BIDDER'S SUBMITTAL

Company: Tobo Construction Inc.

Total Base Bid (numbers): $ 20,162,848.76

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

Honorable Mayor and Members
of the Torrance City Council
Torrance, California

Members of the Council:

In accordance with the Notice Inviting Bids pertaining to the receiving of sealed proposals by the City Clerk of the City of Torrance for the above titled improvement, the undersigned hereby proposes to furnish all Work to be performed in accordance with the Plans, Specifications, Standard Drawings, and the Contract Documents prepared by Frank Webb Architects Inc. for the lump sum bid as set forth in the following schedules.

BASE BID SCHEDULE

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
GENERAL REQUIREMENTS (DIVISION 1 AND SPECIAL PROVISIONS, PART 1 - WITH DESIGNATED BID ITEMS)							
1	01 7123	2-9.1	Permanent Survey Markers	12	EA	$ 1,770.00	$ 21,240.00
2	01 7123	2-9.2	Survey Service	1	LS	$ 141,600.00	$ 141,600.00
3	01 3216	6-1.4	CPM Baseline Schedule	1	LS	$ 53,100.00	$ 53,100.00
4	-	6-1.6	4-Week Look Ahead Schedules (Weekly)	1	LS	$ 47,200.00	$ 47,200.00
5	-	6-1.7	CPM Schedule Updates (Monthly)	1	LS	$ 47,200.00	$ 47,200.00
6	-	6-6.3	Payment for Delays	20	DAY	$ 4,720.00	$ 94,400.00
7	-	7-8.6.2	NPDES / BMP Measures	1	LS	$ 70,800.00	$ 70,800.00
8	-	7-8.6.3	SWPPP / NOI Preparation	1	LS	$ 29,500.00	$29,500.00
9	-	7-8.6.3	SWPPP/WDID Permit	1	LS	$ 29,500.00	$ 29,500.00
10	-	7-8.6.3	SWPPP/Annual Report/Notice of Termination Preparation/Submittal	1	LS	$ 29,500.00	$ 29,500.00

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
11	-	7-10.2	Traffic Control	1	LS	$ 88,500.00	$ 88,500.00
12	01 5813	7-15	Project Signs and Identification	1	LS	$ 41,300.00	$ 41,300.00
13	-	7-15	Portable Changeable Message Signs	2	EA	$ 29,500.00	$ 59,000.00
14	-	8	Facilities & Site Utility Vehicles for Agency Personnel	1	LS	$ 59,000.00	$ 59,000.00
15	-	9-3.4	Mobilization	1	LS	$ 590,000.00	$ 590,000.00
16	-	9-3.5	Demobilization	1	LS	$ 177,000.00	$ 177,000.00
REGIONAL TERMINAL SITE AND FACILITIES							
17	DIV 3	-	Concrete	1	LS	$ 678,500.00	$ 678,500.00
18	DIV 4	-	Masonry	1	LS	$ 678,500.00	$ 678,500.00
19	DIV 5	-	Metals - Structural & Architecturally Exposed Steel, Decking, Metal Pan Stairs and Miscellaneous Metals	1	LS	$885,000.00	$ 885,000.00
20	DIV 6	-	Wood and Plastics	1	LS	$678,500.00	$ 678,500.00
21	DIV 7	-	Thermal and Moisture Protection	1	LS	$454,300.00	$ 454,300.00
22	DIV 8	-	Doors, Door Hardware, Windows & Storefronts	1	LS	$ 430,700.00	$ 430,700.00
23	DIV 9	-	Finishes	1	LS	$ 619,500.00	$ 619,500.00
24	DIV 10	-	Specialties	1	LS	$ 796,500.00	$ 796,500.00
25	DIV 11	-	Equipment (N.I.C. Sections 11 5200 and 11 5233 and Exhibit 11 5233A)	1	LS	$ 0.00	$ 0.00
26	DIV 12	-	Furnishings	1	LS	$265,500.00	$265,500.00
27	DIV 14	-	Conveying Equipment	1	LS	$ 147,500.00	$ 147,500.00
28	DIV 21	-	Fire Suppression Sprinklers	1	LS	$ 171,100.00	$171,100.00
29	DIV 22	-	Plumbing	1	LS	$ 377,600.00	$ 377,600.00
30	DIV 23	-	Heating Ventilation & Air Conditioning	1	LS	$ 914,500.00	$914,500.00
31	DIV 26	-	Electrical	1	LS	$ 1,386,500.00	$ 1,386,500.00
32	DIV 28	-	Electronic Safety Security and Fire Alarm	1	LS	$ 177,000.00	$ 177,000.00

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
33	DIV 31	-	Sitework	1	LS	$ 147,500.00	$147,500.00
33A	DIV 31	-	Sitework - Import (Allowance)	250	CY	$ 206.50	$ 51,625.00
34	DIV 32	-	Exterior Improvements	1	LS	$1,990,435.80	$ 1,990,435.80
35	DIV 33	-	Utilities	1	LS	$206,500.00	$ 206,500.00
OFFSITE IMPROVEMENTS							
C-2014-001 SIGNS AND STRIPING FOR CRENSHAW BOULEVARD							
36	32 1723-1724	314, 317	Signs and Striping Crenshaw Boulevard	1	LS	$147,500.00	$147,500.00
ST-1067 STREET WIDENING CRENSHAW BOULEVARD							
37	31 1000	300-1.3	Sawcut Asphalt Paving	737	LF	$ 18.88	$ 13,914.56
38	31 1000	300-1.3	Sawcut Concrete Paving	167	LF	$ 18.88	$ 3,152.96
39	31 1000	300-1.3	208th St. / Crenshaw Sawcut Asphalt Paving	99	LF	$ 23.60	$ 2,336.40
40	31 1000	300-1.3	Removal of Concrete & A.C. Pavement, Sidewalks, Curb & Gutter, and Unclassified Materials	14,716	SF	$4.72	$ 69,459.52
41	31 1000	300-1.3	208th St. / Crenshaw Removal of Concrete & A.C. Pavement, Curb & Gutter, and Unclassified Materials	343	SF	$59.00	$ 20,237.00
42	31 1000	300-1.1	Clearing/Grubbing/Rough grade - New sidewalk area	12,836	SF	$3.54	$ 45,439.44
43	31 1000	300-1.1	**Clearing/Grubbing/Rough grade - Widening Area,** incl. subgrade prep	27,100	SF	$3.54	$ 95,934.00
44	31 1000	300-1.1	**208th St./ Crenshaw Clearing/Grubbing/Rough grade/Subgrade Prep**	37,850	SF	$3.54	$ 133,989.00
45	32 1206	302-1	Cold Milling	10,270	SF	$1.77	$ 18,177.90
46	31 2000	300-5.2	Imported Borrow	102	CY	$ 413,00	$42,126.00
47	31 2000	301-1	**208th St./ Crenshaw** Imported Borrow	3,643	CY	$ 26.55	$ 96,721.65

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
48	32 1313	303-5 301-2	Concrete Paving, Spandrels, Sidewalks, Driveways, Ramps, PCC Join, including CMB	13,940	SF	$25.96	$ 361,882.40
49	32 1313	303-5, 301-2	208th St./ Crenshaw. Concrete Paving, Spandrels, Sidewalks, Driveways, Ramps, PCC Join, including CMB	18,018	SF	$25.96	$467,747.28
50	32 1313	303-5, 301-2	8" Concrete Curb Per SPPCC 120 (8) on CMB	250	LF	$29.50	$ 7,375.00
51	32 1313	303-5, 301-2	208th St./ Crenshaw. 8" Concrete Curb Per SPPCC 120 (8) on CMB	40	LF	$ 29.50	$ 1,180.00
52	32 1313	303-5, 301-2	8" Concrete Curb w./ 24" Gutter Per Torrance Std T103, on CMB	750	LF	$ 44.84	$ 33,630.00
53	32 1313	303-5, 301-2	208th St./ Crenshaw. 8" Concrete Curb w./ 24" Gutter Per Torrance Std T103, on CMB	428	LF	$ 44.84	$19,191.52
54	32 1313	303-5, 301-2	Curb Ramp with Detectable Warning Surface, Per SPPWC Std 111 on 4" CMB	7	EA	$ 1,416.00	$ 9,912.00
55	32 1313	303-5, 301-2	208th St/Crenshaw Curb Ramp with Detectable Warning Surface, Per SPPWC Std 111 on 4" CMB	2	EA	$ 1,416.00	$ 2,832.00
56	32 1206	302-5, 301-2	10" B-PG64-10 AC Base Paving on 15" CMB	5,150	SF	$23.60	$ 121,540.00
57	32 1206	302-5, 301-2	2" C2-PG64-10 AC Overlay	10,270	SF	$11.80	$ 121,186.00
58	32 8400, 9000	308	Landscape & Irrigation	1	LS	$796,500.00	$ 796,500.00
~~59~~	-	~~307~~	~~Relocate Existing Streetlighting Poles~~	~~6~~	~~EA~~	~~$~~	~~$~~ DELETED
60	-	307	208th St./ Crenshaw. Streetlighting	3	EA	$ 29,500.00	$ 88,500.00
61	32 1313	303-5	208th St./ Crenshaw. 36" W Concrete Channel Under Sidewalk	30	LF	$ 2,360.00	$ 70,800.00

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
62	32 3113	304-3	208th St/Crenshaw Chain Link Fence	62	LF	$ 147.50	$ 9,145.00
63	32 3113	304-3	208th St/Crenshaw. Chain Link 6 'x 15' swing gate	1	EA	$ 23,600.00	$ 23,600.00
64	32 1313	207-16, 306	208th St/ 6" PVC Sanitary Sewer	46	LF	$ 590.00	$ 27,140.00
65	-	207-21.5, 306	208th St./ POC 6" / (E) 18" VCP SEWER in existing street	1	EA	$ 12,390.00	$ 12,390.00
TS-2014 NEW TRAFFIC SIGNAL AT CRENSHAW BLVD AND TRANSIT WAY							
66	-	307	New Traffic Signal at Crenshaw Blvd & Transit Way	1	LS	$ 442,500.00	$ 442,500.00
TS84 200A TRAFFIC SIGNAL MODIFICATION AT CRENSHAW BLVD AND 208TH STREET							
67	-	307	Traffic Signals Modification Plan Crenshaw Blvd & 208th Street	1	LS	$ 442,500.00	$ 442,500.00
WP-306 PLAN & PROFILE FOR CRENSAW BLVD WIDENING & TRANSIT CENTER WATER SYSTEM							
68		306	8" DI Pipe, CL 350	1,300	LF	$ 112.10	$ 145,730.00
69		306	8" Gate Valve	2	EA	$ 5,900.00	$ 11,800.00
70		306	8" DI Bend	4	EA	$ 1,180.00	$ 4,720.00
71		306	12x8x12 DI Tee	3	EA	$ 2,950.00	$ 8,850.00
72		306	8" POC in existing Street	3	EA	$ 17,700.00	$ 53,100.00
73		306	208th Street POC 8"/8" in existing street	1	EA	$ 17,700.00	$ 17,700.00
74		306	208th St. 8" PVC Pipe	24	LF	$ 88.50	$ 2,124.00
75		306	208th Street 8" GATE VALVE	1	EA	$ 5,900.00	$ 5,900.00
76		306	208th Street "8" PIPE CAP/STUB, BLIND FLANGE	1	EA	$ 5,900.00	$ 5,900.00
77		306	6" DI Pipe, CL 350	60	LF	$ 88.50	$ 5,310.00
~~78~~	~~-~~	~~306~~	~~6" DI Pipe, CL 350~~	~~60~~	~~LF~~	~~$~~	~~$~~ DELETED
79		306	6" Gate Valve	2	EA	$2,950.00	$5,900.00
80		306	6" POC in existing Street	2	EA	$ 8,850.00	$ 17,700.00

