1080 p, Full HD, Plasma / Flat screen display systems shall be rated as Commercial / Professional grade, and specified for either Interior or Exterior applications.

   a. For Interior or Exterior applications, the Plasma screen display/s shall be sourced, from the following range of sizes: **[17” through 103”] <Specify Plasma display size> TBD, measured diagonally.**
   b. Display to be rated for a minimum of 100,000 hours service.

3. Display screens shall be designed to withstand physical wear and tear from use, as well as any exposure to the elements / weather for all exterior applications.
4. Plasma Displays shall conform to Underwriters Laboratory Specifications UL 48 and bear a UL label as required by said code.
5. Plasma display shall feature a narrow profile bezel to allow for use of multi screen, video wall applications where specified.

6. Plasma displays shall comply with the National Electric Code (NEC).

F. Touch Screen Digital Display: Subject to compliance with Title 24 requirements (for watts per foot and power supply) or Exempt, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer:

1. Manufacturers:

a. Four Winds Interactive (FWI).
b. LEDCONN.
c. 3M Touch Systems.
d. Windsor Displays.

2. Description: Touch screen displays as specified shall be rated for Commercial / Professional grade usage, and shall be intended for either Interior or Exterior applications.

a. For Interior or Exterior installations, the touch screen displays shall be configured to be adapted to one of three following design options;

1) Freestanding, vertical monolith, with a portrait oriented touch screen. . **<Specify display size /diagonally TBD>.**

3. Touch screen displays shall conform to Underwriters Laboratory Specifications UL 48 and bear a UL label as required by said code.
4. Touch screen displays shall comply with National Electric Code (NEC).

PART 3 - EXECUTION

3.1 DYNAMIC DIGITAL DISPLAY SIGNAGE SCHEDULE

GRAPHICS SCHEDULE DOCUMENT IS TO BE USED IN CONJUNCTION WITH OTHER COMPONENTS OF CONTRACT DOCUMENTS, CONSISTING OF SIGN LOCATION PLANS AND DESIGN DRAWINGS.

END OF SECTION 101300

SECTION 10 14 02
EXTERIOR SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Provide Project exterior signage including:

1. Sign Type 1: Primary Identification Pylon.
2. Sign Type 2: Vehicular Directional Sign.
3. Sign Type 3: Parking Entrance Identification.
4. Sign Type 4: Vehicular Regulatory / Restrictive.
5. Sign Type 5: Vehicular Regulatory / Restrictive.
6. Sign Type 6: Project Identification Dimensional Letters.
7. Sign Type 7: Information Kiosk
8. Sign Type 8: Bus Bay Identification Pylon
9. Sign Type 9: Dynamic Bus Information Sign
10. Sign Type 10: Amenities Identification
11. Sign Type 11: Entrance Information Vinyl
12. Sign Type 12: Wall Directional
13. Sign Type 13: Canopy Column Wrap

B. Related Requirements:

1. Section 033000 “Cast-In-Place Concrete for concrete foundations, concrete fill in postholes, and setting anchor bolts in concrete foundations for signs.
2. Section 101300 “Dynamic Digital Displays/LCD Displays.”
3. Section 101404 “Interior Signage.”

1.3 REFERENCES

A. ADA/ADAAG/SAD – Standards for Accessible Design.

B. American Society for Testing and Materials (ASTM):

1. ASTM A 500/A 500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

C. American Welding Society (AWS):

1. AWS D1.1: Structural Welding Code – Steel.
2. AWS D1.2: Structural Welding Code – Aluminum.

D. California Public Safety Codes – Title 19.

E. California Title 24.

F. Green Seal Standard GS 11 “Paints and Coatings.”

G. International Building Code (IBC 2012), unless instructed to use or reference an earlier IBC dated code by the Project Architect.

H. National Association of Architectural Metal Manufacturers (NAAMM) “Metal Finishes Manual.”

I. National Electrical Code (NEC).

J. National Fire Protection Association (NFPA).

K. Office of Statewide Health Planning and Development (OSHPD) – Seismic and Life Safety Standards specific to California.

L. South Coast Air Quality Management District (SCAQMD):

1. Rule #1168 “Adhesive and Sealant Applications.

M. Underwriter’s Laboratories (UL):

1. UL Standard 48 – Signs.
2. UL Standard 1570 – Fixtures.

N. U.S. Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED).

1.4 COORDINATION

A. Furnish templates, made from rigid material, and tolerance information, for placement of sign-anchorage devices embedded in permanent construction by other installers.

1. Clearly mark with “Side A/Side B” reference and include directional marking denoting “North.”

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers. Include Data cable/s and any shielding or conduit (as required) for the installation of LED or LCD Monitors /Displays.

1.5 ACTION SUBMITTALS

A. General: Except as otherwise indicated, comply with requirements of Section 013300 “Submittal Procedures.”

B. Product Data: For each type of product.

1. Include fabrication details, material descriptions, overall dimensions, and dimensions of individual components.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include product data for paint, coatings, and other finish materials as required to show compliance with specified requirements.

C. Material Data:

1. Submit material cost data for materials required to construct Work in place. Material cost shall reflect actual cost of material without Contractor mark-up.
2. Provide manufacturer's information/data sheet or letter from manufacturer indicating location of manufacture, amount of recycled content (post consumer and industrial percentage in product,) and location of raw material harvest if within 500 miles of Project site.
3. If requested by Owner, submit manufacturer's Material Safety Data Sheet (MSDS) directly to Owner.

D. Shop Drawings: Provide one set of reproducible Shop Drawings in electronic Acrobat PDF format and as paper print set, drawn to scale, detailing sign fabrication and installation. Provide DVD with electronic copy of Shop Drawings.

1. Include fabrication and installation details relating to attachments to other work.
2. Show sign mounting in plan and elevation; show supplementary supports and accessories to be provided by others clearly identified on shop drawings.
3. Provide printed-paper copy layout of each sign type, not less than 1/2 size.
4. Show locations of electrical service connections.
5. Include schematic diagrams of electrical circuitry and components.
6. Schedule and describe anchorage assemblies and their related components.
7. Show location of inserts for anchors and supports, which are to be attached to structure or built into concrete or masonry, if any.
8. Support and Backing in Walls: Sign Contractor with the assistance of the General Contractor, shall provide engineered Sign supports anchored to the building's structure where required and to meet applicable sign code requirements. Installations requiring Support or backing, within the building wall construction, shall be immediately relayed to the Architect of Record and Construction Manager's Representative for field coordination. Location plans and the dimension on the design drawings are to be utilized for typical placement of each sign type. Should any obstructions prohibit installing the signs in any given location, the General Contractor shall be notified immediately and the GC and architect shall provide an alternate location as required.
9. Shop Drawings shall be new drawings prepared specifically for Project.

    a. Re-submittal of issued Drawings with title block modifications are not acceptable.

E. Engineering Drawings: Sealed and signed by Professional Engineer responsible for preparation of engineering analysis who thereby certifies preparing or supervising preparation of data to comply with specified requirements and recognized engineering principles and practices. Engineering Drawings include, but are not limited to:

1. Plans, elevations, sections, and details for fabrication and installation of sign structures and foundations indicating sizes, dimensions, and profiles; arrangement and provisions for jointing, supporting, anchoring, and fastening.

2. Include details showing relationship with, attachment to, and reception of related Work.

a. Indicate details of adjoining Work, even though not included in Work of this Section, to ensure coordination of Work and Work of other Sections.
b. Reference Architect detail numbers where applicable.

F. Engineering Analysis: Sealed and signed by Professional Engineer who thereby certifies preparing or supervising preparation of data to comply with specified requirements and recognized engineering principles and practices.

G. Samples:

1. Paints and Coatings:

a. Color Samples: Submit two samples of each color, sheen, and texture of paint finish on minimum 4 by 6 inch aluminum sheets to simulate actual finish. Resubmit each sample as requested until required color, sheen, and texture are achieved.
b. Technical Specifications: Submit two copies of technical specifications of paint, coatings, and other finish materials.

2. Lettering Patterns: Submit two full-size lettering patterns of sign messages, symbols, or other graphic elements related to sign fabrication.
3. High Performance Graphic Film Copy: Submit two mounted, one-line samples of each size, color, typestyle, and font on pre-spaced tapes.
4. Screen Processed Copy: Submit 2 blue-line prints of film positives.
5. Hardware Samples: Submit 2 samples each of hardware such as hinges, locks, and fasteners that will be exposed to view.
6. Concrete Finish Samples: Provide 2 samples each, 6X6, demonstrating surface texture as specified.

H. Mockup: Submit mockup to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

1. Submit 1 mockup of each of following:

a. Sign Type 1: Sign in progress.
b. Sign Type 2: One finished sign.
c. Sign Type 3: One finished sign.
d. Sign Type 4: One finished sign.
e. Sign Type 5: Sign in progress.
f. Sign Type 6: One finished letter with illumination.
g. Sign Type 7: One finished sign cabinet.
h. Sign Type 8: One finished sign.
i. Sign Type 9: One dynamic sign cabinet.
j. Sign Type 10: One finished letter.
k. Sign Type 11: Sample of vinyl copy.
l. Sign Type 12: Sample of graphics panel.
m. Sign Type 13: Sign in progress.

2. Subsequent fabrication shall conform to accepted mockups.
3. Approval of mockups does not constitute approval of deviations from Contract Documents unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of completed Work if undisturbed at time of Substantial Completion.

I. Product Schedule: For exterior signage. Use same designations indicated on Drawings.

J. Delegated-Design Submittal: For exterior signage indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Welding certificates.

C. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For exterior signage to include in emergency, operation, and maintenance manuals.

B. Record Submittals (As-Builts): Prepare and submit final record drawings, specifications, and current status documents for signs provided as Work of this Section.

1. Comply with requirements of Section 017839, except as otherwise indicated.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm regularly engaged in manufacture of exterior signage similar to products specified for this Project that have been in satisfactory service for minimum of 2 years.

1. Contractor shall demonstrate previous experience with Branding and Wayfinding signage programs for Transportation clients.
2. Contractor shall provide examples of 3 Transportation programs successfully completed over past 5 years.
3. Contractor shall provide 3 letters of reference resulting from completion of similar projects over past 2 years.
4. Contractor shall identify their proposed Project Management team, and provide resume for each team member that will be assigned to project, as well as an Organizational chart.
5. Contractor shall develop a fabrication and installation project schedule.
6. Contractor shall demonstrate capability for creating project database with customer/client accessibility, based upon receipt of NTP, outlining durations for submittals, submittal reviews, fabrication, installation, and completion.

B. Installer Qualifications: Manufacturer or an entity that employs installers and supervisors who are trained and approved by manufacturer.

C. Welding Qualifications: Qualify procedures and personnel for both field and shop/production facility according to AWS D1.1/D1.1M, "Structural Welding Code – Steel lD1.2/D1.2M,

"Structural Welding Code – Aluminum D1.3, "Structural Welding Code - Sheet Steel D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel**.**"

D. Professional Engineer Qualifications: A professional structural engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

E. Ready-Mix-Concrete Manufacturer Qualifications: Firm experienced in manufacturing ready-mixed concrete complying with ASTM C94/C94M requirements for production facilities and equipment.

F. Comply with ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with sign fabricator’s / manufacturer’s ordering instructions and lead-time requirements to avoid construction delays.

B. Submit detailed description of crating methods and materials used for shipment of large scale, fabricated signs or letters to Project team for review and approval prior to actual crating and shipping. Secure finished signage components within crate and protect from shipping or weather related damage.

C. Deliver to jobsite in sign fabricators / manufacturer’s original unopened and undamaged packaging with identification labels intact.

D. Store in lockable, clean, dry area protected from weather, temperature, and other harmful conditions in accordance with sign fabricator’s / manufacturer’s written instructions.

E. Handle products in accordance with manufacturer’s written instructions.

1.10 FIELD CONDITIONS

A. Field Measurements:

1. Inspect existing conditions and verify dimensions related to fabrication and installation of exterior signage prior to production.
2. Verify locations of anchorage devices and electrical services provided for signage installation embedded in permanent construction by other installers by field measurements before fabrication.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in function, materials, or workmanship within specified warranty period.

1. Failures include, but are not limited to following, as applicable to each sign type:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.
d. Mounting failure.
e. Electrical failure.
f. Structural failure.

2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into Work include, but are not limited to:

1. 3M.
2. Akzo Nobel.
3. Arlon Graphics, LLC.
4. BK Lighting.
5. GE Lighting Solutions.
6. Hydrel Lighting.
7. KIM Lighting.
8. Matthews Paint Co.
9. Philips / ColorKinetics.
10. PPG.
11. Sign Comp.
12. Sign Systems.
13. Zumar Industries, Inc.

2.2 FABRICATORS

A. Fabricators: Subject to compliance with requirements, available fabricators approved for fabricating signage components and assemblies specified in this Section include, but are not limited to:

1. AD/S Design & Signs.
2. CNP /California Neon Products.
3. CREO Industrial Arts.
4. Fabrication Arts.
5. Jon Richards Company.
6. National Sign and Marketing Corporation.
7. Neiman & Company.
8. Sign Designers.
9. Sign Industries.
10. TFN Architectural Signage
11. T Graphics, Inc.
12. Tube Art Group.
13. Weidner Architectural Signage.
14. Windsor Displays.

2.3 SYSTEM DESCRIPTION

A. Frame and Enclosure:

1. Design, fabricate and install structural and non-structural support framing in accordance with requirements of authorities having jurisdiction.
2. Design to provide for movement of components without damage, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
3. Design system to accommodate construction tolerances, deflection of structural members, and clearances of intended openings of associated structures.
4. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with requirements of authorities having jurisdiction for seismic zone #4.
5. Design exterior signage to withstand positive and negative wind loads calculated in accordance with requirements of authorities having jurisdiction.