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
81		306	6" POC in existing Sidewalk	1	EA	$ 5,900.00	$ 5,900.00
82		306	208th Street 6" PVC PIPE	60	LF	$ 88.50	$ 5,310.00
83		306	208th Street 6" GATE VALVE	2	EA	$ 4,720.00	$ 9,440.00
~~84~~	~~-~~	~~306~~	~~6" DI Pipe, CL 350~~	~~60~~	~~LF~~	~~$~~	~~$~~ DELETED
85		306	208th Street POC 6"/8" in existing street	1	EA	$ 11,800.00	$ 11,800.00
86		306	Thrust Block	12	EA	$ 590.00	$ 7,080.00
87		306	208th Street Thrust Block	7	EA	$ 590.00	$ 4,130.00
88		306	Air Release Blow Off	2	EA	$ 14,160.00	$28,320.00
89		306	Fire Hydrant Assembly	3	EA	$ 8,850.00	$ 26,550.00
90		306	Remove Existing Fire Hydrant	2	EA	$ 8,850.00	$ 17,700.00
C-2015 SIGNAGE AND STRIPING - 208TH STREET							
91	-	314, 317	Signage and Striping - 208th Street	1	LS	$147,500.00	$ 147,500.00
SL 2015-002 STRET LIGHTING - 208TH STREET							
92	-	307	Ameron 1C1-28 Street Light Pole w/ 1AP8 8' Mast Arm & 107 Watt Led Luminaire	7	EA	$ 47,200.00	$ 330,400.00
SS-386 SANITARY SEWER - 208TH STREET							
93	-	Per Std.	Manhole Type "D" Frame & cover per CSD. Std. No. S-a-204 & S-a-228	1	EA	$ 41,300.00	$ 41,300.00
94	-	Per Std.	Manhole per SPPWC Std. Plan No. 200	3	EA	$ 17,700.00	$ 53,100.00
95	-	306	6" VCP WYE (6"x8")	6	EA	$ 590.00	$ 3,540.00
96	-	306	8" VCP, Trenching per City of Torrance Std. plan T116 and bedding per City of Torrance Std. plan T204	703	LF	$ 165.20	$ 116,135.60
97	-	306	6" VCP, Trenching per City of Torrance Std. plan T116 and bedding per City of Torrance Std. plan T204.	198	LF	$ 88.50	$ 17,523.00

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
98	-	306	8" VCP Cap	1	EA	$ 118.00	$ 118.00
99	-	306	6" VCP Cap	6	EA	$ 118.00	$ 708.00
ST-1066 STREET IMPROVEMENTS - 208TH STREET							
100	-	300-1.3.2	Sawcut & Removal of A.C. Pavement and Unclassified Materials	10,910	SF	$23.60	$ 257,476.00
101	-	300-1	Removal of Fence & post	840	LF	$ 59.00	$ 49,560.00
102	-	300-1	Temporary Removal/Replacement of Property line Chainlink Fence & Gate	786	LF	$ 41.30	$ 32,461.80
103	-	300-1.1	Clearing/Grubbing/Rough grade/Demolition	1	LS	$ 88,500.00	$ 88,500.00
104	-	300-5.2	Import Roadway Fill, delivered to site.	10,000	CY	$ 29.50	$ 295,000.00
105	-	305.2	Import - Process and compacted in place	10,000	CY	$ 23.60	$ 236,000.00
106	-	303-6.1, 301-2	11 in Thick Concrete Pavement on CMB	44,947	SF	$ 14.16	$ 636,449.52
107	-	303-5.1, , 301-2	8" CF Concrete Curb & 24" Gutter per SPPWC Standard 120-2 type A2-8 & City of Torrance Std. T102 on 8" CMB base	1,605	LF	$ 44.84	$ 71,968.20
108	-	800-1	Parkway per landscape plans	2,798	SF	$ 41.30	$ 115,557.40
109	-	303-5.1, 301-2	3 1/2" Thick Concrete Sidewalk per City of Torrance standard T103 on CMB	3,277	SF	$ 10.03	$ 32,868.31
110	-	**303-5.1, 301-2**	**Construct Concrete Driveway with Depressed Sidewalk per City of Torrance Standard ~~T-W5~~ T-105, case 1 w/ ADA Ramps @ Drives on CMB**	**2,028**	**SF**	$ 14.75	$ 29,913.00
111	-	303-5.1, 301-2	Construct longitudinal concrete gutter per SPPWC 122 on CMB	496	SF	$ 11.80	$ 5,852.80
112	-	**303-5.1, 301-2**	**Curb with Depressed Access for Wheelchair per ADA Requirements** on CMB	**55**	**LF**	$ 30.68	$ 1,687.40

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
113	-	302-5.1	8" A.C. Machine Berm	203	LF	$ 147.50	$ 29,942.50
114	-	302-5, 301-2	4 in Thick A.C. Pavement on CMB	2,931	SF	$ 35.40	$ 103,757.40
WP-301 WATER PLAN AND PROFILE - 208TH STREET							
115	-	306	8" DI Pipe, CL 350	915	LF	$ 141.60	$ 129,564.00
116	-	306	6" DI Pipe, CL 350	262	LF	$ 76.70	$ 20,095.40
117	-	306	8" Gate Valve	15	EA	$5,900.00	$ 88,500.00
118	-	306	Fire Hydrant Assembly	5	EA	$ 8,850.00	$ 44,250.00
119	-	306	6" DI, 90^ Elbow	1	EA	$ 885.00	$ 885.00
120	-	306	8" DI, 90^ Elbow	1	EA	$1,416.00	~~$1,416.00~~ 1,416.00
121	-	306	8"x8"x6" M.J Tee	9	EA	$ 1,770.00	$ 15,930.00
122	-	306	Thrust Block	1	LS	$ 5,900.00	$ 5,900.00
123	-	306	2" Meter & 2" PVC Service Line w/ Connection to 8" DIP	6	EA	$ 8,850.00	$ 53,100.00
124	-	306	6" Cap w/Mega Lug & Blow-off	6	EA	$ 5,900.00	$ 35,400.00
125	-	306	8"x6" Reducer	1	EA	$ 885.00	$ 885.00
126	-	306	12" Hot Tap Assembly	1	EA	$ 17,700.00	$ 17,700.00
127	-	308-6	90 Day Plant Establishment and Landscape Maintenance Period	1	LS	$ 41,300.00	$ 41,300.00
128	-	-	Utility Coordination Allowance	1	ALW	$225,000	$225,000

TOTAL BASE BID PRICE $ 20,162,848.76
(Figures)*

TOTAL BASE BID PRICE: TWENTY MILLION ONE HUNDRED SIXTY-TWO THOUSAND
(Words)* EIGHT HUNDRED FORTY-EIGHT AND 76/100 DOLLARS

***BASE BID MAY BE REJECTED IF TOTAL IS NOT SHOWN IN FIGURES AND WORDS.**

B2017- 39

ADDITIVE BID ITEM 25A: The City requests a bid price to furnish and install a Video Wall Display as described in Project Manual (Volume 2) Section 11 5233 and in Exhibit 11 5233A.

ADDITIVE BID ITEM B2017- 39

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
25A	DIV 11	-	Equipment (ONLY Section 11 5233 and Exhibit 11 5233A)	1	LS	$ 206,500.00	$ 206,500.00

ADDITIVE BID ITEMS 25B THROUGH 25F: The City requests prices for the following additive bid items as described in the City's response to RFI 9c.

Item #	PROJECT MANUAL DIVISION	SECT. E SPECIAL PROVS.	DESCRIPTION	QUAN	UNIT	UNIT COST	TOTAL COST
25B	11 5200	-	Training Room and Conference Room AV Systems	1	LS	$ 442,500.00	$ 442,500.00
25C	11 5200	-	Paging Systems	1	LS	$ 324,500.00	$ 324,500.00
25D	11 5200	-	Television Systems	1	LS	$ 265,500.00	$ 265,500.00
25E	11 5200	-	Conference Room Digital Media Receptacles and Control	1	LS	$ 177,000.00	$ 177,000.00
25F	11 5200	-	AV Annual Maintenance	5	YR	$ 59,000.00	$ 295,000.00

The contract will be awarded to the lowest responsive bidder based on the TOTAL BASE BID PRICE.

BIDDER'S SUBMITTAL (Continued) B2017- 39

The undersigned has read the contract and taking no exception, furthermore agrees to enter into and execute a contract, with necessary bonds, at the unit prices set forth herein and in case of default in executing such contract, with necessary bonds, the check or bond accompanying this bid and the money payable thereon shall be forfeited thereby to and remain the property of the City of Torrance.

The above unit prices include all work appurtenant to the various items as outlined in the Specifications and all work or expense required for the satisfactory completion of said items. In case of discrepancies between unit prices and totals, the unit prices shall govern.

The undersigned declares that it has carefully examined the full-size 30" x 42" (Transit site) Plans and accompanying 24" x 36" (Offsite Improvement) Plans, the Specifications (Volume 1) and Project Manual (Volume 2) and Contract Documents, and has investigated the site of the work and is familiar with the conditions thereon.

Contractor: Tobo Construction Inc.

Date: 11/22/17. By: Jimi Chae.

Contractor's State License No. 758012. Class A.B.C10.C17.

Contractor's DIR Registration No. : 1000005638.

Address: 2500 Pacific Coast Highway, Torrance, CA 90505.

Phone: 424. 378. 1131.

Email: jchae@toboco.net, sna@toboco.net, bids@toboco.net.

Fax: 877. 441. 8626.

ACKNOWLEDGMENT OF ADDENDA RECEIVED – B2017-39

The Bidder must acknowledge the receipt of addenda by placing an "X" by each addendum received.

Addendum No. 1 X

Addendum No. 2 X

Addendum No. 3 X

Addendum No. 4 X

Addendum No. 5 ____

Addendum No. 6 ____

Addendum No. 7 ____

Addendum No. 8 ____

Addenda will be issued only by posting to the project's website listed in the Notice Inviting Bids. It is the Bidder's sole responsibility to visit the project's website to obtain and administer any Addendum related to this bid. An Addendum must be acknowledged above by a bidder in its submitted form of Proposal.

If an addendum or addenda have been issued by the City and not noted above as being received by the Bidder, the Bid Proposal may be rejected.