2.4 PERFORMANCE REQUIREMENTS

A. Design Rights: Sign Fabricator is hereby granted limited right to designs as indicated on Design Drawings and specified in this Section for sole purpose of completing contractual obligations to fabricate and install Project signage. Sign Fabricator may not manufacture, reproduce, or exhibit designs or modify designs for any other purpose without prior written consent.

B. Substitutions: No substitutions to fabrication process or material selections allowed unless approved by Architect/Designer in writing prior to fabrication.

C. Sign Fabricator's Responsibilities:

1. Provide labor, materials, and products required to fabricate and install exterior signage and graphic items detailed, noted, or specified in Contract Documents.
2. Obtain and pay for required permits and taxes.
3. Provide engineering design as required for approvals and permits.
4. Provide typographic copy layouts and other finished artwork, unless otherwise specified.
5. Provide for Union Labor (where required) for installation of finished signage.
6. Provide sufficient support and coordination throughout following phases:

a. Submittal of shop drawings.
b. On-site field surveys.
c. Signage Fabrication.
d. In-shop design milestone reviews.
e. RFI process.
f. Coordination of shipping/delivery of finished signage to job site.
g. Final Installation.
h. Participation in final punch-list walk.
i. Correction of any identified deficiencies noted by project Design team and/or Client.

D. Delegated Design:

1. Engage a qualified Professional Engineer as defined in this Section to design sign structure and anchorage.

a. Provide complete engineering drawings and calculations sealed and signed by responsible engineer.
b. Provide engineering design as required for approvals and permits

E. Accessibility Standard: Comply with applicable provisions in U.S. Architectural & Transportation Barriers Compliance Board's ADA/ADAAG Accessibility Guidelines for Buildings and Facilities, SAD (Standards for Accessible Design), and ICC A117.1 for signs.

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

2.5 MATERIALS

A. Acrylic Polyurethane Paint:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. AKZO Nobel.
b. Matthews Paint Co.
c. PPG.

2. General: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
3. Paint systems/products must be either Ultra Low VOC or Low VOC compliant.

B. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

1. Manufacturers: Subject to compliance with requirements, manufacture's offering products that may be incorporated in the Work include, but are not limited to:

a. Evonite Cyro, LLC: Acrylite.
b. Rohm and Haas: Plexiglas.

C. Adhesives:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Dow Corning.
b. General Electric
c. Lord Adhesive.

D. Anti-Graffiti Aerosol Spray Coating.

1. Basis of Design Product: Subject to compliance with requirements, provide Low VOC Satin Clear, Low VOC Gloss Clear, Low VOC Braco Clear (for decorative metals), or Low VOC Super Satin Clear/Anti Graffiti as manufactured by Mathews Paint Co. or product by following meeting or exceeding performance requirements of Basis of Design product:

a. Spraylat.
b. Or approved equal.

E. Anti-Graffiti Protective Film:

1. Basis of Design Product: Subject to compliance with requirements, provide Scotchcal Matte Overlaminate 3642 GPS as manufactured by 3M or product by one of following meeting or exceeding performance requirements of Basis of Design product:

a. Arlon Graphics, LLC.
b. Or approved equal.

F. Aluminum Sheet and Plate: ASTM B 209, alloy and temper indicated.

1. Provide alloy 5005-h32 for anodized finishes and alloy 3003-h14, mill finish, for painted finishes.
2. Where alloy and temper are not indicated, provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

G. Aluminum Extrusions: ASTM B 221, alloy and temper indicated.

1. Provide alloy 6063 T-6 for anodized finishes and alloy 6061 T-6, mill finish, for painted finishes.
2. Where alloy and temper are not indicated, provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
3. Anodizing and Plating: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Danco.
b. LNL Anodizing.
c. Highland Plating.

H. Exterior Digital Color Prints:

1. Manufacturers: Subject to compliance with requirements (Piezo ink jet printed, and /or Mimaki UV Digital Printer, with an acceptable overlaminate or applied second surface, and a Design life of 3-5 years), manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Color Edge
b. Lithographix
c. Rembrandt
d. Supercolor Digital

I. High Performance Graphic Film:

1. Basis of Design Product: Subject to compliance with requirements, provide Scotchcal and Scotchlite Film/Sheeting as manufactured by 3M or product by one of following meeting or exceeding performance requirements of Basis of Design product:

a. Arlon Graphics, LLC.

2. General: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back or face, as required for first or second surface installations; die cut to form characters or images as indicated and suitable for exterior applications.

J. Laminated Safety Glass:

1. Laminated safety glass, conforming to Consumer Product Safety Commission 16 CFR 1201 and ANSI Z97.1 Specification for Safety Glazing, shall be of the thicknesses as specified or indicated. Where holes are required, limiting requirements, as to size and spacing and location in relation to edges and corner, shall be in accordance with recommendation of glass manufacturer.

K. Polycarbonate Sheet:

1. Basis of Design Product: Subject to compliance with requirements, provide Lexan polycarbonate sheet as manufactured by Sabic Innovative Plastics or product by one of following meeting or exceeding performance requirements of Basis of Design product:

a. Sheffield Plastics.
b. Spartech Plastics.
c. Or approved equal

2. General: ASTM C 13449, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), with coating on both sides.

L. Screen Printing Ink: Subject to compliance with requirements, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer.

1. Nazdar Enamel.
2. Nazdar Inks.
3. Or approved equal.

M. Tempered Glass: Heat -treated float glass complying with ASTM C 1048 Type I, Quality Q3, Class I (clear), Kind FT.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

N. Very High Bond Foam and TransferTape:

1. Basis of Design Product: Subject to compliance with requirements, provide VHB Acrylic Foam Tape, and VHB Isotac Tape as manufactured by 3M.

2.6 MANUFACTURED UNITS

A. Direct Burial Lighting, Exterior Rated: Subject to compliance with requirements, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer.

1. Hydrel Lighting.

2. Kim Lighting.

B. Exterior Architectural Lighting (uplight and downlight): Subject to compliance with requirements, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer.

1. BK Lighting.
2. Gardco.
3. KIM Lighting.
4. Philips/ColorKinetics.

C. LED Lighting Components: Subject to compliance with Title 24 requirements (for watts per foot and power supply) or Exempt, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer:

1. Manufacturers:

a. Samsung.
b. Axiom LED.
c. G.E. Lighting Solutions.
d. Sloan LED.

2. Description: 12VDC white, high wattage, wide angle waterproof LED modules and 120v/277v waterproof Class II power supplies.
3. Illuminated signs shall conform to Underwriters Laboratory specifications UL 48 and bear UL label as required by said code.
4. Signs shall also comply with National Electric Code (NEC).

D. Trim Cap Components: Subject to compliance with requirements, provide product sourced by one of following:

1. Manufacturers:

a. Jewelite.
b. Gemini.

2. Description: Trim cap material with integral color throughout product, to be used for letters under 4'-0". For letters larger than 4'-0", provide fabricated aluminum retainer with painted acrylic polyurethane finish applied to match adjacent surface.

E. Edge Lit acrylic sheeting: Subject to compliance with requirements, provide product sourced by one of following:

1. Manufacturers:

a. AD/S - Lumipane product.
b. LEDCONN.

2.7 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with following:

1. Use concealed fasteners and anchors unless indicated on accepted Shop Drawings to be exposed.
2. Furnish stainless steel devices unless otherwise indicated.
3. Furnish stainless steel masonry inserts for embedment in concrete or masonry work.
4. Furnish stainless steel j-bolts for embedment in concrete or masonry work.
5. Furnish stainless steel All Thread to be secured with epoxy adhesive into concrete or masonry work.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

C. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107/C1107M. Provide grout specifically recommended by manufacturer for exterior applications.

D. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Compressive Strength: As required by design conditions but not less than 3000 psi at 28 days.

E. High Strength Concrete Mix /"SAKRETE": Prepare bag mix per manufacturers instructions, in accordance with ACI 302, ACI 308 and ASTM C 387, as follows:

1. Compressive Strength: As required by design conditions but not less than 4000 psi at 28 days.

F. Silicone Adhesive:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Dow.
b. General Electric.
c. C.R. Lawrence.

G. Structural Adhesive:

1. Basis of Design Product: Provide Versilok two-component epoxy-modified acrylic adhesive, with beads, as manufactured by Lord Corporation recommended by adhesive manufacturer for each application or, subject to compliance with requirements, comparable product by one of following, or equal:

a. Akzo Nobel; Liquid Nails Construction Adhesive.
b. Henkel Loctite Corporation; Locktite Construction Adhesive.
c. Or approved equal.

2.8 CONCRETE

A. General: Match Architect's control samples for colors, tint additives, finish textures and chamfers.

B. Formwork: Design, construct, erect, brace, and maintain formwork in accordance with ACI 301.

C. Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

D. Mixing:

1. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

    a. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

    a. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
    b. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional cu. yd.
    c. Provide batch ticket for each batch discharged and used in Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

E. Concrete Placement: Comply with ACI 301 for placing concrete.

F. Finishing: Comply with ACI 302.1R for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

G. Protection: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.

H. Repairs: Remove and replace concrete that does not comply with requirements in this Section.

2.9 FABRICATION

A. General: Manufacturer shall provide labor, materials, tools, fixtures, jigs, equipment, and facilities necessary for production of Work required by Contract Documents.

1. Preassemble signs in shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in locations concealed from view after final assembly.
2. Mill joints to tight, hairline fit. Form joints exposed to weather to resist water penetration and retention.

3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
4. Conceal fasteners and anchors unless indicated to be exposed; locate exposed fasteners where they will be inconspicuous.
5. Internally brace signs for stability and for securing fasteners.
6. Form panels to required size and shape as indicated on Drawings. Comply with requirements for design, dimensions, finish, color, and details of construction.
7. Obtain identification labels which shall conform to Underwriters Laboratories requirements.
8. Locate markings, labels, and manufacturer names and other identifications so as to be concealed from public view and as acceptable to Owner's Representative.
9. Provide wet stamped engineering calculations
10. On new sign products of duplicate design and fabrication, vendor shall assume interchangeability of components, regardless of manufacturing origins.
11. For sign cabinets mounted to walls and other vertical surfaces, or to roofs and other horizontal surfaces and to concrete footings, use stainless steel anchoring hardware.
12. Provide stainless steel aircraft cable and zinc plated mounting hardware and fittings for hanging or suspending signage or graphics components.

B. Aluminum Cabinets:

1. Provide cabinets of seamless welded aluminum construction with brake formed returns where applicable and joints welded, ground and finished smooth.

    a. Provide internal structural framing of welded aluminum construction.
    b. Use sourced and approved aluminum extrusions for cabinet bodies, retainers, posts, and frames, where applicable.
    c. For internally illuminated sign cabinets, paint interior surfaces white to optimize reflection.
    d. Flat or Formed Acrylic or Polycarbonate Sheet Surfaces: Allow for expansion and contraction to prevent blowout.
    e. Except as otherwise indicated, fasteners shall be stainless steel and concealed; when exposed, fasteners shall be countersunk and finished to match adjacent surface.
    f. Electrolysis: Prevent corrosive action due to electrolysis by separating ferrous and non-ferrous metals with neoprene or vinyl spacers, or by using stainless steel fasteners.

C. Internally Illuminated Cabinets:

1. Cabinet sign face shall be from aluminum sheet and have characters and symbols fabricated from Laser cut acrylic inserted through same routed in sign face.
2. Cabinet sign face shall be from aluminum sheet and have inserted panel from milk white acrylic sheet diffuser.
3. Sign face shall be panel from milk white acrylic sheet diffuser #2447, and held in cabinet fabricated from extruded aluminum retainers and aluminum returns.
4. LED illumination: Provide 12 VDC, Class II white high wattage wide angle LED's providing even illumination without hot spots across sign face. Illumination levels shall be uniform and free of any visible defects or light leaks when viewed from a distance of 10 feet.
5. Service Access: Provide sign structures with weatherproof service access panels at back of sign enclosure to provide for convenient and effective service access. Whenever

possible, service access shall be provided through a hinged face system with captive fasteners engaging a prepared receiver. For high-rise cabinets, service entry shall be achieved via access doors with like fasteners. These doors shall be flush and counter sunk.

6. Location and design of access panels shall be indicated on Shop Drawings.
7. Electrical Components: Provide waterproof 120v/277v disconnect switches, junction boxes, wiring, and electrical equipment installed with signs as required by agencies having jurisdiction. Location of J-boxes shall be indicated on Shop Drawings.
8. Provide information on LED lighting, including quantity and placement of power supplies.

D. Internally Illuminated Individual Letters:

1. Channel Letter Construction: Provide details for channel letter type construction on Shop Drawings. Add weep holes to letter returns at bottom. Paint interior of letter forms white to optimize reflectivity. Show anchorage of channel letters to building wall structure, with location of electrical raceway. Details on Design Drawings showing channel letter construction and installation are general guide only.
2. Translucent Acrylic Faces: Provide Laser cut translucent milk white acrylic (#2447) light diffuser letter face to achieve maximum legibility without producing halo or overglow effect when letters are viewed at night. Provide details of trim cap attachment methods on Shop Drawings. Allow for expansion and contraction of acrylic elements to prevent blowout. Details on Design Drawings showing installation of acrylic face panels are general guide only. Provide polycarbonate for letter faces larger than 4 feet.

    a. LED Illumination:

        1) Provide 12VDC, white high wattage wide-angle LED arrays with even illumination with no hot spots across sign face. Indicate placement of LED arrays within letter, showing illumination of letter face.
        2) Provide 120v/277v waterproof Class II power, and indicate placement and details of supplies in raceway.