Bidder's Signature

11/21/17.
Date

CONTRACTOR'S AFFIDAVIT

STATE OF CALIFORNIA }
}
COUNTY OF Los Angeles } **B2017-39**

Jimi Chae, being first duly sworn, deposes and says:

1. That he is the Secretary
Title
of Tobo Construction Inc.
(Name of Partnership, Corporation, or Sole Proprietorship)

hereinafter called "Contractor," who has submitted to the City of Torrance a proposal for the Construction of TORRANCE TRANSIT PARK AND RIDE REGIONAL TERMINAL, FEAP 764, B2017-39;

2. That said proposal is genuine; that the same is not sham; that all statement of facts therein are true;

3. That such proposal was not made in the interest or behalf of any person, partnership, company, association, organization or corporation not named or disclosed;

4. That the Contractor did not, directly or indirectly, induce, solicit or agree with anyone else to submit a false or sham bid, to refrain from bidding, or to withdraw the bid, to raise or fix the bid price of the Contractor or anyone else, or to raise or fix any overhead, profit or cost element of the Contractor's price or the price of anyone else; and did not attempt to induce action prejudicial to the interest of the City of Torrance, or of any other bidder, or anyone else interested in the proposed contract;

5. That the Contractor has not in any manner sought by collusion to secure for itself an advantage over any other bidder or to induce action prejudicial to the interests of the City of Torrance, or of any other bidder or of anyone else interested in the proposed contract;

6. That the Contractor has not accepted any bid from any subcontractor or materialman through any bid depository, the bylaws, rules or regulations of which prohibit or prevent the Contractor from considering any bid from any subcontractor or materialman, which is not processed through said bid depository, or which prevent any subcontractor or materialman from bidding to any contractor who does not use the facilities of or accept bids from or through such bid depository;

CONTRACTOR'S AFFIDAVIT (CONTINUED) - B2017-39

7. That the Contractor did not, directly or indirectly, submit the Contractor's bid price or any breakdown thereof, or the contents thereof, or divulge information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any individual or group of Individuals, except to the City of Torrance, or to any person or persons who have a partnership or other financial interest with said Contractor in its business.

Dated this 13th day of November, 2017.

Jun. Toho Construction Inc.
(Contractor)

Secretary.
(Title)

Subscribed and Sworn to before me this 13th day of November, 2017.

Suzie H. Na, Notary Public.
Notary Public in and for said County and State.
(Seal)

SUZIE H. NA
Notary Public - California
Los Angeles County
Commission # 2197833
My Comm. Expires May 19, 2021

X Jimi Chun.

ACKNOWLEDGMENT

"A Notary Public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document."

State of California
County of (Los Angeles)

On November 13, 2017 before me, Suzie H Na, Notary Public
(Insert name and title of the officer)

personally appeared Jimi Chae.
who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of Californa that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

SUZIE H. NA
Notary Public – California
Los Angeles County
Commission # 2197833
My Comm. Expires May 19, 2021

Signature _____ (Seal)

LIST OF SUBCONTRACTORS: B2017-39

The Bidder is required to fill in the following blanks in accordance with the provisions of the California Public Contract Code Sections 4100-4114, CHAPTER 4. SUBLETTING AND SUBCONTRACTING. The contractor, sub recipient or subcontractor must not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor must carry out applicable requirements of Title 49 CFR (Code of Federal Regulations) part 26 in the award and administration of US DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance. Failure of the bidder to fulfill the requirements of the Special Provisions for submittals required to be furnished after bid opening, including but not limited to escrowed bid documents, where applicable, may subject the bidder to a determination of the bidder's responsibility in the event it is the apparent low bidder on a future public works contracts. Bidder must copy this form as required to list all applicable subcontractors.

Name Under Which Subcontractor is Licensed: Ace R Systems Inc.

Subcontractor's Address: 747 S. Ardmore Ave. #405 LA CA 90005.

Specific Description of Sub-Contract: roofing.

Subcontract Dollar Value: $176,715.

License Number: 1002364. CA License Classification/Type: C39.

DIR Registration Number: 1000018679.

Name Under Which Subcontractor is Licensed: Chae Inc.

Subcontractor's Address: 4229 Via Pinzon, PVE. CA. 90274.

Specific Description of Sub-Contract: mechanical.

Subcontract Dollar Value: $375,000.

License Number: 955399 CA License Classification/Type: B, C20.

DIR Registration Number: 1000042963.

Name Under Which Subcontractor is Licensed: Delgado Tile & Stone, Inc.

Subcontractor's Address: 13422 Palamos Pl. Chino Hills. CA. 91709.

Specific Description of Sub-Contract: Tiling.

Subcontract Dollar Value: $35,000.-

License Number: 824886 CA License Classification/Type: C54.

DIR Registration Number: 1000041168.

Name Under Which Subcontractor is Licensed: Excelsior Elevator Corp.

Subcontractor's Address: 1961 Blair Ave. Santa Ana CA. 92705.

Specific Description of Sub-Contract: elevator.

Subcontract Dollar Value: $65,000.

License Number: 733576. CA License Classification/Type: C11.

DIR Registration Number: 1000008460.

Name Under Which Subcontractor is Licensed: Finishing Touch Woodworking Inc.

Subcontractor's Address: 12271 Industry ~~Ave~~ Street. Garden Grove, CA 92841.

Specific Description of Sub-Contract: casework + paneling.

Subcontract Dollar Value: $45,000.

License Number: 870143. CA License Classification/Type: C6

DIR Registration Number: 1000017499.

Name Under Which Subcontractor is Licensed: Hur Flooring Co.

Subcontractor's Address: 15204 Stagg St. Van Nuys CA 91405.

Specific Description of Sub-Contract: flooring.

Subcontract Dollar Value: $82,500.

License Number: 604929. CA License Classification/Type: B, C15, C54

DIR Registration Number: 1000006907.

Subcontractors listed must be properly licensed under the laws of the State of California for the type of work which they are to perform. Do not list alternate subcontractors for the same work.

Subcontractors that must be listed are those that will perform work in an amount in excess of ½ of 1 percent of the total bid or $10,000, whichever is greater. (Pub Cont Code SS 4100 et seq.)

The Bidding Contractor must include each subcontractor's contract license number (AB 44). An inadvertent error in listing the subcontractor's license number shall not be grounds for filing a bid protest, or grounds for considering the bid nonresponsive, if the corrected contractor's license number is submitted to the public entity by the prime contractor within 24 hours after the bid opening – provided that the corrected license number corresponds to the submitted name and location of the subcontractor.

LIST OF SUBCONTRACTORS: B2017-39

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Name Under Which Subcontractor is Licensed: JNK Builders Inc.

Subcontractor's Address: 1463 S Norton Ave. LA CA 90019

Specific Description of Sub-Contract: electrical.

Subcontract Dollar Value: $450,000.-

License Number: 1002330. CA License Classification/Type: B. C10.

DIR Registration Number: 1000021825.

Name Under Which Subcontractor is Licensed: KMU Solutions Inc.

Subcontractor's Address: 1463 S Norton Ave. LA CA 90019.

Specific Description of Sub-Contract: data. Audio Video, security & Alarm.

Subcontract Dollar Value: $495,800.

License Number: 1018418. CA License Classification/Type: C10.

DIR Registration Number: 1000043016

Name Under Which Subcontractor is Licensed: McWhitter Steel Inc.

Subcontractor's Address: 42211 7th St. E. Lancaster CA 93535.

Specific Description of Sub-Contract: Metals.

Subcontract Dollar Value: $325,000.

License Number: 718542. CA License Classification/Type: B. C51, C60.

DIR Registration Number: 1000009497.

Name Under Which Subcontractor is Licensed: Mirae Construction Co.

Subcontractor's Address: 1501 W Washington Bl. LA CA 90007.

Specific Description of Sub-Contract: plumbing & Utilities.

Subcontract Dollar Value: $575,000.

License Number: 876472. CA License Classification/Type: B. C36.

DIR Registration Number: 1000019460.

Name Under Which Subcontractor is Licensed: Paracon Const. Inc.

Subcontractor's Address: 7319 Somerset Bl. Paramount, CA 90723.

Specific Description of Sub-Contract: Concrete + site improvements.

Subcontract Dollar Value: $2,950,000.

License Number: 963050. CA License Classification/Type: A, B, C8, C21.

DIR Registration Number: 1000006893.

Name Under Which Subcontractor is Licensed: Sierra Fireproofing, Inc.

Subcontractor's Address: PO Box 893. Temple City CA 91780.

Specific Description of Sub-Contract: fireproofing.

Subcontract Dollar Value: $35,000.

License Number: 419299 CA License Classification/Type: C9, C35.

DIR Registration Number: 1000000768.

Subcontractors listed must be properly licensed under the laws of the State of California for the type of work which they are to perform. Do not list alternate subcontractors for the same work.

Subcontractors that must be listed are those that will perform work in an amount in excess of ½ of 1 percent of the total bid or $10,000, whichever is greater. (Pub Cont Code SS 4100 et seq.)

The Bidding Contractor must include each subcontractor's contract license number (AB 44). An inadvertent error in listing the subcontractor's license number shall not be grounds for filing a bid protest, or grounds for considering the bid nonresponsive, if the corrected contractor's license number is submitted to the public entity by the prime contractor within 24 hours after the bid opening – provided that the corrected license number corresponds to the submitted name and location of the subcontractor.

LIST OF SUBCONTRACTORS: B2017-39

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Name Under Which Subcontractor is Licensed: Trade Fire Protection Group.

Subcontractor's Address: 6824 Louise Ave. Van Nuys CA 91406.

Specific Description of Sub-Contract: fire sprinklers.

Subcontract Dollar Value: $40,000.

License Number: 793554 CA License Classification/Type: C16.

DIR Registration Number: 1000008959.

Name Under Which Subcontractor is Licensed: United Construction & Maintenance Inc.

Subcontractor's Address: 9018 Balboa Bl. #128. Northridge CA 91325.

Specific Description of Sub-Contract: Landsape & irrigation.

Subcontract Dollar Value: $485,000.-

License Number: 960915. CA License Classification/Type: C27.

DIR Registration Number: 1000002840.

Name Under Which Subcontractor is Licensed: COSCO Fire Protection Inc.

Subcontractor's Address: 29222 Rancho Viejo Rd #205. San Juan Capistrano. CA 92675.

Specific Description of Sub-Contract: fire alarm.

Subcontract Dollar Value: $48,000.

License Number: 577621. CA License Classification/Type: C10, C16.

DIR Registration Number: 1000002305

REFERENCES (Page 1 of 2) - B2017-39

List work similar in magnitude and degree of difficulty completed by the Contractor within the past three (3) years. Additionally provide other information requested in instructions to bidders section above and the section below. (addition Project History attached).

1. Name (Firm/Agency): UCLA.
   Address: 1060 Veteran Ave. LA CA 90095.
   Contact Person: Sajal Debnath. Telephone No.: 310. 825. 9961.
   Email Address: sdebnath@ha[redacted] ucla.edu.
   Title of Project: Hedrick Hall Dining/Study Renovation.
   Project Location: 250 De Neve Dr. LA CA 90095.
   Duration of Construction 270 Cdays.
   Date of Completion: 3/28/17. Contract Amount: $7,388,917.

2. Name (Firm/Agency): UCLA.
   Address: 1060 Veteran Ave. LA CA 90095.
   Contact Person: John D'Amico. Telephone No.: 310. 663. 1030.
   Email Address: jdamico@capnet.ucla.edu.
   Title of Project: Ostin Music Center.
   Project Location: 445 E. Charles E Young Dr. LA CA 90095.
   Duration of Construction 600 C days.
   Date of Completion: 12/15/15. Contract Amount: $16,756,936.

3. Name (Firm/Agency): Housing Authority City of LA.
   Address: 2600 Wilshire Bl. LA CA 90045.
   Contact Person: Tina Booth. Telephone No.: 213-252-8344.
   Email Address: tina.booth@hacla.org.
   Title of Project: Build Back for the HACLA Headquarter Building.
   Project Location: 2600 Wilshire Blvd. LA CA 90045.
   Duration of Construction 680 Days.
   Date of Completion: 12/10/13. Contract Amount: $16,125,265.

4. Name (Firm/Agency): City of Santa Clarita.
   Address: 23920 Valencia Bl. #300. Santa Clarita CA 91355.
   Contact Person: James Tong. Telephone No.: 661.510.2312.
   Email Address: jtong@santa-clarita.com.
   Title of Project: McBean Regional Transit Center Park and Ride.
   Project Location: 24375 Valencia Blvd. Santa Clarita. CA 91355.
   Duration of Construction 220 Days.
   Date of Completion: 6/19/14 Contract Amount: $ 3,635,245.

REFERENCES (PAGE 2 OF 2) - B2017-39

If Contractor has not performed work for the City of Torrance within the last five (5) years, list all work done within said five years (attach additional sheets if necessary). Note if work was done as subcontractor [include only subcontract amount]:

Work Description & Contract Amount	Agency and Contact Information	Date Completed
Old Town Newhall Library $12,750,000.	City of Santa Clarita. Henry Cordova. 661.286.4025. hcordova@santa-clarita.com.	3/18/13. G.C.
Horizon View Mental Health Rehab. $6,606,507.	County of Ventura. Brian D'Anna. 805.658.2025. brian.danna@ventura.org.	4/11/17. G.C.
Ryan Park Southern Entrance Realignment + Parking Lot Expansion $1144,639.	City of RPV. Mike Jenkins. 310.329.0102. mjenkins@koacorp.com.	7/17/15. G.C.
City Hall Expansion $2,325,320.	City of Simi Valley. Brian Gabler. 805.583.6701. bgabler@simivalley.org.	4/15/13 G.C.
(additional project history attached).		

Contractor's License No.: 775892. Class: A, B, C10, C17.

Contractor's DIR Registration No.: 1000005638.

a. Date first obtained: 1/13/99 Expiration: 1/31/19.

b. Has License ever been suspended or revoked? No.

If yes, describe when and why: N/A.

c. Any current claims against License or Bond? NO.

If yes, describe claims: N/A.

Principals in Company (List all – attach additional sheets if necessary):

NAME	TITLE (If Applicable)	LICENSE NO.
Monica Oh.	President	B479904.
Jimi Choe.	Secretary	C31532225 / 775892.
N/A.		

VIOLATIONS OF FEDERAL, STATE OR LOCAL LAWS
B2017-39

Contractor: Toro Construction Inc.

1. Has your firm or its officers been assessed any penalties by an agency for noncompliance or violations of Federal, State or Local labor laws and/or business or licensing regulations within the past five (5) years relating to your construction projects?

   Yes/No: No. Federal/State: no.

   If "yes," identify and describe, (including agency and status): N/A.

   Have the penalties been paid? Yes/No: ~~No~~ N/A.

2. Does your firm or its officers have any ongoing investigations by any public agency regarding violations of the State Labor Code, California Business and Professions Code or State Licensing Laws?

   Yes/No: No. Code/Laws: N/A Section/Article: N/A

   If "yes," identify and describe, (including agency and status): N/A.

DISQUALIFICATION OR DEBARMENT
B2017-39

Contractor: Tobo Construction Inc.

Has your firm, any officer of your firm, or any employee who has a proprietary interest in your firm ever been disqualified, removed, or otherwise prevented from bidding on, performing work on, or completing a federal, state or local project because of a violation of law or a safety regulation? Yes/No: No. If yes, provide the following information (if more than once, use separate sheets):

Date: N/A Entity: N/A

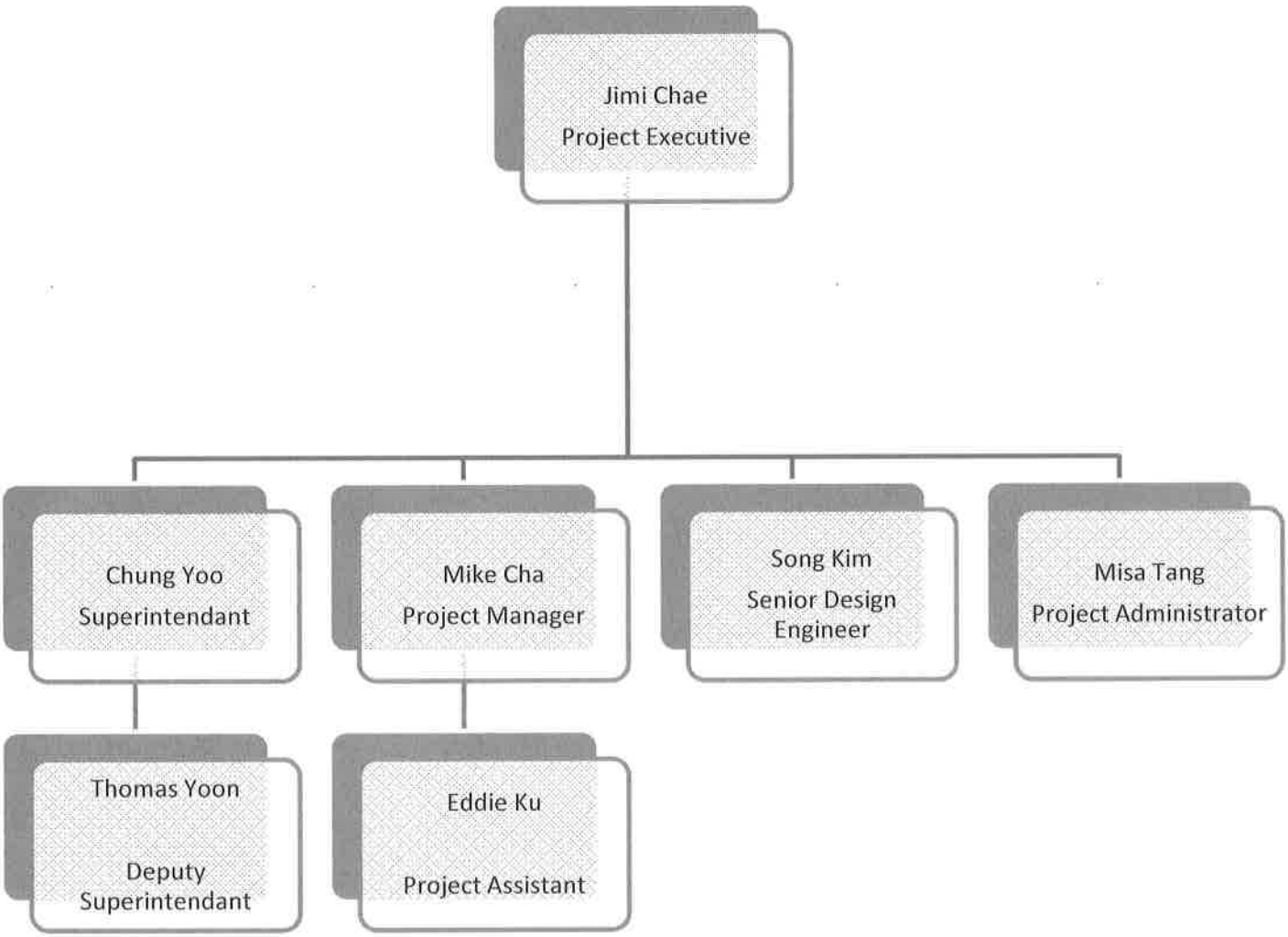
Location: N/A

Reason: N/A

Provide Status and any Supplemental Statement: N/A

Has your firm been reinstated by this entity? Yes/No: N/A.

TOBO Construction, Inc.



2500 PACIFIC COAST HIGHWAY, TORRANCE, CA 90505
Tel: (424) 378-1131 Fax: (877) 411-TOBO/8626

Project Team Resume

JIMI CHAE – Project Executive

- Student Services Center / City of Torrance / $24.7 Million / 2018 Completion
- Fire Station 27 / County of Ventura / $8.1 Million / 2018 Completion
- Lynwood City Hall Annex / City of Lynwood / $5.5 Million / 2017 Completion
- Ramona & Lone Hill Middle School Gymnasium / Bonita USD / $12.3 Million / 2017 Completion
- Hedrick Hall Dining / UCLA / $7.3 Million / 2016 Completion
- Horizon View Mental Health Rehabilitation / $6.6 Million / 2016 Completion
- Ryan Park Southern Entrance Expansion / City of RPV/ $714,639 / 2015 Completion
- Ostin Music Center / UCLA / $16.7 Million / 2015 Completion
- McBean Transit Center/City of Santa Clarita/ $3.8 Million / 2013 Completion
- Old Town Newhall Library/City of Santa Clarita/ $13.6 Million / 2013 Completion
- Renovation of Housing Authority Headquarters/Housing Authority City of Los Angeles/ $16.1 Million/ 2013 Completion
- Simi Valley City Hall Expansion /City of Simi Valley / $2.3 Million / 2013 Completion
- Fire Station 80/City of Los Angeles, World Airports / $9.2 Million / 2011 Completion
- San Pedro Community Center / County of LA / $1.1 Million / 2011 Completion
- Grand Stand & Restroom / LACCD / $1.7 Million / 2001 Completion
- Pierce College Equestrian & Animal Science Center / LACCD / $3.4 Million / 2009 Spring, Completion
- South LA Recreation Center / City of Los Angeles / $2.9 Million / 2007 Completion
- Blythe Street Recreation Center / City of Los Angeles / $3.0 Million / 2008 Completion
- Echo Park Pool / City of Los Angeles / $5.9 Million / 2008 Completion
- Downey Childcare Center / City of Los Angeles / $2.1 Million / 2007 Completion
- Vine School Project / Los Angeles Unified School District / $4.5 Million / 2007 Completion

MIKE CHA– Project Manager

- Student Services Center / City of Torrance / $24.7 Million / 2018 Completion
- Ramona & Lone Hill Middle School Gymnasium / Bonita USD / $12.3 Million / 2017 Completion
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- Blythe Street Recreation Center / City of Los Angeles / $3.0 Million / 2008 Completion
- Job Order Contract / County of Los Angeles / $3.5 million / 2008 Completion
- Downey Childcare Center / City of Los Angeles / $2.1 Million / 2007 Completion

CHUNG YOO– Senior Superintendent

- Ramona & Lone Hill Middle School Gymnasium / Bonita USD / $12.3 Million / 2017 Completion
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- Downey Childcare Center / City of Los Angeles / $2.1 Million / 2007 Completion

THOMAS YOON– Superintendent (current), Deputy Superintendent (2007-2011)