3. Illumination levels shall be uniform and free of any visible defects or light leaks when viewed from a distance of 10 feet.
4. Provide means for convenient and effective service of letters and associated electrical components.
5. Electrical Components: Provide waterproof disconnect switches, junction boxes, wiring and electrical equipment, installed with signs as required by local codes and ordinances. Location and arrangements of “J” boxes shall be shown on Shop Drawings.

E. Halo Illuminated Individual Letters:

1. Reverse Channel Letter Construction: Provide details for reverse channel letter type construction on Shop Drawings. Add weep holes to letter returns at bottom. Paint interior of letter forms white to optimize reflectivity. Incorporate clear or translucent milk white acrylic backer to seal off letters. If letters are 4’-0” or larger, utilize clear polycarbonate material for the letter backs. Show reverse channel letters installed with standoffs from wall, standoff distance as shown on Design Drawings. Show anchorage of channel letters to building wall structure, with location of concealed electrical raceway. Details on Design Drawings showing reverse channel letter construction and installation are general guide only.
2. Halo Lit Illumination:

a. Halo lit illumination shall be achieved by reflecting light from inside surface of opaque letter face to wall surface directly behind letter
b. LED Illumination:

1) Provide 12 VDC white high wattage wide-angle LED arrays with even illumination and showing no hot spots across wall surface. Indicate placement of LED arrays within letter, showing illumination of inside of letter face.
2) Illumination levels shall be uniform and free of visible defects or light leaks when viewed from distance of 10 feet.
3) Provide 120v/277v waterproof Class II power, and indicate placement and details of supplies in raceway.
4) Provide means for convenient and effective service of letters and associated electrical components.
5) Electrical Components: Provide waterproof disconnect switches, junction boxes, wiring and electrical equipment, installed with signs as required by local codes and ordinances. Location and arrangements of “J” boxes shall be shown on Shop Drawings.
6) Location and arrangement of J-boxes shall be indicated on Shop Drawings.

F. Internally Illuminated Signs (for Neon or Fluorescent applications): Assemble components within illuminated signs conforming to approved standards of Underwriters Laboratories, Inc., as published in the latest edition of "Standards for Electric Signs" (ANSI/UL48). Illuminated signs shall bear U.L. label. Conceal wiring and equipment within sign structure.

1. Ballasts: Provide ballasts by Jefferson or equal. Provide exact number and arrangement of lamps per ballast recommended by ballast manufacturer, with no exceptions. Ballasts shall be easily accessible for required maintenance.
2. Transformers: Provide transformers of high power factor type by Jefferson or equal. Secondary voltages shall be as required by footage of glass to be illuminated. Transformers shall have 30 to 60 M.A. rating.
3. Wiring: Provide high-tension wiring of not less than gto 15 wire as manufactured by Carol Cable Company or equal. Wiring shall be 90 degree centigrade, 1000-volt tw/mtw U.L. file no. E 18971. Wiring connectors for wire splicing shall be U.L. approved 1000-volt capacity. They shall be scotch lock type Y or R, and accessible for inspection and repair.
4. Sockets: Provide Kulka no. 582 and 583 or Kulka No. 530-2 and 530-1 sockets with silver coated contacts and pitch sealed backs for use with 800 M.M. lamps or equal.
5. Fluorescent Lamps: Provide high output 800 M.A. sign white lamps in lengths as required.
6. Disconnect Switches: Provide external, waterproof, disconnect key activated switches for electrical cabinet signs. Switches shall be flush mounted to cabinet face, and shall control primary wiring within sign. Location of switch is subject to approval of Owner’s Representative, and shall be shown on shop drawings.

G. Specialty Lighting

1. Flexible LED Tube

a. Provide exposed within aluminum channel letterforms and characters.
b. Provide exposed letterforms and characters.
c. Provide as exposed or concealed peripheral accent lighting.

1) Provide detailed information regarding length and placement of tubing, housings, power supplies and re-lamping. Information required includes, but is not limited to:

a) Flexible tubing specification including diameter and color of tubing.
b) Color specification of LED.

2. Service Access: Provide removable character or letter form for service access.
3. Electrical Components: Provide waterproof disconnect switches, junction boxes, wiring and electrical equipment, installed with signs as required by local codes and ordinances. Location and arrangements of junction boxes shall be shown on Drawings.
4. Electrical Raceway: Provide sourced and approved extruded aluminum raceway, concealed when possible. Where raceway is exposed, raceway color shall match mounting surface color.
5. Test lighting components upon completion of cabinet, letter or character fabrication prior to installation.

H. Very High Bond Tape (VHB):

1. Provide type of VHB recommended in writing by tape manufacturer for each tape application.
2. Apply tape in accordance with tape manufacturer's written instructions for each tape application.

a. Pre-treat surfaces prior to application of tape, removing oil and foreign matter and lightly sand bonding surfaces prior to tape application.
b. Prior to removal of carrier tape, burnish tape to first applied surface to activate adhesive properties.
c. Re-burnish bond areas and clamp elements together for time specified by tape manufacturer.

I. Acrylic Panels: Finish exposed edges of panels smooth with polished or painted finish as noted on Drawings. All edges to be eased and exposed lamination seams shall not be permitted.

J. ADA/ADAAG /SAD Code Compliant Signs:

1. Sign face shall have an applied sheet of surface painted raised copy and Grade 2 translation Braille.
2. Edges shall be flush, eased and finished.
3. Spray paint panel face background and edges.
4. Sign face shall have applied laser cut surface painted raised copy and transparent Grade 2 translation bead Braille bonded into holes engraved into sign face after painting.

K. California Title 24 Compliant Restroom Signs:

1. Provide painted acrylic equilateral triangle panel with eased edges and direct digital print male symbol for attachment to Men's Restroom door.
2. Provide painted acrylic circular disk panel with eased edges and direct digital print female symbol for attachment to Women's Restroom door.
3. Provide painted acrylic equilateral triangle panel with eased edges and direct digital print male and female symbols bonded over painted acrylic circular disk panel with eased edges for attachment to Unisex Restroom door.
4. Production Option for Symbols on Signage: Screen printing.

L. Regulatory Signs

1. Provide acrylic panel with eased edges and radiused corners, and with direct digital print copy and or symbol.
2. Production Option for Copy and Symbols on Signage: Screen printing

2.10 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

B. Appearance of Finished Work / “Fabrication”: Noticeable variations within same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

C. Appearance of Finished Work / “Paint”: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

2.11 PAINT FINISH

A. Performance Requirements: Five years acceptable performance is required of approved paint systems. Acceptable performance is defined as follows:

1. Will not crack, check, or peel (lose adhesion) except when cracking or crazing is a result of metal fracture.
2. Will not chalk in excess when measured in accordance with the standard procedures as defined by the “Standard Methods of Evaluating Degree of Chalking of Exterior paints”, ASTM D4214-89.
3. Will not fade or change in color when exposed painted surfaces, which have been cleaned of external deposits and chalk, are measured by a spectro-photometer or color meter. It is understood that fading or color change may not be uniform if the surfaces are not equally exposed to the sun and elements.

    a. Process requirements - All surfaces shall be degreased, cleaned, and rinsed well. Drying the substrate may be necessary to prevent white rust. Remove mill scale by sandblasting if necessary.
    b. Scuff metal surfaces and make ready for self-etching primer. Apply wash / filler primer in multiple passes, yielding a minimum of .5 mil dry film thickness.
    c. Apply finish paint, following manufactures recommendations for mixing and application.
    d. Apply sprayed on, Low VOC protective clear coat /anti graffiti finish, following manufacturers recommendations for mixing and application. Final applied clear coat finish shall be Satin Clear.

B. Perform crosshatch adhesion test on painted parts as prescribed by ASTM D3359-93 “Standard Test Methods for Measuring Adhesion by Tape Test”.

2.12 WALL GRAPHICS

A. Provide pre-treatment and finish processing as required for application of wall graphics to unpainted wall surfaces including:

1. Thoroughly cleanse surfaces to be painted to be free of grease and foreign matter.
2. Patch and sand holes prior to painting.
3. Machine-cut frisket masks as required, then tape, and mask windows, fire hose cabinets, fire extinguishers, and other hardware/items in painting area prior to painting.
4. Apply primer/sealer coats prior to finish coat.
5. Use spray method to apply specified finish coats. Primer and finish coats shall be cross-linking waterborne acrylic, self -sealing satin enamel paint, unless otherwise specified.

B. Provide pretreatment and finish processing as required for application of graphics to previously painted wall surfaces, including:

1. Remove existing signs prior to painting. If signs are to be reused, wrap and protect until re-installed.
2. Remove peeling/scaling paint, and patch and sand holes and imperfections prior to painting.
3. Machine-cut frisket masks as required for graphics, then tape and mask windows, fire hose cabinets, and fire extinguishers, prior to painting.
4. Apply a primer/sealer coat prior to finish coat, depending on condition of existing painted wall.
5. Apply minimum of 2 finish coats of specified colors using spray method. Primer and finish coats shall be cross-linking waterborne acrylic, self -sealing satin enamel paint, unless otherwise specified. There shall be no show-through or ghosting of previously painted surface.

2.13 COPY AND GRAPHICS APPLICATION

A. General Requirements: Provide Adobe Type I Postscript Font available from Adobe Systems for copy applications except as otherwise noted on Drawings. Typestyle indicated on Drawings is for information only. For production, provide software able to reproduce project graphics exactly.

1. Ensure that size and placement of copy comply with dimensions for letter height, line spacing, and placement as either noted on Drawings, in digital files, or final approved lettering patterns.
2. Ensure that baselines of copy are straight and parallel with top or bottom of sign structure unless otherwise noted.
3. Ensure that edges of letter forms and numerals are true and smooth with straight and curved sections representing specified Project typestyle exactly.
4. Letterforms, numerals and graphics shall be free of imperfections and distortions of straight lines or curves. Rounded letter forms shall extend slightly below normal baseline per respective typestyle characteristics.

B. Screen Printed Copy: Provide photo-mechanically produced screens for copy and characters from computer generated files. Print copy using fine mesh screens and screening inks.

1. Pre-treat surfaces by applying one protective coat of clear acrylic polyurethane.
2. Ensure that surface of letters are uniform in color, finish, and free of pinholes and imperfections.
3. Match sign message and background colors to approved color samples in every respect for consistency in chroma, value, and coverage.

4. Provide sign colors that maintain proper opacity or translucency and are free of blistering, bleeding, or fading. Color registration shall be crisp, sharp, and free of imperfection.
5. Ink colors to match colors as specified on drawings.

C. High Performance Graphics Film Applications: Provide machine cut film copy and characters from computer-generated files.

1. Pre-treat surfaces for High Performance graphic film application in accordance with manufacture's specifications and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter prior to application.
3. Spacing of copy shall be done according to approved samples utilizing pre-spacing application tapes.
4. Provide film type and color to match type and color specified on Drawings.

D. Masked and Painted copy and graphics Applications: Provide machine cut copy and character painting masks from computer-generated files.

1. Pre-treat surfaces for painting in accordance with paint manufactures specifications and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter.
3. Paint types for application conditions to be in accordance with paint manufacturer's specification and recommendations. Paint colors to match colors specified on Drawings.

E. Direct Digital Print Copy and Graphics Applications: Provide direct digital printing on specified substrate from computer generated files using flat bed four color ink jet printer.

1. Prepare surface for printing in accordance with printer manufactures specification and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter prior to application.
3. Ink types for application conditions to be in accordance with printer manufacture specifications and recommendations. Ink colors to match colors specified on Drawings.

F. Anti-Graffiti Coating applied to Finished Signs:

1. Apply anti-graffiti aerosol spray coating in accordance with coating manufacturer's written recommendations for each application.
2. Apply anti-graffiti protective film in accordance with film manufacturer's written recommendations for each application.

G. Anti-graffiti Coatings for sign Faces: Apply 3M Scotchcal Matte Overlaminate 3642 GPS anti-graffiti film to sign faces. Apply after copy has been applied per manufacturer's instructions.

H. Frisket masked and Painted:

1. Mask and paint process onto material substrates, including by not limited to:

    a. Painted aluminum.
    b. Painted acrylic or polycarbonate.
    c. Facility concrete wall or surfaces, or CMU walls.

2. Preparation: Comply with paint manufacturer's written recommendation for each substrate to be painted.
3. Protective Finish Coating

    a. Sprayed on clear coat; Select one of following Low VOC finish sheens as determined by Project Design Team on Project to Project basis:

        1) Matte.
        2) Satin.
        3) Gloss.

2.14 QUALITY CONTROL

A. Provide work-in-progress sign elements for review. Scheduled viewings at Shop or Factory may be initiated as deemed necessary to ensure continued quality control during fabrication.

    1. Correct unsatisfactory items as directed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs.

C. Verify that concrete sign footings are sacked, finished and chamfered, and without cracks or broken edges.

D. Verify that pre-installed anchors, if any, are correctly sized and located to accommodate signs.

E. Verify that dedicated electrical circuit is located to accommodate illuminated signs.

F. Locate pre-installed external sign lighting, if applicable, and verify clearance for sign installation.

G. Review documents and confirm conditions and dimensions indicated and identify number of units and locations of Project signage.

    1. Sign locations indicated on Drawings are for reference only. Exact locations shall be field verified with Owner's Representative prior to installation.
    2. Identify sign locations on site by numbered stake that includes sign type item number.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install exterior signage using installation methods indicated and in accordance with manufacturer's written instructions.