- Ramona & Lone Hill Middle School Gymnasium / Bonita USD / $12.3 Million / 2017 Completion
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- Downey Childcare Center / City of Los Angeles / $2.1 Million / 2007 Completion

MISA TANG – Project Administrator

- Ramona & Lone Hill Middle School Gymnasium / Bonita USD / $12.3 Million / 2017 Completion
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EDDIE KU – Project Assistant

- Student Services Center / City of Torrance / $24.7 Million / 2018 Completion
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SONG KIM – Senior Project Engineer

- Student Services Center / City of Torrance / $24.7 Million / 2018 Completion
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- Hedrick Hall Dining / UCLA / $7.3 Million / 2016 Completion

COMPANY AND TEAM'S LEED EXERIENCE

- Ostin Music Center / UCLA / $16.7 Million / 2015 Completion / LEED GOLD CERITIFCATION IN PROCESS
- Hedrick Hall Dining / UCLA / $7.3 Million / 2016 Completion / LEED GOLD MAY 2017
- Old Town Newhall Library/City of Santa Clarita/ $13.6 Million / 2013 Completion / LEED GOLD 2015

JIMI CHAE – Project Executive

MIKE CHA– Project Manager

CHUNG YOO– Senior Superintendent

THOMAS YOON– Superintendent (current)

MISA TANG – Project Administrator

EDDIE KU – Project Assistant

SONG KIM – Senior Project Engineer

1000055186, Los Angeles, CA

Hedrick Hall Dining/Study Renovation

LEED ID+C: Commercial Interiors (v2009)

GOLD, AWARDED MAY 2017

SUSTAINABLE SITES — AWARDED: 17 / 21

SSc1	Site selection	3 / 5
SSc2	Development density and community connectivity	6 / 6
SSc3.1	Alternative transportation - public transportation access	6 / 6
SSc3.2	Alternative transportation - bicycle storage and changing rooms	0 / 2
SSc3.3	Alternative transportation - parking availability	2 / 2

WATER EFFICIENCY — AWARDED: 0 / 11

WEc1	Water use reduction	0 / 11

ENERGY & ATMOSPHERE — AWARDED: 30 / 37

EAc1.1	Optimize energy performance - lighting power	1 / 5
EAc1.2	Optimize energy performance - lighting controls	2 / 3
EAc1.3	Optimize energy performance - HVAC	10 / 10
EAc1.4	Optimize energy performance - equipment and appliances	2 / 4
EAc2	Enhanced commissioning	5 / 5
EAc3	Measurement and verification	5 / 5
EAc4	Green power	5 / 5

MATERIAL & RESOURCES — AWARDED: 6 / 14

MRc1.1	Tenant space - long-term commitment	1 / 1
MRc1.2	Building reuse - maintain interior nonstructural elements	0 / 2
MRc2	Construction waste Mgmt	2 / 2
MRc3.1	Materials reuse	0 / 2
MRc3.2	Materials reuse - furniture and furnishings	0 / 1
MRc4	Recycled content	1 / 2
MRc5	Regional materials	1 / 2
MRc6	Rapidly renewable materials	0 / 1
MRc7	Certified wood	1 / 1

INDOOR ENVIRONMENTAL QUALITY — AWARDED: 8 / 17

EQc1	Outdoor air delivery monitoring	0 / 1
EQc2	Increased ventilation	0 / 1
EQc3.1	Construction IAQ Mgmt plan - during construction	1 / 1
EQc3.2	Construction IAQ Mgmt plan - before occupancy	0 / 1
EQc4.1	Low-emitting materials - adhesives and sealants	1 / 1
EQc4.2	Low-emitting materials - paints and coatings	1 / 1
EQc4.3	Low-emitting materials - flooring systems	1 / 1
EQc4.4	Low-emitting materials - composite wood and agrifiber products	1 / 1
EQc4.5	Low-emitting materials - systems furniture and seating	0 / 1
EQc5	Indoor chemical and pollutant source control	0 / 1
EQc6.1	Controllability of systems - lighting	1 / 1
EQc6.2	Controllability of systems - thermal comfort	0 / 1
EQc7.1	Thermal comfort - design	1 / 1
EQc7.2	Thermal comfort - verification	1 / 1
EQc8.1	Daylight and views - daylight	0 / 2
EQc8.2	Daylight and views - views	0 / 1

INNOVATION — AWARDED: 6 / 6

IDc1	Innovation in design	5 / 5
IDc2	LEED Accredited Professional	1 / 1

REGIONAL PRIORITY — AWARDED: 4 / 4

EAc1.1	Optimize energy performance - lighting power	0 / 1
EAc1.3	Optimize energy performance - HVAC	1 / 1
MRc2	Construction waste Mgmt	1 / 1
MRc5	Regional materials	1 / 1
MRc7	Certified wood	1 / 1
WEc1	Water use reduction	0 / 1

TOTAL 71 / 110

40-49 Points	50-59 Points	60-79 Points	80+ Points
CERTIFIED	SILVER	GOLD	PLATINUM

1000000281, Santa Clarita, CA

Old Town Newhall Library

LEED BD+C: New Construction (v2009)

GOLD, AWARDED JAN 2015

SUSTAINABLE SITES — AWARDED: 16 / 27

SSc1	Site selection	1 / 1
SSc2	Development density and community connectivity	5 / 5
SSc3	Brownfield redevelopment	0 / 1
SSc4.1	Alternative transportation - public transportation access	6 / 6
SSc4.2	Alternative transportation - bicycle storage and changing rooms	0 / 1
SSc4.3	Alternative transportation - low-emitting and fuel-efficient vehicles	0 / 3
SSc4.4	Alternative transportation - parking capacity	2 / 2
SSc5.1	Site development - protect or restore habitat	0 / 1
SSc5.2	Site development - maximize open space	0 / 1
SSc6.1	Stormwater design - quantity control	0 / 1
SSc6.2	Stormwater design - quality control	1 / 1
SSc7.1	Heat island effect - nonroof	0 / 1
SSc7.2	Heat island effect - roof	1 / 1
SSc8	Light pollution reduction	0 / 1
SSpc121	Solar Access to Green Space	REQUIRED

WATER EFFICIENCY — AWARDED: 5 / 10

WEc1	Water efficient landscaping	2 / 4
WEc2	Innovative wastewater technologies	0 / 2
WEc3	Water use reduction	3 / 4

ENERGY & ATMOSPHERE — AWARDED: 18 / 35

EAc1	Optimize energy performance	12 / 19
EAc2	On-site renewable energy	0 / 7
EAc3	Enhanced commissioning	2 / 2
EAc4	Enhanced refrigerant Mgmt	2 / 2
EAc5	Measurement and verification	0 / 3
EAc6	Green power	2 / 2

MATERIAL & RESOURCES — AWARDED: 6 / 14

MRc1.1	Building reuse - maintain existing walls, floors and roof	0 / 3
MRc1.2	Building reuse - maintain interior nonstructural elements	0 / 1
MRc2	Construction waste Mgmt	2 / 2
MRc3	Materials reuse	0 / 2
MRc4	Recycled content	2 / 2
MRc5	Regional materials	2 / 2

MATERIAL & RESOURCES — CONTINUED

MRc6	Rapidly renewable materials	0 / 1
MRc7	Certified wood	0 / 1

INDOOR ENVIRONMENTAL QUALITY — AWARDED: 9 / 15

EQc1	Outdoor air delivery monitoring	1 / 1
EQc2	Increased ventilation	1 / 1
EQc3.1	Construction IAQ Mgmt plan - during construction	1 / 1
EQc3.2	Construction IAQ Mgmt plan - before occupancy	0 / 1
EQc4.1	Low-emitting materials - adhesives and sealants	1 / 1
EQc4.2	Low-emitting materials - paints and coatings	1 / 1
EQc4.3	Low-emitting materials - flooring systems	1 / 1
EQc4.4	Low-emitting materials - composite wood and agrifiber products	0 / 1
EQc5	Indoor chemical and pollutant source control	0 / 1
EQc6.1	Controllability of systems - lighting	1 / 1
EQc6.2	Controllability of systems - thermal comfort	0 / 1
EQc7.1	Thermal comfort - design	1 / 1
EQc7.2	Thermal comfort - verification	1 / 1
EQc8.1	Daylight and views - daylight	0 / 1
EQc8.2	Daylight and views - views	0 / 1

INNOVATION — AWARDED: 3 / 6

IDc1	Innovation in design	2 / 5
IDc2	LEED Accredited Professional	1 / 1

REGIONAL PRIORITY — AWARDED: 3 / 4

EQc8.1	Daylight and views - daylight	0 / 1
SSc1	Site selection	1 / 1
SSc4.1	Alternative transportation - public transportation access	1 / 1
SSc7.1	Heat island effect - nonroof	0 / 1
WEc1	Water efficient landscaping	1 / 1
WEc3	Water use reduction	0 / 1

TOTAL 60 / 110

40-49 Points	50-59 Points	60-79 Points	80+ Points
CERTIFIED	SILVER	GOLD	PLATINUM

Please upgrade your browser. This site requires a newer version to work correctly. Read more

Account

LEED BD+C: New Construction v3 - LEED 2009

UCLA Ostin Music Center Addition

Certification in progress

445 Charles E. Young Drive East
Los Angeles, CA
90024
United States

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Tobo Construction Inc.

Project History-Completed 5 years

Project Name	Hedrick Hall Dining/Study Renovation	Horizon View Mental Health Rehabilitation	Ostin Music Center
Project Description	renovation of cafeteria/study	new construction of health rehab	Addition of Music Center
Project No.	Project# 946479.01 Order# 9910ZTA322	Spec# CP12-08 Project# ENT12104	contract: 9910ZQA144 Project: 940177.01
Completion Date	03/28/17 CERT OF OCCPNCY-1/13/17	04/11/2017 7/5/2016-Occpncy	10/1/2014-Occupation 12/15/15-NOC
Original Duration Days	270 Cdays	200 Wdays	600
Total Contract Amount	$7,388,917	$6,606,507	$16,756,936
Owner	UCLA	County of Ventura	UCLA
Project Location	250 De Neve Drive Los Angeles, CA 90095	333 Skyway Drive Camarillo, CA 93010	445 Charles E Young Drive Los Angeles, CA 90095
Owner Address	1060 Veteran Avenue Los Angeles, CA 90095	800 S Victoria Ave. Ventura, CA 93009	1060 Veteran Avenue Los Angeles, CA 90095
Owner Contact	Sajal Debnath	Brian D'Anna	John D'Amico
Contact E-Mail	sdebnath@ha.ucla.edu	brian.danna@ventura.org	JDAmico@capnet.ucla.edu
Contact Phone	310-825-9961	805-658-2025	310-663-1030
LEED Certification	GOLD		IN PROCESS-2015

Tobo Construction Inc.