1. Signs shall be produced by authorized manufacturers and installed by Union sign companies where required. For State of California, work shall be completed by C-45 licensed installers.
2. Signs shall be installed only after securing proper permits and complying with local ordinances. Should a variance be required, installation shall be placed on hold until such time as proper authorization is granted.
3. Installation work shall be performed in accordance with OSHA standards (Occupational Safety and Health Administration). Equipment shall be operated in a safe manner, with safe clearances between work area and any nearby utility lines.
4. Coordinate underground excavation with local utility board prior to commencing earth removal.
5. Disposal of material shall be performed in accordance with prevailing environmental laws and governmental agencies.
6. Open excavations shall not be abandoned for any reason. If overnight completion is required, excavation shall be surrounded with reflective barricades clearly indicating construction zone.
7. Installation contractor shall not erect damaged signs or components. Shipping damage shall be reported to manufacturer and repair or replacement made prior to installation.
8. Installation work shall be performed in accordance with OSHPD standards, and certain facilities may require coordination and approval of OSHPD inspection.
9. Install signage level and plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
10. Install signs so they do not protrude or obstruct, in accordance with applicable accessibility standards.
11. Prior to installation, verify that sign components are clean and free of materials or debris that could impair installation.
12. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with heavy coat of bituminous paint.
13. Connect electrical signs to stubbed power source. Test lighting components after dark to ensure functionality.
14. Remove temporary protective coverings and strippable films as signs are installed.
15. Restore adjacent building surfaces damaged during exterior signage installation to original condition.

    a. Preserve sod and topsoil and replace after backfilling is completed

        1) Replace damaged sod with sod of quality equal to that removed.

    b. Where surface is disturbed in newly seeded area, restore surface to be reseeded with same quantity and formula seed as that used in original seeding.

3.3 ADJUSTING AND CLEANING

A. Adjust hardware and electrical equipment for proper operation.

B. Clean glass, frames, and other exterior signage surfaces in accordance with manufacturer's written instructions.

C. Remove damaged or deformed exterior signage and signage that does not comply with specified requirements. Replace with exterior signage complying with requirements.

D. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

E. Maintain exterior signage in clean condition during remainder of construction and protect from damage until acceptance by Owner.

F. Remove packing materials, cartons, and any trash from the Site at the end of each days work.

1. To maximum extent possible, recycle materials in accordance with requirements of USGBC and requirements and initiatives of agencies having jurisdiction.

3.4 MAINTENANCE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of signage Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, cleaning, and adjusting as required for proper signage operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance during normal working hours.
2. Perform emergency callback service during normal working hours with response time of two hours or less.
3. “Acts of God”, “Acts of nature”, or similar term shall be applicable to wind related effects only when recorded wind speeds at nearest official weather recording station exceed Basic Wind Speed for that location as defined by prevailing building code.

3.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Project Design Team's List of Incomplete Items (Punch List): Prepare and submit list of items requiring completion or correction, indicating value of each item on list and reasons for Work being incomplete.

3.6 EXTERIOR SIGNAGE SCHEDULE

GRAPHICS SCHEDULE DOCUMENT IS TO BE USED IN CONJUNCTION WITH OTHER COMPONENTS OF CONTRACT DOCUMENTS, CONSISTING OF SIGN LOCATION PLANS AND DESIGN DRAWINGS.

END OF SECTION 101402

SECTION 10 14 04
INTERIOR SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Provide Project interior signage including:

1. Sign Type 26: Directory.
2. Sign Type 27: Directional Signage.
3. Sign Type 40: Room Identification ADA.
4. Sign Type 41: Room Identification Changeable.
5. Sign Type 44: Restroom Identification ADA.
6. Sign Type 45: Restroom Identification Title 24.
7. Sign Type 46: Room Identification – Back of house.
8. Sign Type 50: Egress Identification & Directional.
9. Sign Type 52: Emergency Evacuation Plan.
10. Sign Type 70: Regulatory Restrictive.
11. Sign Type 70.1 Regulatory/Restrictive Signage.
12. Sign Type 71 Fire Equipment Sign
13. Sign Type 72: Informational Signage.

B. Related Requirements:

1. Section 101300 “Dynamic Digital Displays / LCD Displays.”
2. Section 101402 “Exterior Signage”.

1.3 REFERENCES

A. ADA/ADAAG/SAD – Standards for Accessible Design.

B. American Society for Testing and Materials (ASTM):

1. ASTM A 500/A 500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

C. California Public Safety Codes -Title 19.

D. California Title 24.

E. Green Seal Standard GS 11 “Paints and Coatings”.

F. International Building Code (IBC 2012), unless instructed to use or reference an earlier IBC dated code by the Project Architect.

G. National Fire Protection association (NFPA).

H. Office of Statewide Health Planning and Development (OSHPD) –Seismic and Life Safety Standards specific to California.

I. South Coast Air Quality Management District (SCAQMD):

1. Rule #1168 “Adhesive and Sealant Applications.

J. Underwriters Laboratories (UL):

1. UL Standards 48 - Signs.
2. UL Standard 1570 - Fixtures.

K. U.S. Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED).

1.4 COORDINATION

A. Furnish templates made from rigid material and provide tolerance information for placement of sign-anchorage devices to be embedded in permanent construction by other installers.

1. Clearly mark each template with a “Side A / Side B” reference, and include a directional marking to denote “North.”

1.5 ACTION SUBMITTALS

A. General: Except as otherwise indicated, comply with requirements of Section 013300 “Submittal Procedures”.

B. Product Data: For each type of product.

1. Include fabrication details, material descriptions, dimensions overall and dimensions of individual components.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include data for paint, coatings, and other finish materials as required to show compliance with specified requirements.

C. Material Data:

1. Submit material cost data for materials required to construct Work in place. Material cost shall reflect actual cost of material without added Contractor mark-up.
2. Provide manufacturer’s information/data sheet or letter from manufacturer indicating location of manufacture, amount of recycled content (post consumer and industrial percentage in product), and location of raw material harvest if within 500 miles of Project site.

3. If requested by Owner, submit manufacturer's Material Safety Data Sheet (MSDS) directly to Owner.

D. Shop Drawings: Provide one set of reproducible Shop Drawings in electronic Acrobat PDF format and as a paper print set, drawn to scale, detailing sign fabrication and installation. Provide DVD with electronic copy of Shop Drawings.

1. Include fabrication and installation details relating to attachments to other work.
2. Show sign mounting in plan and elevation; show supplementary supports and all accessories to be provided by others, clearly identified on the shop drawings.
3. Provide printed-paper copy layout of each sign type, not less than 1/2 size.
4. Schedule and describe sign anchorage assemblies and their related components.
5. Show location of inserts for anchors and supports, which are to be attached to structure or built into concrete or masonry, if any.
6. Support and Backing in Walls (new construction): Sign Contractor with the assistance of the General Contractor shall provide engineered sign supports anchored to the building's structure where required and to meet applicable sign code requirements. Installations requiring support or backing within the building wall construction shall be immediately relayed to the Architect of Record and Construction Manager's Representative for field coordination. Location plans and the dimensions on the design drawings to be utilized for placement of each sign type. Should any obstructions prohibit installing the signage in any given location, the General Contractor (GC) shall be notified immediately and the GC and Architect shall provide alternate locations as required.
7. Shop Drawings shall be new drawings prepared specifically for the Project.

    a. Re-submittal of issued Drawings with title block modifications is not acceptable.

8. Shop drawings may be submitted electronically, saved as a pdf file, for review and comment by the design team.

E. Engineering Drawings and Analysis: Sealed and signed by Professional Structural Engineer, responsible for preparation of engineering analysis who thereby certifies preparing or supervising preparation of data to comply with specified requirements and recognized engineering principles and practices. Engineering Drawings include, but are not limited to:

1. Plans, elevations, sections, and details for fabrication and installation of sign structures indicating sizes, dimensions profiles and arrangement and provisions for jointing, supporting, anchoring, and fastening.
2. Include details showing relationship with, attachment to, and reception of related Work (i.e. "Retrofit to Existing Structure").

    a. Indicate details of adjoining Work, even though not included in Work of this Section, to ensure coordination of Work and Work of other Sections.
    b. Reference Architect detail numbers where applicable.

F. Samples:

1. Paints and Coatings:

    a. Color Samples: Submit 2 samples of each color, sheen, and texture of paint finish on minimum 4 by 6 inch acrylic sheet to simulate the actual finish. Resubmit each sample as requested until required color, sheen, and texture are achieved.

b. Technical Specifications: Submit 2 copies of technical specifications of paint, coatings, and other finish materials.

2. Lettering Patterns: Submit 2 full-size lettering patterns of sign messages, symbols, or other graphic elements related to sign fabrication.
3. High Performance Graphic Film Copy: Submit 2 mounted, one-line samples of each size, color, typestyle, and font on pre-spaced tapes.
4. Screen Processed Copy: Submit 2 prints of film positives.
5. Hardware Samples: Submit 2 samples each of hardware such as hinges, locks, and fasteners that will be exposed to view.

G. Sign Prototype: Submit prototype to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

H. Samples:

1. Submit 1 prototype of each of the following:

a. Sign Type 27: One complete sign including copy application.
b. Sign Type 40: One complete sign including copy application.
c. Sign Type 41: One complete sign including copy application.
d. Sign Type 44: One complete sign including copy application.
e. Sign Type 52: One complete sign including copy application.
f. Sign Type 72: One complete sign including copy application.

2. Subsequent fabrication shall conform to accepted prototypes.
3. Approval of prototypes does not constitute approval of deviations from Contract Documents unless the Architect / Designer specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved prototypes may become part of completed Work if undisturbed at time of Substantial Completion.

I. Graphics Schedule: For interior signage, reference the same sign item numbers as indicated on Drawings.

J. Delegated-Design Submittal: For Interior signage indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional structural engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Manufacturer.

B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: To include in emergency, operations, and maintenance manuals.

B. Record Submittals (As-Builts): Prepare and submit final record drawings, specifications, and current status documents, saved in digital/pdf format for signs provided as Work of this Section.

1. Comply with requirements of Section 017839, except as otherwise indicated.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed, and that are packaged with protective covering for storage, and identified with labels describing contents.

1. Provide 6 extra interchangeable message panels.

1.9 QUALITY ASSURANCE

A. Sign Contractor Qualifications: Company regularly engaged in the manufacture of Interior signage similar to product specified for this Project, and which have been in satisfactory service for a minimum of 4 years.

1. Contractor shall demonstrate previous experience with Branding and Wayfinding signage programs Transportation Facilities.
2. Contractor shall provide examples of three Transportation Facilities projects / programs successfully completed over the past 5 years.
3. Contractor shall develop a fabrication and installation project schedule, and demonstrate the capability for creating a project database with customer / client accessibility, based upon receipt of Notice to Proceed, and outlining the durations for submittals, submittal reviews, fabrication, installation and Project completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Comply with Sign Contractor’s ordering instructions and lead-time requirements to avoid construction delays.

B. Submit detailed description of crating method and materials used for shipment of large scale, fabricated signs or letters to Project team for review and approval prior to actual crating and shipping. Secure finished signage components within crate and protect from shipping or weather related damage.

C. Deliver to jobsite in Sign Contractor’s original unopened and undamaged packaging with identification labels intact.

D. Store in lockable, clean, dry area protected from weather, temperature, and other harmful conditions in accordance with Sign Contractor’s written instructions.

E. Handle products in accordance with Sign Contractor’s written instructions.

1.11 FIELD CONDITIONS

A. Field Measurements:

1. Inspect existing conditions and verify dimensions related to fabrication and installation of Interior signage prior to production.
2. Verify locations of any anchorage devices and /or electrical service provisions specific to the signage installation, and any embedments made within permanent construction and executed by others. Recheck site /in-field conditions prior to the final graphics installations.

1.12 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in function, materials or workmanship within specified warranty period.

1. Failures include, but are not limited to following, as applicable to each sign type:

a. Deterioration of finishes beyond normal wear.
b. Deterioration of embedded graphic image.
c. Separation or de-lamination of sheet materials and components.
d. Mounting failure.
e. Structural failure.

2. Warranty Period: One Year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into Work include, but are not limited to:

1. 3M.
2. AKZO Nobel.
3. APCO graphics, Inc.
4. Arlon Graphics, LLC.
5. ASI Sign Systems, Inc.
6. Matthews Paint Co.
7. Philips /ColorKinetics.
8. PPG.
9. Sign Comp.
10. Sign Systems.

2.2 FABRICATORS

A. Fabricators: Subject to compliance with requirements, available fabricators approved for fabricating signage components and assemblies specified in this Section include, but are not limited to:

1. AD/S Design & Signs.
2. CNP / California Neon Products.
3. CREO Industrial Arts.
4. Fabrication Arts.
5. Icon Identity Solutions.
6. Jon Richards Company.
7. Sign Designers.
8. T Graphics
9. Windsor Displays.

2.3 PERFORMANCE REQUIREMENTS

A. Design Rights: Sign Contractor is hereby granted limited right to designs as indicated on Design Drawings and specified in this Section for sole purpose of completing contractual obligations to fabricate and install Project signage. Sign Contractor may not manufacture, reproduce, or exhibit designs or modify designs for any other purpose without prior written consent.

B. Substitutions: No substitutions to fabrication process or material selections allowed unless approved by Architect / Designer in writing prior to fabrication.

C. Sign Contractor's Responsibilities:

1. Provide labor, materials, and products required to fabricate and install Interior signage and graphic items detailed, noted, or specified in Contract Documents.
2. Identify Signage permit costs, obtain the required permit/s, and cover all costs associated to said permits, including plan checks submittals, processing fees and all applicable taxes.
3. Provide engineering design as required for approvals and permits.
4. Provide typographic copy layouts, and other finished artwork, unless otherwise specified.
5. Provide for Union Labor (where required) for installation of finished signage.
6. Provide sufficient support and coordination throughout the following phases:

    a. Submittal of shop drawings.
    b. On-site field surveys.
    c. Sign prototypes.
    d. Sign fabrication.
    e. In-shop design milestone reviews.
    f. RFI process.
    g. Coordination of shipping/delivery of finished signage to job site.
    h. Final installation.
    i. Participation in final punch-list walk.
    j. Correction of any identified deficiencies noted by project Design team and/or Client.

D. Delegated Design:

1. Engage a qualified professional structural engineer as defined in this Section to design sign structure and anchorage.

a. Provide complete engineering drawings and calculations sealed and signed by responsible engineer.
b. Provide engineering design as required for approvals and permits.

E. Accessibility Standard: Comply with applicable provisions in U.S. Architectural & Transportation Barriers Compliance Board's ADA/ADAAG Accessibility Guidelines for Buildings and Facilities, SAD (Standards for Accessible Design), and ICC A117.1 for signs.

2.4 MATERIALS

A. Acrylic Polyurethane Paint:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. AKZO Nobel.
b. Matthews Paint Co.
c. PPG.

2. General: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
3. Paint systems / products must be either Ultra Low VOC or Low VOC compliant.

B. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

1. Manufacturers: Subject to compliance with requirements, manufacture's offering products that may be incorporated in the Work include, but are not limited to:

a. Evonite Cyro, LLC: Acrylite.
b. Rohm and Haas: Plexiglas.

C. Adhesives:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Dow Corning.
b. General Electric.
c. Lord Adhesive.

D. Aluminum Extrusions: ASTM B 221, alloy and temper indicated.

1. Provide alloy 6063 T-6 for anodized finishes and alloy 6061 T-6, mill finish, for painted finishes.
2. Where alloy and temper are not indicated, provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
3. Anodizing and Plating: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work to include, but are not limited to:

a. Danco

b. LNL Anodizing
c. Highland Plating

E. Digital High Pressure Laminates:

1. Basis of Design Product: Subject to compliance with requirements, provide digital high pressure laminated graphic panels as manufactured by IZONE or product by one of following, meeting or exceeding performance requirements of Basis of Design Product:

a. Fossil Industries Inc.

F. High Performance Graphic Film:

1. Basis of Design Product: Subject to compliance with requirements, provide Scotchcal and Scotchlite Film/Sheeting as manufactured by 3M or product by the following, meeting or exceeding performance requirements of Basis of Design product:

a. Arlon Graphics, LLC.

2. General: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back or face, as required for first or second surface installations; machine / computer cut to form characters or images as indicated and suitable for Interior applications.

G. Interior Digital Color Prints:

1. Manufacturers: Subject to compliance with requirements (Piezo ink jet printed and / or a Mimaki UV Digital Printer, with an acceptable overlaminate or applied second surface, and a Design life of 3-5 years), manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Color Edge.
b. Lithographix.
c. Rembrandt.
d. Supercolor Digital.

H. Screen Printing Ink: Subject to compliance with requirements, provide product by one of following manufacturers or equal product, meeting or exceeding performance requirements of a named manufacturer:

1. Nazdar Inks.
2. Or approved equal.

I. Very High Bond Foam and Transfer Tape:

1. Basis of Design Product: Subject to compliance with requirements, provide VHB Acrylic Foam Tape, and VHB Isotac Tape as manufactured by 3M.

2.5 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, non-corrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated on accepted Shop Drawings for fasteners/anchors to be exposed.
2. Furnish stainless steel devices unless otherwise indicated.
3. Furnish stainless steel masonry inserts embedment into concrete or masonry work.
4. Furnish stainless steel j-bolts for embedment in concrete or masonry work / footings.
5. Furnish stainless steel All Thread to be secured with epoxy adhesive into concrete or masonry work / footings.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C1107M. Provide grout specifically recommended by manufacturer for Interior applications

C. Silicone Adhesive:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work to include, but are not limited to:

a. Dow.
b. General Electric.
c. C.R. Lawrence.

D. Structural Adhesive:

1. Basis of Design Product: Provide Versilok two-component epoxy-modified acrylic adhesive, with beads, as manufactured by Lord Corporation recommended by adhesive manufacturer for each application or, subject to compliance with requirements, comparable product by one of following:

a. Akzo Nobel; Liquid Nails Construction Adhesive.
b. Henkel Loctite Corporation; Locktite Construction Adhesive.

2.6 FABRICATION

A. General: Manufacturer shall provide labor, materials, tools, fixtures, jigs, equipment and facilities necessary for production of Work required by Contract Documents.

1. Preassemble signs in shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in locations concealed from view after final assembly.
2. Mill joints to tight, hairline fit.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
4. Conceal fasteners and anchors unless indicated as exposed; locate exposed fasteners where they will be inconspicuous.
5. Internally brace signs for stability and for securing fasteners.

6. Form panels to required size and shape as indicated on Drawings. Comply with requirements for design, dimensions, finish, color, and details of construction.
7. Obtain identification labels, which shall conform to Underwriters Laboratories requirements.
8. Locate markings, labels, and manufacturer names and other identifications so as to be concealed from public view and as acceptable to Owner's Representative.
9. Provide wet stamped engineering calculations.
10. On new sign products of duplicate design and fabrication, vendor shall assume interchangeability of components, regardless of manufacturing origins.
11. For sign cabinets mounted to walls and other vertical surfaces, or to other horizontal surfaces, use zinc or steel anchoring hardware.
12. Provide stainless steel aircraft cable and zinc plated mounting hardware and fittings for hanging or suspending signage or graphics components.

B. Very High Bond Tape (VHB):

1. Provide type of VHB recommended in writing by tape manufacturer for each tape application.
2. Apply tape in accordance with tape manufacturers written instructions for each tape application.

    a. Pretreat surfaces prior to application of tape, removing oil and foreign matter and lightly sand bonding surfaces prior to tape application.
    b. Prior to removal of carrier tape, burnish tape to first applied surface to activate adhesive properties.
    c. Reburnish bond areas and clamp elements together for time specified by tape manufacturer.

C. Acrylic Panels: Finish exposed edges of panels smooth with polished or painted finish as noted on Drawings. All edges to be eased and exposed lamination seams shall not be permitted.

D. ADA / ADAAG / SAD Code Compliant Signs:
1. Tactile Sign: Sign face shall have applied Laser cut surface painted raised copy and transparent Grade 2 translation (Raster bead) Braille, bonded into holes engraved into sign face after painting.
2. Edges shall be flush, eased and finished.
3. Spray paint panel face, background and edges.

E. California / Title 24 Compliant Restroom Signs:

1. Provide painted acrylic equilateral triangle panel with eased edges for attachment to Men's Restroom door.
2. Provide painted acrylic circular disk panel with eased edges for attachment to Women's Restroom door.
3. Provide painted acrylic equilateral triangle panel with eased edges and direct digital print male and female symbols bonded over painted acrylic circular disk panel with eased edges for attachment to Unisex Restroom door.

F. Regulatory Signs:

1. Provide acrylic panel with eased edges and 1/8” radiused corners and with screen printed copy.

2.7 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying temporary protective covering before shipping

B. Appearance of Finished Work / “Fabrication”: Noticeable variations within the same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

C. Appearance of Finished Work / “Paint”: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

2.8 PAINT FINISH

A. Performance Requirements: Five years acceptable performance is required of approved paints systems. Acceptable performance is defined as follows:

1. Will not crack, check, or peel (lose adhesion) except when cracking or crazing is a result of metal fracture.
2. Will not fade or change in color when exposed painted surfaces (which have been cleaned of external deposits and chalk), are measured by a spectro-photometer or color meter. It is understood that fading or color change may not be uniform if the surfaces are not equally exposed.

    a. Process requirements - All surfaces shall be degreased, cleaned, and rinsed well. Drying the substrate may be necessary to prevent white rust. Remove any mill scale by sandblasting if necessary.
    b. Scuff metal surfaces and make ready for self-etching primer. Apply wash/filled primer, in multiple passes, yielding a minimum of .5 mil dry film thickness.
    c. Apply Low VOC paint finish , following the manufactures recommendations for mixing and application.
    d. Follow with a sprayed on, Ultra Low VOC protective clear coat/anti graffiti finish, adhering to the manufacturers recommendations for mixing and application. Final applied clear coat finish shall be Satin Clear.

B. Perform crosshatch adhesion test on painted parts as prescribed by ASTM D3359-93 “Standard Test Methods for Measuring Adhesion by Tape Test”.

2.9 WALL GRAPHICS

A. Provide pre-treatment and finish processing as required for application of wall graphics to unpainted wall surfaces including:

1. Thoroughly cleanse surfaces to be painted to be free of grease and foreign matter.

2. Patch and sand holes in wall prior to painting. Note: for any large cracks or voids present, these surface defects are to be filled and refinished by Others.
3. Machine-cut frisket masks as required, and then tape and mask all windows, fire hose cabinets, fire extinguishers, and any other hardware/items in painting area prior to painting.
4. Apply primer/sealer paint coats prior to the finish coat.
5. Use spray method to apply specified finish coats. Primer and finish coats shall be cross-linking waterborne acrylic, self -sealing satin enamel paint, unless otherwise specified.

B. Provide pretreatment and finish processing as required for the application of graphics to previously painted wall surfaces, including:

1. Remove all existing signs prior to painting. If signs are to be reused, wrap and protect until re-installed.
2. Remove all peeling/scaling paint, and patch and sand all holes and imperfections prior to painting.
3. Machine-cut frisket masks as required for all graphics, and tape and mask all windows, fire hose cabinets, fire extinguishers, etc. prior to painting.
4. Apply a Primer/sealer coat prior to the finish coat, depending on the condition of existing painted wall.
5. Apply minimum of 2 finish coats of specified colors using spray method. Primer and finish coats shall be cross-linking waterborne acrylic, self -sealing satin enamel paint, unless otherwise specified. There shall be no show-through or ghosting of previously painted surface.

2.10 COPY AND GRAPHICS APPLICATION

A. General Requirements: Provide Adobe Type I Postscript Font available from Adobe Systems for copy applications except as otherwise noted on Drawings. Typestyle indicated on Drawings is for information only. For production, provide software able to reproduce project graphics exactly.

1. Ensure that size and placement of copy comply with dimensions for letter height, line spacing, and placement as either noted on Drawings, in digital files, or final approved lettering patterns.
2. Ensure that baselines of copy are straight and parallel with top or bottom of sign structure unless otherwise noted.
3. Ensure that edges of letterforms and numerals are true and smooth with straight and curved sections representing the specified Project typestyle exactly.
4. Letterforms, numerals and graphics shall be free of imperfections and distortions of straight lines or curves. Rounded letter forms shall extend slightly below normal baseline per respective typestyle characteristics.

B. Screen Printed Copy: Provide photo-mechanically produced screens for copy and characters from computer generated files. Print copy using fine mesh screens and screening inks.

1. Pre-treat surfaces by applying one protective coat of clear acrylic polyurethane.
2. Ensure that surface of letters are uniform in color, finish, and free of pinholes and imperfections.
3. Match sign message and background colors to approved color samples in every respect for consistency in chroma, value, and coverage.

4. Provide sign colors that maintain proper opacity or translucency and are free of blistering, bleeding, or fading. Color registration shall be crisp, sharp, and free of imperfection.
5. Ink colors to match colors as specified on drawings.

C. High Performance Graphics Film Applications: Provide machine cut film copy and characters from computer-generated files.

1. Pre-treat surfaces for High Performance graphic film application in accordance with manufacturer's specifications and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter prior to application.
3. Spacing of copy shall be done according to approved samples utilizing pre-spacing application tapes.
4. Provide film type and color to match type and color as specified on Drawings.

D. Masked and Painted Copy and Graphics Applications: Provide machine cut copy and character painting masks from computer-generated files.

1. Pre-treat surfaces for painting in accordance with paint manufactures specifications and recommendations.
2. Surfaces shall be perfectly smooth and free of dust, grease, wax, or other foreign matter.
3. Paint types for application conditions to be in accordance with paint manufacturer'os specification and recommendations. Paint colors to match colors as specified on Drawings.

E. Frisket masked and Painted:

1. Mask and paint process onto material substrates, not limited to:

a. Painted aluminum.
b. Painted acrylic or polycarbonate.
c. Onto facility concrete or CMU wall surfaces.

2. Preparation: Comply with paint manufacturer's written recommendation for each substrate to be painted.

3. Protective Finish Coating:

a. Sprayed on clear coat; Select one of the following Low VOC finish sheens as determined by the Project Design Team, and on a per Project basis:

1) Satin.

2.11 QUALITY CONTROL

A. Provide work-in-progress sign elements for review. Scheduled viewings at Shop or Factory may be initiated as deemed necessary to ensure continued quality control during fabrication.

1. Correct unsatisfactory items as directed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs.

C. Verify that pre-installed anchors, if any, are correctly sized and located to accommodate signs.

D. Verify existence of dedicated electrical circuit and location for support of illuminated signs.

E. Locate pre-installed external sign lighting if applicable, and verify clearance for sign installation.

F. Review documents and confirm conditions and dimensions indicated and identify number of units and locations of Project signage.

1. Sign locations indicated on Drawings are for reference only. Exact locations shall be field verified with Owner's Representative prior to installation.
2. Identify sign locations / placement on site using blue 3M painters tape strips applied to the actual signage locations, and which incorporates the sign type item number.

G. Proceed with installation only after any unsatisfactory field conditions have been corrected.

3.2 INSTALLATION

A. General: Install Interior signage using installation methods indicated and in accordance with the manufacturer's written instructions.