Project History-Completed 5 years

Project Name	Ryan Park Southern Entrance Realignment and Parking Lot Expansion Project	McBean Regional Transit Center Park and Ride	Build Back for the Headquarter of Los Angeles Housing Authority
Project Description	Alignment & Expansion of Parking Lot	Construction of Transit Center	TI of Housing Authority Headquarters
Project No.	014812	T1012	HA-2010-1697
Completion Date	03/17/15	6/19/14-NOC 8/29/13	12/10/13-occupancy certificate
Original Duration Days	120	220	680
Total Contract Amount	$714,639	$3,635,245	$16,125,265
Owner	City of RPV	City of Santa Clarita	Housing Authority City of Los Angeeles
Project Location	30259 Hawthorne Blvd. Rancho Palos Verdes, CA 90275	24375 Valencia Blvd. Santa Clarita, CA 91321	2600 Wilshire Blvd. Los Angeles, CA 90045
Owner Address	30940 Hawthorne Blvd. Rancho Palos Verdes, CA 90275	23920 Valencia Blvd., Suite 300 Santa Clarita, CA 91355-2196	2600 Wilshire Blvd, Los Angeles, CA 90045
Owner Contact	Mike Jenkins	James Tong	Tina Booth
Contact E-Mail	mjenkins@koacorp.com	jtong@santa-clarita.com	tina.booth@hacla.org
Contact Phone	310-329-0102	661-510-2312	213-252-8844
LEED Certification			

Tobo Construction Inc.
Project History-Completed 5 years

Project Name	**City Hall Expansion**	**Old Town Newhall Library**
Project Description	Addition to Simi Valley City Hall	Construction of New Library
Project No.	CM-2012-1	10-00517
Completion Date	04/15/13	03/18/13
Original Duration Days	423	540
Total Contract Amount	$2,325,326	$12,750,000
Owner	City of Simi Valley	City of Santa Clarita
Project Location	2929 Tapo Canyon Road Simi Valley, CA 93063	22601 Lyons Avenue Santa Clarita, CA 91321
Owner Address	2929 Tapo Canyon Road Simi Valley, CA 93063	23920 Valencia Blvd., Suite 300 Santa Clarita, California 91355
Owner Contact	Brian Gabler	Harry Corder
Contact E-Mail	bgabler@simivalley.org	hcorder@santa-clarita.com
Contact Phone	805-583-6701	661-286-4025
LEED Certification		GOLD

HEDRICK HALL DINING

Owner: University of California- Los Angeles

Project Value: $7.3 Million

Project Scope: Renovation of cafeteria and study area

Reference Contact: Sajal Debnath | 310-825.9961

OSTIN MUSIC CENTER

Owner: University of California- Los Angeles

Project Value: $16.7 Million

Project Scope: New construction of music hall

Reference Contact: JohnD'amico | 310.663.1030

Housing Authority of City of Los Angeles

Owner: Housing Authority of City of Los Angeles

Project Value: $16.1 Million

Project Scope: Improvements of Housing Authority Headquarters

Reference Contact: Tina Booth | 213-252-8844

McBean Transit Center

Owner: City of Santa Clarita

Project Value: $3.6 Million

Project Scope: New construction of Transit Center

Reference Contact: James Tong | 661.510.2312

Old Town Newhall Library

Owner: City of Santa Clarita

Project Value: $12.7 Million

Project Scope: New construction of public library

Reference Contact: Harry Corder | 661.286.4025

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.

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"

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.

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

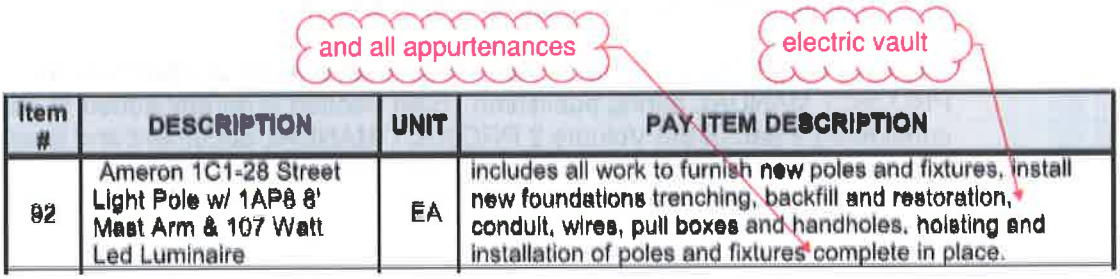
D. REFER TO SPECIFICATIONS, VOLUME 1, SECTION E – SPECIAL PROVIONS, SUBSECTION 9-3.7 BID ITEM DESCRIPTIONS, PAGE E-61.

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

- Bid Item #92. The "Pay Item Description" is hereby amended to:

  "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

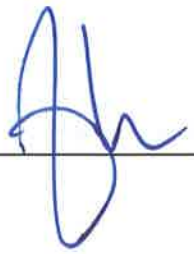
CRAIG BILEZERIAN
Deputy Public Works Director/City Engineer

Enclosures

BIDDER'S CERTIFICATION

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

Tobo Construction Inc.
Bidder

By 

09/12/17
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 ID1.2/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

CITY OF TORRANCE, CALIFORNIA

ADDENDUM NO. 2
Issued: November 7, 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 6a:

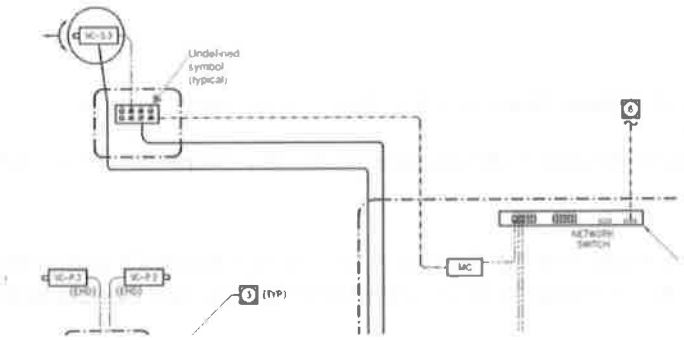
1) Is the fiber between network switches to be included in the security scope?

A6a: Refer to Addendum 2, Item III.F for revised Plan Sheets A1-11, A4-15 and E-101. sheets providing clarifications and adjustments related to low voltage distribution. Specified 12-strand fiber optic cable is specified in Section 280513 Article 2.2 Paragraph C. Note that 2-strand fiber cable connecting to the parking lot cameras is part of the security contractor's requirements and specified in Section 280513.

RFI 6b:

2) Reference part of Drawing Sheet EY600 (see next page).

There is an undefined symbol on the single line drawing. Is this a hardened network switch? Is it to be provided by the City IT (like the other network hardware)?



A6b: The referenced device in the drawing attached to the Bidder's RFI (partial, marked up portion of plan shown above) is a hardened outdoor rated switch. It is specified in Section 282300, Article 2.2, Paragraph B.

RFI 7:

1) Please clarify if the Owner will be providing the Builders Risk and Earthquake insurance coverage for the Project.

A7: The Owner will not provide Builders Risk and Earthquake insurance coverage. There is no such requirement for this project.

RFI 8:

1) We are a prospective bidder for the electrical systems on the Torrance Transit Park and Ride project. We have reviewed the bid documents and do not find any reference to a Project Labor Agreement for this project. Experience has taught us they are not always brought forth at the bid process. Could you please confirm there is or is not a PLA attached to this project.

A8: There is no Project Labor Agreement (PLA) for this project.

RFI 9a:

1 – Section E – Special Provisions, page E-64 includes Bid Item 127. This is not included in the Bid Schedule in Section C. Please clarify if required.

A9a: Refer to Addendum 2, Item III.A for revised Bidder's Submittal Packet and Item III.C for pay item description.

RFI 9b:

2 – Due to the extensive breakdown required at bid time, we respectfully request an Excel spreadsheet of the Bid Schedule
in Section C be provided for all bidders use.

A9b: An Excel spreadsheet of the Bid Schedule, including items revised per this Addendum 2, is available to download at the City's project website:

https://www.torranceca.gov/our-city/public-works/park-and-ride-regional-terminal

The Excel spreadsheet may not be used as the Bid form submitted to the City. Only the official Bidder's Submittal issued by the City is permitted.

RFI 9c:

3 – Addendum #1 included Specification 11 5200 – Audio Visual Systems. This spec includes Bid pricing and a Bid Alternate price
breakout that is not included in the Bid Schedule found in Section C. Please confirm these additional bids are not required.

A 9c: Refer to Addendum 2, Item III.A for revised Bidder's Submittal Packet, Item III.C for pay item descriptions and Item III.E for revised Specification Section 115200.

RFI 10a:

a.1: Detail 4 & 5/A8-91 shows guardrail detail at the roof. The roof plans do not show any guardrail. Is this guardrail required at any of the roofs? If so, where are these located?

A 10a: Detail 14/A8-90 shows the roof hatch-mounted guard rail (Bilco or equal) as noted on A2-41. Details 4 & 5/A8-91 may be omitted.

RFI 10b:

b.2: Detail 4 & 12/A8-82 shows structural steel angles attached to the bottom of the beams for the plank ceiling. These angles are not shown on the structural design drawings nor any details for these angles. What size are the angles? Are these continuous the length of the canopy? Provide additional structural details as necessary?

A 10b: Refer to Addendum 2, Item III.E for supporting structural calculations specifying sizes for connections and clarifying spanning members and Item III.F for revisions to Plan Sheets A2-43, A3-02, A3-25.

RFI 10c:

c.3: Detail 16/A8-82 shows a heavy bolted connection to 14GA framing. No detail provided in the structural design drawings. What size is the connection angle and how often does this connection occur?

A 10c: Refer to Addendum 2, Item III.E for supporting accompanying structural calculations and Item III.F for revisions to Plan Sheets A8-82 and A8-84b.

RFI 11:

1) What type of Sunshade (Light Shelf) to be used for this Project?

A11: Refer to Addendum 2, Item III.E for new specification section 10 7113, which specifies the product.

RFI 12a:

a.4 – Specification 09 3000 – Tiling includes a tile schedule that does not match the Interior Schedule ID0.10. Please confirm the schedule on ID0.10 is correct.

A 12a: Refer to Addendum 2, Item III.F for revised Plan Sheet ID0.10, which is associated with specification section 09 3000. See Item III.E for Revised specification section 09 6616 clarifying terrazzo tile finish.

RFI 12b:

b.5 – Provide Specifications for Acoustical Panels AP-01 thru AP-04 shown on the Interiors Schedule ID0.10 and misc. interior elevations.

A 12b: Refer to Addendum 2, Item III.E for new specification section 09 7723.

RFI 12c:

c.~~6~~ – Confirm if the cast-in-place concrete benches are to be per 1/A1-11 (18" x 30" x 8'-0" long) or per L1.11 & 7/L1.50 (18" x 24" x 10'-0" long).

A 12c: Dimensions shown on landscape sheets are correct. Refer to Addendum 2, Item III.F for revised Plan Sheet A1-11.

RFI 12d:

d.~~7~~ – Interiors drawing ID1.13 and 2/ID1.15 indicate wall covering WC-01 at the Conference Room 202. Architectural Interior elevation 15/A7-40 indicates wall finish W-01 (gyp architectural panels) at the same location. Please clarify which wall covering is desired. Ref.: ID0.10

A 12d: WC-01 is correct as shown on ID010. Refer to Addendum 2, Item III.F for revised Plan Sheet A7-40.

RFI 12e:

e.~~8~~ – Will the Owner provide all relevant electronic files (Revit, etc.) to the awarded Contractor for BIM coordination (ref: Spec 01 7839/3.3)?

A 12e: Yes. A waiver will need to be signed by the awarded contractor. Refer to Addendum #2, Item III.E for new specification Appendix that includes the waiver.

RFI 13:

Ref. Sheet M-301, Details #9,10,11, & 17
On Sheet M-301, the controls are shown as what appears to be stand alone controls but The Instrumentation and Control Devices section in the Spec's refer to Automated Logic with a BAS System.
Which one is required? If BAS we will need a Sequence of Operations, required points, etc. Please clarify.

A 13: There is no Energy Management System (EMS) proposed for the project. Both buildings will have an Emergency Mode shutdown method with Emergency Power Off (EPO) switch per note 11 on Sheet E-201 and Note 24 on Sheet E-111. In normal mode, the Fan coils will control to a standalone thermostat.

RFI 14a:

a9 – Please confirm the correct reference for Keynote 05.11 on A3-02 for the canopy column covers is 17/A1-13 and not 8/A8-30.

A 14a: Confirmed. Refer to Addendum 2, Item III.F for revised Plan Sheet A3-02.

RFI 14b:

b10 – Please clarify if the glass guardrail shown on A7-31 is to have a stainless steel cap per Specification 05 5000/2.2F, or if it should match the elevation shown on 17/A9-02.

A 14b: The glass guardrail shown on A7-31 will have a stainless steel cap per the Specifications.

RFI 14c:

c11 – Please clarify if the exterior block is to be burnished per Keynote 04.02 on misc exterior elevation drawings (A3-03, A3-04, etc.) or split faced or glazed per Concrete Unit Masonry Specifications 04 2200. In addition, please clarify where the glazed block is required, if so.

A 14c: No glazed block. All Glacier White block is to be single score burnished (exposed sides) block. Accent block Summer is not required to be burnished. Refer to Exterior Elevation sheets A3-01 through A3-04.

RFI 14d:

d12 – Please confirm the Bus Bay Canopy is to be included in the bid proposal as misc. notes on S2-09 and A1-01 indicate a separate permit, final design required and no specifications are provided for this prefab canopy by Coverworx.

A 14d: The prefab canopy is a design-build item provided by the contractor and must meet the design criteria established in the Contract Documents. As a prefabricated solution, the manufacturer, once contracted, will need to provide the final engineering for City regulatory review.

RFI 14e:

e13 – Please confirm Mechanical Room Traffic Coating Specification 07 1800 is not required. ID drawings indicate the mechanical and elevator machine rooms to have sealed concrete floors, not traffic coating.

A 14e: The 07 1800 traffic coating specification refers to all CS-01 locations. Refer to Addendum 2, Item III.F for revised Plan Sheet ID0.10.

RFI 15a:

a 14 – Please confirm the Glazing Legends on A8-01 & A8-02 are to be used in lieu of the GL-1, 2 & 3 included in Glass & Glazing Specification 08 8100.

A 15a: Confirmed. Glass assembly is to follow the logic and description from the specification while adhering to the requirements and specific tint colors identified in A8-01 and A8-02.

RFI 15b:

b 15 – Window Schedule A8-01 indicated GL-6 one-way mirror at Window #108. Interiors sheet ID1.11 indicates VW-01, a vinyl graphic film cover at this location. Please clarify if both finishes are required at Window #108.

A 15b: Yes. The vinyl film is a laser cut graphic and mirror work together to create a design effect. The final graphic design is being curated under separate RFP (By Others / NIC).

RFI 15c:

c 16 – See painting subcontractor's questions:
1. Please refer to plan sheet A2-43 this canopy indicates high-performance coatings. Please reference specification 09 9600 and confirm which system is to be utilized for the canopy. If 2.4 Fluoropolymer coating system is to be utilized can you please clarify the primer. 1. Shop Primer Tnemec 90-97Tnemec Zinc 2. Spot Primer: Tnemec Series 94-H20 3. Intermediate Coating: 90-97 Tnemec-Zinc. Please note the

94H20 is for spot priming done in the field which is correct but this spec indicates intermediate coat of 90-97 Tnemec-Zinc is applied again after spot - priming which isn't accurate. Please clarify.

A 15c: The canopy's exposed structure addressed in Section 05 1213, titled "Architecturally-Exposed Structural Steel," and application of its Fluoropolymer coating system is described in Section 09 9600, Article 2.4., as noted. Section 05 1213 indicates that the primer 90-97 is applied in the shop. After steel erection, a spot primer is to be applied to damaged areas, then another coat of 90-97 is applied (the intermediate coat), followed by the finish coat.

RFI 15d:

d 2. Please confirm if the canopy structural members are going to be provided shop-primer with 90-97 Tnemec Zinc.

A 15d: Shop applied primer 90-97 is applied in the shop and after installation.

RFI 15e:

e 8. Please clarify the finish of the underside of the exposed metal deck at this canopy and if field painted with high-performance coatings which system is to be utilized as well. If the metal deck is being galvanized and requires a high-performance coating system in the field it changes the overall surface preparation.

A 15e: Metal decking is galvanized and is painted as specified in Section 09 9600, 2.5 "COATING SYSTEM FOR EXTERIOR GALVANIZED STEEL." It is at the contractor's discretion to paint in the field or to provide shop painted material and retouch in the field.

RFI 15f:

f 17 – Please provide further information regarding Keynote 10.04 – Alum Frame Fabric Snap Tension Panel System shown on A3-01 & A3-03 (Specification, Product #, etc.). In addition, please confirm only the frame is required with the bid as indicated on wall sections 1/A3-22 & A3-31B (Keynote 10-01).

A 15f: Correct. The final graphic design is being curated under separate RFP.

RFI 15g:

g 18 – Misc. Interior drawings indicate VW-02 as a wall finish (see ID1.11, ID1.12 & ID1.15). This wall finish code is not included in the Finish Schedule ID1.10. Please clarify if this is WC-02 included in Specification 09 7216 Vinyl Graphic Film Wall Covering.

A 15g: VW-02 as called out in the stair well on sheet ID1.11 is accompanied by note: "See Architectural plans for stair material". 151A & 201C/A7-31 identifies this wall as smooth trowel integral colored plaster wall with ¾" clear anodized fry reglet reveals. This finish is to wrap all sides of this freestanding wall.

RFI 16a:

In reference to the Torrance Transit Park and Ride Regional Terminal project bidding on 11/15/17, please clarify the following:

a 1. Please provide the Insulated Aluminum Panel location (noted 08-04 wall section keynote and spec. 074243-3 Composite Metal Panels).

A16a: Refer to Addendum 2, Item III.F for revised Plan Sheets A3-02, A3-25, and A8-82 clarifying aluminum panel locations at canopy.

RFI 16b:

b 2. Please advise what area needs to be covered per section 071813-3 Pedestrian Traffic Coating.

A 16b: Refer to Addendum 2, Item III.F for revised Plan Sheet A4-25 showing the Pedestrian Traffic Coating application location at Exterior Patio 211.

RFI 17a:

19 – See Signage subcontractor's questions below. Addendum #1 Specification 10 13 00 – Dynamic Digital Displays include numerous options (LCD display, plasma, LED, touch screen, etc.):
a.1 - Will the Double Face be in Master / Slave configuration or Master / Master?

A 17a: Master/Slave configuration.

RFI 17b:

b.2 - Communication? Hardwired? Distance? Ethernet cable or Fiber cable?

A 17b: These items are to be determined by the vendor for the system proposed that conforms to the contract specifications related to this item.

RFI 17c:

c.3 - How are these signs going to be programmed? From where? Will they have a programming

A 17c: Refer to Specifications Section 101300 B.4.

RFI 17d:

d.4 - Does the Owner have their own content management software which they want to use and have Digital LED sign compatible with that?

A 17d: The City uses General Transit Feed Specification-Real Time software by Google for its Event Management System.

RFI 17e:

e.1. Please reference 3/A8-82, 3/A8-84 Metal Siding w/ Kynar XL Finish And Field Applied High-Performance Coating Installed on Air and Water Barrier over CMU. Can you please clarify this item and system to be utilized – both prefinished and field finished siding?

A 17e: Refer to Addendum #2, Item III.F, for revised sheets A8-82 and A8-84 noting desired Zincalum+ finish. Prefabricated panel system specified in Specification Section 07 4619 is to be prefinished per Section 05 0514. Per Section 09 9100a, all field-painted systems are to be high performance paint finish as specified in Section 09 9600.

RFI 17f:

f .2. Please reference 4,12/A8-82 Linear ACM plank ceiling system indicated high-performance paint finish. Please clarify if this is factory finished or field finished. This is typically a prefinished system prior to field installation.

A 17f: Yes, this is to be a factory finish for this prefabricated system. Fascia to be custom silver and underside to be custom copper color. Both colors to be coordinated with architect during construction to ensure alignment with Torrance Transit branding.

RFI 17g:

g 4: Please clarify the finishes required at the Commercial Spaces 102 & 150. Do the walls and exposed ceilings require painting at these areas?

A 17g: Yes, these spaces are to be floated to level 4 finish, painted and primed as shown.

RFI 17h:

h 5: Please confirm that the interior of the electrical yard and transformer enclosure cmu walls are only to receive water repellents since they're not exposed to public view.

A 17h: Yes, confirmed

RFI 17i:

i 6: Please clarify which structural members require thin-film intumescent fireproofing Coating and rating required. The coatings specified in Specification 07 8124 are for interior use.

A 17i: Elevator columns to receive intumescent fireproofing finish as shown on 17/A9-11. Only elevator machine room requires rating, finish to be applied as shown on machine room side only.

RFI 17j:

j 21 – Please provide specifications for the 2'-0" wide linear metal plank ceiling at the Bus Canopy shown on A2-43. Or revise Specification 09 5423 which only includes the 4" interior plank Hunter Douglas product at the East bldg. lobbies.

A 17j: Linear plank material is not an off-the-shelf ceiling system, but a custom fabrication made from ACM panels per 07 4243.

RFI 18:

Electrical and security drawings do not reflect the same quantity or location for security cameras, which set of drawings should we follow?

A 18: Security Camera locations and quantities shall be based on security plans. Conduit must be provided at all security camera locations and within all inaccessible ceiling and/or wall spaces to the accessible ceiling spaces with complete routing back to the security head end equipment within the IT room.

Refer to Addendum 2, Item III.F for revised sheets E-100, E-101 & E-111.

RFI 19a:

a 22 – As a follow-up to Addendum #1, Q#1: Appendix I, Paragraph 18- Insurance specifically requires all subcontractors to provide the same limits of insurance as the general contractor. Many subcontractors do not carry the higher limits and therefore may choose not to bid the project resulting in increased

cost. The alternative is for the GC to purchase a separate project insurance policy which covers the GC and all of the subcontractors and that will significantly increase the insurance cost for the project. Will the City allow subcontractors to meet the following minimum requirements, $2,000,000 for General Liability and $1,000,000 for Automobile Liability?

A 19a: No. Requirements are as stated in Addendum #1.

RFI 19b:

b 23 - Paragraph 19 requires all insurance companies to be "admitted" in the State of California which means they must be licensed in the State. This eliminates the majority of insurers who provide insurance to the construction industry who are "authorized" to do business in the State of California but are not licensed in the state. Will the City allow insurers "authorized" to do business in the State of California?