1. Signs shall be produced by authorized manufacturers and installed by Union sign companies where required. For the State of California, work shall be completed by C-45 licensed installers.
2. Signs shall be installed only after securing proper permits and complying with local ordinances. Should a variance be required, installation shall be placed on hold until such time as proper authorization is granted.
3. Installation work shall be performed in accordance with OSHA standards (Occupational Safety and Health Administration). Equipment shall be operated in a safe manner, with safe clearances between the work area and any surrounding objects or structures.
4. Disposal of material shall be performed in accordance with prevailing environmental laws and governmental agencies.
5. Installation contractor shall not erect damaged signs or components. Shipping damage shall be reported to manufacturer and repair or replacement made prior to installation.
6. Installation work shall also be performed to be in compliance with OSHPD standards, and certain facilities may require additional coordination and approval, including an OSHPD inspection.

7. Install signage level and plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
8. Install signs so they do not protrude or obstruct, in accordance with applicable accessibility standards.
9. Prior to installation, verify that sign components are clean and free of materials or debris that could impair installation.
10. Remove temporary protective coverings and films as signs are installed.
11. Installers to be knowledgeable regarding current Signage Code Requirements.

3.3 ADJUSTING AND CLEANING

A. Adjust hardware and electrical equipment for proper operation.

B. Clean glass, frames, and other signage surfaces in accordance with manufacturer's written instructions.

C. Remove damaged or deformed signage, or any signage that does not comply with specified requirements. Replace with signage complying with requirements.

D. Replace signs having damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

E. Maintain Interior signage in clean condition during remainder of construction and protect from damage until acceptance by Owner.

F. Remove packing materials, cartons, and any trash from Site at end of each workday.

1. To maximum extent possible, recycle materials in accordance with requirements of USGBC and the requirements and initiatives of agencies having jurisdiction.

3.4 MAINTENANCE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of signage Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, cleaning, and adjusting as required for proper signage operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance during normal working hours.
2. Perform emergency callback service during normal working hours with response time of two hours or less.

3.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Project Design Team's List of Incomplete Items (Punch List): Prepare and submit a list of items to be completed and corrected, indicating the value of each item on the list and reasons why the Work is incomplete.

3.6 INTERIOR SIGNAGE SCHEDULE

GRAPHICS SCHEDULE DOCUMENT IS TO BE USED IN CONJUNCTION WITH OTHER COMPONENTS OF CONTRACT DOCUMENTS, CONSISTING OF SIGN LOCATION PLANS AND DESIGN DRAWINGS.

END OF SECTION 101404

SECTION 11 5200
AUDIO VISUAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies:

1. Training Room and Conference Room Audio Visual Systems.

2. Paging Systems.

3. Television Systems.

B. Related Sections:

1. Division 26 for electrical requirements.

2. Section 28 0000, Security Systems General Requirements.

1.2 SCOPE OF WORK

A. Furnish, install, place into operation, adjust, test, document and warrant as described, hereinafter "provide", the following, including all wire, cable, equipment, equipment racks, assemblies and devices:

1. Training Room and Conference Room Audio Visual Systems.

2. Paging Systems.

3. Television Systems.

B. Any Accepted Required Alternate Bids and Optional Alternate Bids.

C. The power feed, ground feed, conduit and raceway systems will be provided for all circuits as part of the Electrical work.

D. The Video Projectors will be furnished by the City for installation under this scope of work.

E. The Flat Panel Video Displays at the Conference room will be provided and installed by the City, including brackets. Provide rough-in, power, cabling and support blocking.

F. Verify all dimensions at the site.

G. Coordinate the work with all other trades.

H. Provide the Submittals as described herein.

I. Provide all items not indicated on the Drawings or mentioned in the Specifications that are necessary, required or appropriate for this work to realize complete, stable and safe operation.

J. Provide the following operator training sessions:

1. Concurrent with acceptance testing provide a training session for the system operator and maintenance staff. Provide written, step by step instructions to operate all systems a minimum of two weeks prior to the training session.

2. Concurrent with review of corrective work required for acceptance or (in the case that no corrective work is required) 30 days after acceptance testing, provide a follow up training session for the system operator and maintenance staff.

K. Provide a Warranty for all systems, equipment and workmanship for a period of one year from the date of Substantial completion including the following services:

1. Perform examinations every 90 days by trained personnel including all necessary measurements, adjustment, lubrication, and parts replacement to keep the equipment in efficient and proper operation.

2. Perform all warranty work, except emergency repairs, during regular working hours of regular working days.

3. Provide a service representative at the project site within 24 hours of request. Provide all necessary work to realize a safe, stable operational system within 36 hours of a notice of request, including but not limited to providing portable systems to maintain the operational requirements as defined herein and as indicated on the Drawings to the extent required by the City.

4. Perform emergency repairs when an item or component malfunctions during use on an immediate basis.

5. Warranty work shall not be subcontracted or assigned unless the City has approved such assignment in writing.

L. Provide a Renewable Annual Maintenance Agreement Proposal for the work.

1.3 RELATED WORK BY OTHER SECTIONS

A. Conduit and Boxes.

B. Cable Tray.

C. Raceway systems.

D. Electrical Power Distribution.

E. Lighting Systems and Equipment

F. Miscellaneous Metal.

G. Finish Work.

H. Heating Ventilation and Air Conditioning.

I. Fire Protection Systems.

1.4 REFERENCE STANDARDS

A. Perform the work in accordance with the latest revisions al all applicable standards and specifications including but not limited to the following:

1. National Electrical Code.

2. Uniform Building Code.

3. Applicable local Building Codes and Ordinances.

4. Society of Motion Picture and Television Engineers (SMPTE).

5. National Association of Broadcasters (NAB).

6. Underwriters Laboratories (UL).

7. Institute of High Fidelity (IHF).

8. Electrical Industries Association (EIA).

9. National Television Standards Committee (NTSC).

1.5 BIDDER QUALIFICATION

A. This work shall be provided by an audio systems contractor having at least five years direct experience with devices, equipment, and systems of the type and scope specified herein, maintaining a fully staffed and equipped maintenance and repair facility within 250 miles of the job site.

B. Supervisors shall have at least five years direct experience in similar work and shall carry CTS certification as a minimum.

C. Installation, adjustment, and testing personnel shall have at least three years direct experience in similar work.

D. Control system Programmers are to be Crestron Certified for systems of this type.

1.6 BIDS

A. Submit a statement of qualifications for the work including verification of the above as well as references for the projects submitted including the representatives of the City, Architect, Designer, as well the current Operator.

B. Submit "Base Bids" based on the material, components, devices, equipment, and practices specified herein and indicated on the Drawings. Submit individual prices for the following items to be included in the Base Bid Work:

1. Training Room and Conference Room Audio Visual Systems. $_____

2. Paging Systems. $_____

3. Television Systems. $_____

C. Submit the following Required Alternate Bids:

1. Alternate bid to add Conference Room digital Media Receptacles and Control. $_____

2. Alternate Bids as may be defined on the Drawings or described elsewhere herein.

3. Optional "Alternate Bids" may be submitted at this contractors discretion and if submitted shall be consistent with the components, devices, equipment, concepts, and practices specified herein, and indicated on the Drawings. Optional alternate bids will not be considered unless accompanied by a base bid as described herein. "Optional Alternate Bids" shall include:

a. A comprehensive statement of modifications or changes proposed and the associated cost or savings.

b. A comprehensive statement of the impact to operational procedures, warranty and dependability.

c. A statement enumerating the benefits which would accrue if the alternate bid is accepted.

d. A complete list of changes or modifications of related work which could be required if the alternate is accepted.

e. Complete specifications and characteristics of the proposed materials and methods to be used in lieu of those specified.

D. Submit a renewable annual maintenance agreement proposal, for the servicing and adjustment of this work, as part of the Bid Submittal, including the following services:

1. Perform examinations every 90 days by trained personnel including all necessary measurements, adjustment, lubrication, and parts replacement to keep the equipment in efficient and proper operation.

2. Perform all maintenance work, except emergency repairs, during regular working hours of regular working days. Perform emergency repairs when an item or component malfunctions during use and advised that emergency repair is needed. Provide repair work under emergency conditions during this period on an immediate basis in accordance with the hourly rate schedule defined in the agreement with the non-emergency repair work performed as part of the Maintenance Agreement within two business days. Maintenance work shall not be subcontracted or assigned unless the City has approved such assignment in writing.

3. Provide the hourly labor rates for emergency or extraordinary repair work to be conducted under the renewable annual maintenance agreement as part of the Bid Proposal.

1.7 SUBMITTALS

A. Comply with the requirements of Section 01 3323 and additional requirements herein.

B. General:

1. All Drawings shall be of a sheet size consistent with the Bid Documents.

2. Submittals must be explicitly identified as such including the type of submittal it represents and be complete in the materials for that submittal stage.

3. Refer to Specification Section 01 3323 regarding additional requirements for submittals.

C. Notwithstanding requirements elsewhere submit the following:

1. Shop Drawing Submittal: Within ninety days of award of contract, prior to ordering equipment or installation of same, submit the following:

a. Shop Drawings.

b. Material list included in the following. Provide dividers and a table of contents for all 8-1/2"x 11" information:

c. A complete Bill of Quantities and catalog data manual, including all materials, components, devices, and equipment required for this work. Include the following information for each item listed:

1) Quantity.

2) Description.

3) Manufacturer's name and model number

4) Manufacturer's specification sheet with complete technical, dimensional and finish information.

d. Single line diagrams for each system, indicating all equipment, devices, cable and connections, completely identified by location, generic type, manufacturer and model number, including cable types as well as specific input and output terminations.

1) Details of all contractor fabricated assemblies with complete dimensional assembly and finish information.

2) Floor plans and reflected ceiling plans with complete system conduit drawings, indicating all equipment, devices, cable, conduit and boxes, completely identified by generic type or size, and mounting elevation. These drawings are to be tendered after review of all related site work as well as the requirements of this work.

3) Complete, scaled (1" = 1'-0", minimum) front and rear rack elevation drawings, including equipment designation, manufacturer's name, model number, rack or enclosure location and designation as well as, complete rack wiring diagrams indicating harnessing for segregation of signal level.

D. Pre Acceptance Submittal:

1. A minimum of one week prior to acceptance testing (not less than one month from substantial completion of The Work), provide one copy of each of the following for use and annotation during acceptance procedures:

a. One print and one reproducible of each Drawing, as previously described.

b. Instruction Manual: Provide copies of all brochures, manuals, and service instructions, published by the manufacturers of the components, devices and equipment provided, with labeled dividers. Where manual or service instructions are not available, provide the catalog information as described or the Shop Drawing Submittal. Provide complete lay level operating instructions for all systems including regular maintenance instructions as well as contact information for assistance and warranty service.

c. Performance, Test and Adjustment Data Manuals: Comprehensive documentation of all performance verification and correction procedures and measurements, with labeled dividers.

d. A Bill of Quantities.

e. Two copies of each different key required for the operation of all cabinet, door, drawer, switch, and other locks furnished as part of this work, as scheduled in the Shop Drawing Submittal, and a copy of the completed key schedule.

f. All certificates of acceptance, operation and/or compliance, as required by local regulations and laws.

E. Contract Close Out Documentation, Operation and Maintenance Data and Record Drawings: Submit the following documentation developed from the final "as-built" systems after any correction during acceptance testing prior to and as a requirement of Acceptance of this work:

1. Comply with the requirements in Sections 01 7700, 01 7823, and 01 7839 and additional requirements herein.

2. Record Drawings.

3. Instruction Manuals: Provide copies of all brochures, manuals, and service instructions published by the manufacturers of the components, devices and equipment provided, with labeled dividers. Provide complete lay level operating instructions for all systems including regular maintenance instructions as well as contact information for assistance and warranty service.

4. Performance, Test and Adjustment Data Manuals: Comprehensive documentation of all performance verification and correction procedures and measurements, with labeled dividers.

5. Bill of Quantities Manuals.

6. Copies of each different key required for the operation of all cabinet, door, drawer, switch, and other locks furnished as part of this work, as scheduled in the Field and Shop Drawing submittal, and the completed key schedule.

7. All certificates of acceptance, operation and/or compliance, as required.

PART 2 - PRODUCTS

2.1 GENERAL

A. Material and equipment specified herein have been selected on the basis of acceptable quality and performance and have been coordinated to function as components of the included

systems. Where a particulate material, device, equipment or system is specified directly, the current manufacturer's specification for same is a part of these specifications, as if completely elaborated herein.

B. All materials specified herein shall be new and shall be the manufacturer's latest design, permanently labeled with the manufacturer's name, model number, and serial number.

C. All active circuitry shall be solid state and shall be rated for continuous use.

D. Similar devices shall be of the same manufacturer.

E. All electronic equipment indicated within equipment racks shall be designed for 19-inch rack mounting or be provided with rack mount provisions unless otherwise noted.

F. Coordinate all control and receptacle panels with the Architect such that their general appearance is similar to devices provided by other disciplines.

G. Provide the equipment racks as indicated on the Drawings.

H. Do not provide engraving, labels, decals or other identification on any device, equipment or miscellaneous component without review of such provisions as indicated on the associated Field or Shop Drawing.

I. All steel shall be treated with zinc phosphate and finish painted with baked enamel or painted with a thermosetting epoxy paint. All finish colors shall be as directed by the City excepting pre-finished, manufactured panels and equipment.

J. Provide intelligible, permanent, engraved identification on or adjacent to all controls; fuses and/or circuit breakers; patching jacks; connectors; receptacles; terminal blocks; meters; indicators; switches; equipment; etc. The identification shall be directly engraved on all Contractor-fabricated equipment and devices, clearly indicate the function of the item and be numbered or lettered to correspond with the function, circuit and/or locations, consistent with the Field and Shop Drawings. Identification of fuses and circuit breakers on Contractor-fabricated equipment shall also indicate:

   1. Protected circuitry.

   2. Rating of protective device.

   3. Voltage across open circuited protected device.

K. All devices connected to the protected electrical system and all auxiliary equipment necessary for the operation of the equipment associated with systems specified herein shall be designed to operate from 105 to 130 volt, 60 Hertz, alternating current service, with stable performance, fully in accordance with these specifications, and shall have integral fuse or circuit breaker protection.

L. Contractor-fabricated items shall be provided with fuses of the clear glass cartridge type.

M. Protection devices shall be located to facilitate replacement, resetting, or observation of status without de-mounting the associated unit and/or de-energizing adjacent equipment.

N. All circuit components shall be operated in accordance with recommendations of the component manufacturer and shall contain sufficient permanent identification to facilitate replacement.

O. Provide cooling devices and adequate ventilation for equipment to operate within the manufacturers recommended temperature range within the ambient temperature of the equipment space.

2.2 CITY FURNISHED EQUIPMENT

A. For equipment that will be Owner Furnished Contractor Installed (OFCI) and Owner Furnished Owner Installed (OFOI) comply with the requirements of Section 01 6400.

2.3 CABLE TERMINATION DEVICES:

A. Screw-Type Barrier Blocks (Loudspeaker and control circuits): TRW-Cinch, 140, 141 and 142 Series; Kulka 601 Series; Beau 7100 Series.

B. Microphone and Line level Receptacles: Switchcraft Model D3F.

2.4 EQUIPMENT RACKS AND ACCESSORIES:

A. Equipment Racks:

1. General: Equipment racks in the East Building Data Center Room 170 shall be provided by the City. Coordinate with the City IT Department for installation of equipment in the Data Center racks.

2. Provide as described herein with all accessories and devices indicated herein and on the Drawings, including drawer assemblies, shelves, isolated power and ground provisions, etc.

3. Provide seismically rated equipment rack. Provide restraint provisions as recommended by manufacturer.

4. Provide a slide out or fixed equipment rack as indicated on the Drawings.

5. Acceptable Model for Slide out Conditions:

a. Middle Atlantic Products Model MRK-4426AXS-Z4 with service tracks, service stands, cable carriers as required to accommodate the construction at the location indicated and provide a seismically rated installation.

6. Acceptable Model for Fixed, Floor Mount Conditions:

a. Middle Atlantic Products Model WRK-37SA-27 with all accessories and devices to accommodate the construction at the location indicated and provide a seismically rated installation.

B. Equipment Rack Shelf Assemblies: Atlas SH19 Series; H.O.M.E. CS Series; Stantron WD1900 Series, BGW, Middle Atlantic Products.

C. Equipment Rack Sliding Drawer Assembly: Atlas SD Series (Black); H.O.M.E. DSD, SD Series, BGW, Middle Atlantic Products.

D. Blank Panels: Atlas A19 Series; H.O.M.E. ARP, PMF Series, BGW, Middle Atlantic Products.

E. Vent Panels: Atlas, SVP Series; H.O.M.E. PRP, FPFP Series, BGW, Middle Atlantic Products.

F. Equipment Rack Outlet Strips: SGL Waber, Model 4610; Wiremold 2000 Series; Stantron PM 4000 Series Atlas, Middle Atlantic Products.

2.5 CABLE

A. Acceptable products:

1. Loudspeaker Circuits at Paging Systems: Shielded, 16 AWG twisted pair with overall jacket by:

a. Belden.

b. West Penn.

2. Loudspeaker Circuits at all other areas except Paging Systems: 16 AWG twisted pair with overall jacket by:

a. Belden.

b. West Penn.

3. Microphone Line Level Circuits 20 AWG minimum, twisted shielded pair:

a. Belden.

b. West Penn.

4. Line Level Circuits 20 AWG minimum, twisted shielded pair:

a. Belden.

b. West Penn.

5. Control Circuits, Data circuits for AV use and Digital Media Circuits:

a. Crestron DM8G+ digital media twisted pair cable as recommended by control manufacturer.

6. VGA and RGBS Video Circuits:

a. Matched length composed of Belden 8281 or West Penn P806.

b. Extron SHR-4.

7. Television Circuits:

a. Interior spaces: West Penn 25Q841.

b. Exterior spaces: By Service Provider to the point of demarcation.

B. Where multiple shielded pair cables are utilized provide flexible protective insulation for each shielded pair to final destination.

2.6 POWER AMPLIFIERS

A. General: The power amplifier must deliver the rated output to the voice coil throughout the band pass specified and must be stable at the amplifiers rated power level throughout the impedance range exhibited by the connected load.

B. Acceptable Product: QSC model CX302V or equivalent by alternate manufacturers.

C. Alternate Manufacturers:

1. Ashly
2. BGW.
3. Crown.
4. Crest.
5. Crestron.
6. Yamaha.

2.7 BUFFER AMPLIFIERS AND DISTRIBUTION AMPLIFIERS

A. General:

1. Provide transformer balanced outputs.
2. Provide a device capable of delivering 1 volt into a 60 ohm load.

B. Acceptable Manufacturers:

1. BGW.
2. Oxmoor.
3. Shure.
4. Radio Design Labs.
5. ATI.

2.8 TYPE SA LOUDSPEAKER ASSEMBLY

A. General: The assembly shall include a loudspeaker unit, fiber blanketed enclosure, baffle, transformer and grille and include all adapters, safety cables and accessories to accommodate the ceiling construction at the indicated location.

B. Paint as directed by Architect.

C. Provide seismic bracing and support independently from ceiling systems.

D. Include cutting of ceiling tile, mounting of device, installation of cabling and cabling support devices.

E. Acceptable Units:

1. Atlas Model FAP40T.

2.9 TYPE SB LOUDSPEAKER ASSEMBLY

A. General: The assembly shall include a loudspeaker unit, fiber blanketed enclosure, baffle, transformer and grille and include all adapters, safety cables and accessories to accommodate the ceiling construction at the indicated location.

B. Paint as directed by Architect.

C. Provide seismic bracing and support independently from ceiling systems.

D. Include cutting of ceiling tile, mounting of device, installation of cabling and cabling support devices.

E. Acceptable Units:

1. JBL Model Control 26CT with enclosure.

2. Tannoy CMS603 DC, with enclosure.

2.10 TYPE SC LOUDSPEAKER ASSEMBLY

A. General: The assembly shall be weather resistant, include a loudspeaker unit, fiber blanketed enclosure, baffle, transformer and grille and include all adapters, safety cables and accessories to accommodate the construction at the indicated location.

B. Paint as directed by Architect.

C. Provide seismic bracing and support independently from ceiling systems.

D. Include cutting of canopy, mounting of device, installation of cabling and cabling support devices.

E. Acceptable Units:

1. Tannoy CMS503 DC, or approved equal, with enclosure.

2.11 TYPE SD LOUDSPEAKER ASSEMBLY

A. General: The assembly shall be weather resistant, include a loudspeaker unit, fiber blanketed enclosure, baffle, transformer and grille and include all adapters, safety cables and accessories to accommodate the construction at the indicated location.

B. Paint as directed by Architect.

C. Provide seismic bracing and support independently from ceiling systems.

D. Include cutting of canopy, mounting of device, installation of cabling and cabling support devices.

E. Acceptable Units:

1. Tannoy CMS803DC, or approved equal, with enclosure.

2.12 TYPE SE LOUDSPEAKER ASSEMBLY

A. General: The assembly shall be weather resistant, include a loudspeaker unit, enclosure, baffle, transformer and grille and include all adapters, safety cables and accessories to accommodate surface mounting to the construction at the indicated location.

B. Paint as directed by Architect.

C. Provide seismic bracing and support independently from raceway systems.

D. Include mounting of device, installation of cabling, safety cable and support devices.

E. Acceptable Units:

1. Electrovoice Model EVID8.2, in white or black as directed by architect (prior to painting) or approved equal, with tamper resistive bracket.

2.13 MOTORIZED PROJECTION SCREEN

A. General:

1. Provide screen to the General and Electrical Contractor for installation.

2. Provide low voltage control from wall switch and via control system.

3. Coordinate the installation work and the trim condition at perimeter of screen, prior to submission of shop drawings for same.

4. Provide 16:10 aspect ratio, 72.5" high x 116" wide matte white image area with black masking border, minimum 6" drop at ceiling line and sufficient extra drop for bottom of screen to reach 4'-0" A.F.F..

5. AV contractor to adjust limit switches and install low voltage interface and control provisions.

6. Provide device compatible with 120VAC, 60Hz power.

B. Acceptable Models:

1. Da-lite Tensioned Advantage Deluxe Electrol with Da-Mat surface.

2.14 VIDEO PROJECTOR AT MEETING ROOM - FURNISHED BY CITY

A. General: Provide infrastructure for projector. Provide compatible lift to general and electrical contractor for installation. Provide control interfaces, scaler and low voltage control unit.

B. Verify compatibility of all devices and coordinated position related to other above ceiling equipment with equipment by other trades, prior to submission of shop drawings.

C. Coordinate lens of correct focal length to realize a full width image at the screen.

D. Provide seismically rated lift and mounting mechanism with all required safety cables and independent attachment to structure separate from the ceiling support systems.

E. Acceptable units:

1. Anticipated Product: InFocus Model 5145. AV Contractor to provide Draper SL Series motorized projection lift, Model LVCIII low voltage control interface.

2.15 REMOTE CONTROL AUDIO DSP AND VIDEO ROUTING SYSTEMS

A. Provide the coordinated systems as indicated on the Drawings and as described herein.

B. Provide interfaces for all controlled devices.

C. Control and presentation System:

1. Provide Crestron Digital Media system with sufficient inputs and outputs to realize the functions and requirements shown on the drawings and described herein.

D. Input plates at Walls and Floor Box under table at Conference Room:

1. Acceptable unit: Crestron Model DM-TX-200-C-2G-W-T with conventional wall plates for microphone level inputs as described elsewhere herein.

E. Interface at projector lift:

1. Acceptable Unit: Crestron DM-RMC-SCALER-C.

F. Control panels:

1. Provide minimum 4" diagonal measure control panel with physical buttons adjacent to the control screen.

2. Acceptable unit: Crestron TPMC-4SM.

G. POE network switch: Provide NetGear, Cisco or Crestron. Provide as needed to establish required control network.

H. Provide groups of control pages as described elsewhere herein.

I. Provide control of routing of audio and video signals as described herein as well as control of individual channel audio level and control of master level of mixers as described herein. Audio signals will be controlled by interface to the audio processor.

J. Submit control panel layouts as part of shop drawing procedure.

K. Provide additional programming for up to ten additional automated command sequences based on user request after operation of completed systems.

L. The system will include digital audio processing and routing systems.

M. Provide the following additional functions assignable within the digital device to any input or output or group of same.

1. Equalization for each channel output.

2. Limiting for each channel output.

3. Compression for each channel output.

4. Master Level Control.

5. Automatic gain control of sources and combined outputs.

6. Individual level control of audio inputs and outputs as well as mixed audio output and record outputs.

7. Routing of signals to recording devices and teleconference systems as well as to the overhead loudspeakers and wall mounted loudspeakers, adjacent to the screen.

N. Refer to Systems Description for additional requirements.

O. Provide a editable copy of all programming software as part of the as-built documentation.

2.16 FLOOR BOX

A. Acceptable unit:

1. FSR Model 600P-4-B floor box with cover.

2.17 RECEPTACLE PANELS

A. General: Crestron Digital Media: Provide in Architect's selection of factory finish colors.

B. For other receptacle panels:

1. Provide anodized aluminum, brass or stainless steel finish with engraved designations adjacent to indicated receptacles. Provide mount for Decora style mount computer interface where indicated.

2. Acceptable Manufacturers:

a. ProCo.

b. Middle Atlantic Products.

2.18 AV MONITOR AT AV RACK

A. Provide rack mount video monitor with HDMI 1080p resolution, stereo audio and volume control.

B. Acceptable Manufacturers:

1. Boland Communications.

2. Tote Vision.

3. Wohler Technologies.

4. Crestron (as part of touch screen).

2.19 PAGING SYSTEMS ELECTRONIC EQUIPMENT

A. Provide quantity of zones of paging with independent loudspeakers and cabling from other systems.

B. Provide access via telephone systems.

C. Provide programming and training of systems.

D. Provide supplemental Mackenzie Laboratories Model OPM-3SM Message Stacker with latching relay to provide repeat of page until cancelled function for stored message.

E. Acceptable Systems:

1. Bogen Model PCM-2000, including PCM-CPU, PCM-TIM, PCM-ZPM and all accessories, power supplies, cables, connectors, interface devices needed for a complete and operational system.

2.20 BROADBAND TELEVISION R.F. AMPLIFIER

A. Acceptable units:

1. PICO Macom, INC Model PIDA-1000.

2. Blonder Tongue Model BIDA 100A-30.

2.21 DIRECTIONAL COUPLERS

A. Acceptable units: Blonder Tongue DGT-8 Series.

2.22 CONFERENCE ROOM DISPLAY ROUGH IN BOX

A. Provide infrastructure for display, coordinate blocking for wall mount bracket to support future connect City Provided Display.

B. Coordinate power TV and data line connection to the display in a concealed condition.

C. Provide FSR model PWB-270 wall box. Coordinate position of rough-in devices to realize the indicated position on the architectural elevations.

PART 3 - EXECUTION

3.1 GENERAL

A. Perform this work in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.

B. Furnish and install all materials, devices, components, and equipment required for complete, operational systems.

C. Maintain a competent supervisor and supporting technical personnel, acceptable to the Architect during the entire installation. Change of supervisor during the project shall not be acceptable without prior written approval from the Architect.

D. Coordinate all efforts with those of related trades. In the event of any conflicts, delayed or improper preparatory work by others, notify the Architect; the Architect's decision will be binding. Verify all field conditions.

3.2 WIRE AND CABLE INSTALLATION

A. Except as indicated herein, conduit wireways and cable bundles shall contain only wiring of this system.

B. Cables will be installed within conduit with open wiring on j-hooks provided for non-microphone level circuits throughout the project. Contiguous steel conduit is to be provided for all microphone circuits.

C. All wiring and cable shall be continuous and splice-free for the entire length of run between designated connections or terminations.

D. All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, panels or equipment enclosures. Tin terminated shield drain wires and insulate with heat shrinkable tubing.

E. Directly terminate video cables at equipment. Utilize compression style connectors for all coaxial cables.

F. Make any connections to screw-type barrier blocks with insulated crimp-type spade lugs. Size all lugs properly to assure high electrical integrity, i.e. low resistance connections. Connect only one (1) wire per spade lug and not more than two (2) lugs per screw terminal. Screw-type connections are not acceptable for microphone or line level interconnection unless required for interconnection at input or output of a system component.

G. Solder all microphone and line level connections except at punch block connectors specifically designed for stranded wire use; use only rosin core 60/40 tin/lead solder. In the event a microphone or line level connection is made to a screw-type barrier strip, solder the spade terminal after crimping. Tin all connections to screw-type compression connectors where a stranded conductor is utilized.

H. Lace, tie, or harness wire or cable as required herein, and in accordance with accepted professional practice. 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. Verify that all coaxial cables have been properly routed, dressed and secured to preclude stress and/or deformation.

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. Ungrommetted, unbushed or uninsulated wire or cable entries.

7. Deformation or improper radiusing of wire, or cable.

K. Verify that all conduit has been de-burred and properly joined, coupled, and terminated prior to pulling of cables.

L. Inspect all conduit bends to ensure proper radiusing, in accordance with recommendations of the wire, cable, or conduit manufacturer; in no case shall the radius be less than twelve (12) times the conduit diameter.

M. Verify that all conduit is clear of foreign matter and substances prior to pulling of wire or cable.

N. Verify permanent identification of conduit destination at all conduit terminations provided by the Electrical Contractor.

O. Apply a chemically inert conduit lubricant to all wire and cable prior to pulling. Do no subject wire and cable to tension greater than recommended by the manufacturer. Under no circumstances shall wire or cable be "jerked" through conduit.

P. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Cable loops and bends shall not be bent at a radius smaller than that recommended by the manufacturer.

Q. Identify all wire and cable clearly with permanent labels wrapped about the full circumference within one (1) inch of each connection. Indicate the number designated on the associated field or shop drawings. Assign wire or cable designations consistently throughout a given system; i.e., each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations. Labels shall be by Brady or Thomas and Betts.

3.3 BOX, PANEL, AND ENCLOSURE INSTALLATION

A. Install all boxes, panels, and enclosures square and plumb. Mount boxes, panels, and trim so that there are no gaps, cracks, or obvious lines between the trim and the adjacent finished surface, and ready them to receive final finish, as applicable.

B. Prior to installing any cable, verify insulating terminations have been provided by the Electrical Contractor on all conduit terminating in equipment racks or consoles provided as part of this section. All signal circuit boxes, panels, enclosures, wireways, and conduit shall be grounded through Building Ground only, unless otherwise noted herein. Removal and reinstallation of cable to allow installation of insulated bushings will be at the expense of this contractor and will be required for acceptance of the work.

C. Provide access panels where needed to access boxes, panels and enclosures in walls or ceilings, and indicated and dimensioned on the shop drawings. Finish panels to match the adjoining surfaces.

3.4 EQUIPMENT RACK INSTALLATION

A. Install a full-height, isolated ground outlet strip with not less than ten outlets and a rack panel mounted power receptacle for temporary equipment use, both ready to be served by separate isolated ground, branch circuits via a duplex receptacles provided within of the equipment rack.

B. Install matching blank panels in all spare panel spaces.

C. Install access covers, hinged panels, or pull-out drawers to ensure complete access to terminals and interior components. In no case shall such access require demounting or de-energizing of same or adjacent equipment.

D. Provide an unobtrusive permanent label on the front of each equipment rack section including its designation, as assigned and referenced consistently throughout this project, and the circuit breaker number and associated electrical distribution panel designation servicing the console section.

E. Elevate equipment racks on riser and provide access tracks with support stands of compatible height. Mounting of equipment racks must be executed by methods that preserve the integrity of the isolated ground provisions.

3.5 SIGNAL GROUNDING PROCEDURES

A. Connect all equipment chassis and equipment racks of this section shall be connected to Signal Ground by a single, green #14 TW stranded wire unless internally connected to the ground pin of the power cord serving the device. Each ensemble of enclosures shall include a single labeled ground buss bar to land the individually labeled chassis and equipment rack grounds. Coordinate interconnection of the insulated ground feed from the isolated ground power distribution load center serving the equipment racks power circuit (by Electrical Contractor) to the ground buss bar. An isolated signal ground will be furnished and installed to each ensemble of equipment racks by the Electrical Contractor.

B. Provide seismic restraint of equipment as indicated on Architectural and Structural documents. Including restraint of slide in equipment rack, motorized projection screen, projector, infrared radiator and camera.

C. Shielded cables of this section shall be grounded exclusively to Signal Ground.

D. Only where specifically designated, shields shall be permitted to carry low duty cycle DC control signals.

E. Shields shall be tied to Signal Ground at one end only, i.e., at the low potential end of run, unless otherwise noted.

F. There shall be no Signal Ground current paths, unless otherwise noted.

G. Signal and electrical system grounds shall be isolated except at the project ground field connection.

H. Signal Ground provisions shall realize less than 2.0 ohms to the primary ground connection.

I. All signal circuit conduit of this section shall be grounded exclusively to Building Ground, and then insulated at the entry to Equipment Racks. Coordinate installation of conduit, including entry points to devices and equipment and termination methods with Electrical Contractor prior to installation of the conduit.

3.6 TEST EQUIPMENT

A. Furnish, store, and maintain test equipment at the jobsite as required for both routine and performance testing of this work, thereafter, remove all of the latter equipment from the site. Include professional grade versions of the following at a minimum, provide test equipment as required to make systems operational and demonstrate the systems are functioning within the performance parameters as described elsewhere herein:

1. Multimeter.

2. Pink Noise Generator/Real Time Analyzer.

3. Low Impedance Microphone with Cable.

4. Oscilloscope.

5. Video Test signal Generator.

3.7 PRELIMINARY CHECKS AND TESTING

A. Conduct preliminary checks and testing prior to acceptance testing. Repeat these tests and make corrections to system and documentation subsequent to completion of related or adjacent work of other trades. Verify safe and proper operation of all components, devices or equipment, nominal signal levels within the systems and the absence of extraneous or degrading signals.

B. Perform the following verification and testing procedures:

1. Proper grounding of devices and equipment.

2. Integrity of signal and electrical system ground connections.

3. Proper provision of power to devices and equipment.

4. Integrity of all insulation, shield terminations and connections.

5. Integrity of soldered connections.

6. Absence of solder splatter, solder bridges, debris of any kind, tools, etc.

7. Proper routing and dressing of wire and cable.

8. "Wire-checking" of all circuitry, including phase and continuity, with reference to cable designations on field and shop drawings.

9. Mechanical integrity of all support and positioning provisions.

C. Determine the proper sequence of energizing systems to minimize the risk of damage.

D. After successfully energizing the systems, make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltage gains and losses, as applicable. Tabulate all data along with an inventory of test equipment, a description of testing conditions, and a list of test personnel as itemized below. Copies of preliminary test data shall accompany copies of performance testing data as part of the final submittal.

E. Verify the performance parameters of the individual systems following established professional procedures, in addition to those specified herein.

F. Document all acceptance testing, calibration and correction procedures described herein with the following information:

1. Performance date of the given procedure.

2. Condition of performance of procedure.

3. Type of procedure, and description.

4. Parameters measured and their values, including values measured prior to calibration or correction, as applicable.

5. Parameters associated with calibration or corrective networks, components, or devices.

6. The names of personnel conducting the procedure.

G. Provide permanent "wedge" type labels on all controls, as applies, to indicate correct settings after performance testing and adjustment procedures have been successfully completed. Provide records of all control settings as part of as-built documentation.

3.8 SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

A. Conduct testing and adjusting procedures to realize and verify the performance criteria specified herein. Notwithstanding any other requirements, standards, and miscellaneous criteria provided elsewhere within these specifications, performance testing, adjusting and documentation shall include the procedures itemized below.

1. Perform testing, adjustment, measurement and documentation. Procedures for audio reinforcement and playback systems shall include, as applies:

a. Maximum continuous sound pressure level 4'-0" A.F.F., with Total Harmonic Distortion less than 0.5 percent, at 1,000 Hertz; 95dB SPL, A-weighted.

b. Signal-to-noise ratio referenced and extrapolated to the specified maximum continuous sound pressure level 4'-0" A.F.F.; utilize a source of two (2) octaves of pink noise centered at 2,000 Hertz with mechanical systems unoperated; not less than 70dB.

B. Conduct all necessary performance testing; adjustment and documentation procedures to verify and realize compliance with the performance specifications herein. Make available at least one (1) technician familiar with this work, and all required test equipment for the duration of performance testing verification, at the convenience of the City or Architect.

3.9 TRAINING AND CONFERENCE ROOM AUDIO VISUAL SYSTEMS

A. Provide the Training Rooms with an audio visual system including remote control of the systems and equipment functions:

1. Sound Reproduction Systems:

    a. Provide Sound Reproduction of audio associated with and meetings, utilizing wireless, lapel microphone systems or hand held microphone as well as portable audio and audio visual equipment connected to receptacles located at the receptacle panels or equipment rack.

    b. Provide room combining for audio visual systems for tracking of audio source selection and volume control.

2. Data/Video Projection Systems:

    a. General: Provide infrastructure for City Furnished Projector with compatible lift, control interfaces, scaler and low voltage control unit.

    b. Verify compatibility of all devices and coordinated position related to other above ceiling equipment with equipment by other trades, prior to submission of shop drawings.

    c. Coordinate lens of correct focal length to realize a full width image at the screen.

    d. Provide seismically rated lift and mounting mechanism with all required safety cables and independent attachment to structure separate from the ceiling support systems.

    e. The systems will project the image routed to them from the Control and Presentation Systems. Provide for control of both projectors from either room when the rooms are operated in the combined mode.

    f. Provide control of all systems and room combining from the touch panel at the equipment rack.

3. Projection Screens:

    a. Provide Motorized Projection Screens as described herein and as indicated on the Drawings.

    b. Provide screen to electrical and general contractors for installation and provide direction in installation procedure.

    c. Adjust limit switches and closure doors.

    d. The Motorized projection screen will be controlled manually from a control located adjacent to the lighting controls.

4. Provide for the projected display of media with mono overhead audio for portable devices connected to the receptacle panels:

    a. VHS-tape, DVD and Compact disc.

    b. CATV system receiver.

    c. Audio reinforcement of electronic musical instruments (organ, keyboard, guitar, mixed group, etc.).

d. Display of laptop PC output.

e. Display of Digital Media from the internet.

B. The basic electronic equipment for this area will be housed in a slide out equipment rack, located within a closet opening in to the lobby area.

C. Assisted Listening Provisions: Provide the Training Room with line level output for use with portable assisted listening and recording systems equipment.

D. Conference Room:

1. Base Bid: Provide receptacles within floor box and pop up at table, connected to City Furnished Displays.

2. Alternate Bid: Provide touch panel with input and output from digital media systems.

3.10 PAGING SYSTEMS

A. Provide paging with independent loudspeakers and cabling from other systems.

B. Provide access via telephone systems.

C. Provide programming and training of systems.

D. Provide shut down of systems in the event of an alarm condition annunciated by the Fire/Life Safety Systems by a coordinated power shut down to each equipment rack.

E. Paging systems are considered as communication systems and not part of any life safety or voice evacuation systems.

F. There is no visual paging or annunciation system accompanying the audio signal.

G. Provide intelligible audio signal to each area with a Speaker Zone indicated on the drawings at a level 10dB above the anticipated ambient sound level with deviation of sound level not more than +3dB/-6dB from 300 Hz to 4kHz, measured at 5'-0" above finished grade or floor.

H. Provide Paging initiated by dialing a telephone extension with each designated area associated with a specific telephone extension.

I. Group Paging; Provide a separate telephone extension for each “group page” up to 10 groups, facilitating broadcast of the page signal to multiple areas at the same time.

J. Paging Storage and Retrieval; Provide a page/message storage and retrieval system to allow all call messages to be recorded and played multiple times for a given event or scheduled to repeat at a selected interval. Provide a latching relay and program the system to allow message to be played once by accessing a given number and repeat until a specific number is called to cancel for a second all call page storage and play function.

3.11 TELEVISION SYSTEMS

A. Provide the Television Distribution Systems as Described herein and as indicated on the Drawings.

B. Receive the feed from the cable service provider and distribute to receptacles in each room as indicated on the Drawings.

C. Provide a separate home run for each outlet to the backboard at the Data Room.

D. Mount amplification and distribution equipment at TV back board located in the Data Room.

E. Provide a minimum bandwidth of 1GHz with signal level of +12 to +6 dBMV with not more than 6dB of tilt and no visible degradation of signal from input of system to output of system as observed with a TV receiver or projection equipment.

END OF SECTION