A 19b: No.

RFI 19c:

c 24 – Please clarify if the Eco Resin Panels (RE-01, 02 & 03) should be by Lumicor per the Interiors Material Schedule ID0.10 or Varia Wave by 3-Form per the Specifications 12 3630.

A 19c: Refer to Addendum#2, Item III.E for revised Specification Section 12 3630, which will specify the manufacturer for the product.

RFI 19d:

d 25 – Please provide additional information for the requirements of the Electric Vehicle Charging Stations shown on E-100 & E-003. If these are to be included with the bid, specifications, etc. is required. GE DuraStation indicated in Note 16 has numerous models available.

A 19d: – Refer to Addendum #2 for, Item III.G for the specified the City's model number for Electric Charging dual station set up (Reference E-003 and E-100).

RFI 19e:

e 26 – Confirm the scope required for the PhotoVoltaic panels shown on A2-41, S2-05, 10/S8-02. PV panels are not shown on 1/E-113. Is it to be Backbone only? If not, additional information (specifications, wattage, switch gear req'mts, etc.) is required. Please provide.

A 19e: The bid documents include the parameters of the PV System (rated and sized as indicated on sheet E-003, construction note 2) and location of potential PV inverter (E-200/1). It is the contractor's responsibility to design and install a PV design/build system to meet the requirements and PV locations shown on architectural and electrical drawings.

RFI 19f:

f 27 – Please clarify where Utility Service Trench detail 4/E-300 occurs. Site plans E-100 and P-101 do not reference this detail. Note 6 implies the electrical subcontractor is to coordinate with ALL utility companies involved, PRIOR to bid, including the gas company. As this information may not be readily available, this may lead to incomplete or overinflated pricing at bid time. Please confirm work shown on E-100 & E-101 are correct. Also, Note 3 indicates the trench "not be covered" until final outside services are complete. Please clarify if the final pavement be left off until utility services are completed? In addition, a gas line is shown in the same trench as the power. This is not standard practice, so please clarify if it will be allowed per code.

A 19f: Detail 4/E-300 is related to the identical detail shown on various plans for the construction of 208th St. See C2015; SL-2015-002; SS-386; and ST-1066. Refer to Addendum #2 Item III.A for new bid item #128 and Item III.C for the pay item #128 description to address the joint trench. Any single utility or multiple set of utilities in a joint trench will be to applicable code(s).

RFI 20a:

a 28 – Please clarify if the Psomas Civil Drawings C-101 thru C-502 dated 4/10/2017 supersede the Civil Drawings C-1 thru C-9 included with the Off-Site Drawings as Reference Drawings (see drawing C 00).

A 20a: No. Drawings C-1 through C-9 represent rough grading work completed in 2016 and are provided for reference, and are to be considered along with the contractor's in-person review of current site conditions in order to fully incorporate scope as required to provide for the civil scope shown in drawings C-101 through C-502.

RFI 20b:

b 29 – For bidding information and reference, is an SCE plan available? Even a preliminary SCE plan would be helpful for evaluating the off-site work.

A 20b: Refer to Addendum #2, Item III.F for the Final SCE utility design plans.

RFI 20c:

c 30 – Architectural wall sections A3-23, A3-31, etc. indicate Keynote 07-01 for the roofing at the East and West Buildings. This Keynote indicates light weight concrete on metal deck. Structural drawings S2-05 & S2-07 call out Type D2 deck, which does *not* have concrete (ref: 1/S1-09). Please clarify what system required at the East Bldg high roof and West Bldg roof.

A 20c: Both East and West building roof decking will not have concrete as identified in Structural Sheet S1/S1-09+G67. Refer to Addendum #2, Item III.F. for revised Plan Sheets A3-21 through A3-38 to correct the roof assembly details.

RFI 20d:

d ~~31~~ – Canopy elevation 4/A3-02 indicates Keynote 05.12 – Stainless Steel Fascia & Detail 4/A8-82. Specification 07 4243 Composite Metal Panels is an aluminum material. Please clarify finish of the acm panels.

A 20d: Fascia shall be prefabricated Aluminum Composite Material (ACM) panel with custom silver finish to be coordinated with architect during construction to ensure alignment with Torrance Transit branding. Refer to Addendum #2, Item III.F for revised sheet A8-82.

RFI 21:

In reference to the Torrance Transit Park and Ride Regional Terminal project bidding on 11/15/17, please confirm the Underground Detention Basin per SP-504 & 18" RCP SD is existing condition per C-201.

A 21: Confirmed as existing improvements to be protected in place.

RFI 22:

We are General Contractor Interested bidding the above project, Per Specifications there is a minimum requirements for the GC's experience.
The specs noted that the GC to have or list two (2) LEED Gold Certified Project.
We can provide other LEED Certified Projects, LEED Silver Certified Project, and a LEED GOLD Certified Project as reference.
Please advise if you can reconsider at least having one (1) LEED Gold Certified Project as a Reference/experience.

A 22: We cannot reconsider. The qualifications requirements stipulated in the Bid documents remain unchanged.

RFI 23a:

a- Sign type 1 - There will be a minimum of 5 seams due to material size availability.

A23a: Suggested number of seams is acceptable, but no seams will be permitted through perforated areas. 6'-0" X 12'-0" Panels, 11 Gauge available from Beyond Steel. Contact Name Alex (562) 803-0202, 9650 Washburn Rd, Downey, CA 90241, https://www.beyondsteelinc.net/

RFI 23b:

b- Sign type 1: There will be a vertical 10" square tube support

A23b: Sign type 1: It is acceptable to increase tube size on either ends of the sign with pier footing supports.

RFI 23c:

c- Sign types 2 and 4 we will be adding a vertical support tube.

A23c: Sign types 2 and 4: If utilizing support tube, then only 2" tube pan sign is acceptable.

RFI 23d:

d- Sign Type 7: We will add base plates for stability

A23d: Sign Type 7: Suggested addition of base plates is acceptable only if concealed within cabinet.

RFI 23e:

e- Sign type 8 – is illumination required?

A23e: Sign type 8: No, illumination is not required.

RFI 23f:

f- Sign type 10 – Can you verify the thickness of the letters? The drawing calls it out as 1" thick in one place and 1.5" in

A23f: Sign type 10: Letters are to be 1.5" thick fabricated aluminum.

RFI 23g:

g- Sign type 10 – Can we use a square tube fabricated mounting frame instead of a 1" thick mounted plate to reduce weight and cost?

A23g: Sign type 10 (cont.): Yes, square tube fabricated mounting frame in place of plate.

RFI 23h:

h- Sign type 13 Can we use a thinner gauge material for the column wrap?

A23h: Sign type 13: Yes, thinned gauge material may be used for the column wrap. Minimum thickness is 11 gauge.

RFI 23i:

Questions: LED Video Displays

i- Sign type #9 Need a little more clarification on the cabinet that it is housed in.

A23i: Sign type 9: This question is vague. Refer to 4/AG-06, 2/AG-06, and specification section 10 1402 for information regarding design of Sign Type 9.

RFI 23j:

j- Sign type #9 Do you have an integrator that is handling the NTCIP compliant bus info to be displayed. is it in a format that can be displayed on digital media? Or are you looking to us for a recommendation?

A23j: Sign type 9: City has an integrator for NTCIP Bus info to be displayed for Torrance Transit busses only. Information can be displayed on digital media. City is not seeking recommendations.

RFI 23k:

k- In the Addendum: Page 15 Item B : LED Digital Display; Can you give us more detail, product specs, renderings, preferred pitch, resolution, application / use? Do you need it video capable? Do you have any Renderings? What specific information do you want to display? How many of these? Are they single face, double face? Wall Mounted? Pylon Mounted?

A23k: Sign type 9: LED Digital Display. There are no LED monitors or digital displays within the signage package. Refer to Addendum #2, Item III.E for a revised Section 10 1300 that specifies only the required components.

RFI 23l:

l- In the Addendum Page 16 Item C: LED Ribbon board display; Can you give us more detail, product specs, renderings, preferred pitch, resolution, application / use? Do you need it video capable? Do you have any Renderings? What specific information do you want to display? How many of these? Are they single face, double face? Wall Mounted? Pylon Mounted?

A23l: LED Ribbon Display: Original basis of design for LED ribbon display for bus info sign is: STANDARD DAKTRONICS, GALAXY DISPLAY AF-3200, SERIES, MODEL: AF-3200-16x96-12-A. Video capability is not required for this sign. Refer to Addendum #2, Item III.E for a revised Section 10 1300 that clarifies the intended resolution.

RFI 23m:

m- **LED Video Wall:** You have it listed as 8mm in the document and 585 x 1125 matrix, but then in attachment B you have it called out as LED 8mm or 10mm. As a 10mm your matrix will shrink considerably. Are you staying with the 8mm? Would you like us to quote just the 8mm?

A23m: Please use 8mm as a basis for bid. Refer to Addendum #2, Item III.E, expected release date November 7, 2017. Addendum #2, Item III.F will include a revised Section 11 5233B Equipment List with this correction.

RFI 23n:

n- Question: Is there an existing or preferred content management system for the LED Video Display or can we provide one through the LED manufacturer?

A23n: There is no preferred or existing content provider. Yes, content management can be provided through the LED manufacturer. The content management system must meet the design requirements/specification as indicated on bid documents.

RFI 23o:

o- Are you open to an Equal: 8mm LED Video Wall manufactured in Ontario California by Vantage LED which offers a 7 year warranty on Parts and Onsite Labor?

A23o: Yes, if the system meets all design specifications/requirements based on the Daktronics basis of design provided. Contractors must follow the process outlined in the Project Manual for consideration of alternate products and systems to meet the project's basis of design.

RFI 24:

a 33 – Addendum #1 Spec Bid Item #59 is requesting unit pricing for relocating (6) existing street lighting poles on Crenshaw Blvd.
- The ST-1067 Civil plans clearly show these particular poles to be Relocated by SCE. As the street lights are attached to the power poles, please confirm the unit cost is only to remove and relocate the (6) street lighting arms and pole top fixtures, and re-install them after SCE has relocated the (6) High Voltage Power Poles.

A24: SCE poles shown on ST-1067 were previously relocated. Street light relocation is no longer anticipated. Refer to Addendum 2, Item III.A for revised Bidder's Submittal Packet (Bid Item 59 deleted) and Item III.C deletion of Bid Item 59 from the for pay item description.

RFI 25:

a 1. Please reference RFI "15c". Please confirm zinc 90-97 is being shop applied & spot-primed in the field due to weld(s) etc and the entire structural system is require an additional coat of zinc in the field.
So a total of (2) zinc coats is being requested is that correct?

Please also note only 94H20 Hydro-Zinc is for field application 90-97 is for shop application.

A 25: Coating requirements are specified in 09 9600. Refer to this section also for primers, intermediate coats, and finish coats. 90-97 Tnemec-Zinc and 94-H20 Hydro-Zinc both meet the project's specification requirements for shop application of primer. Due to specified VOC limits for field application, only 94-H20 Hydro-Zinc may be used in the field. Refer to Addendum #2, Item III.E for a revised Specification Section 09 9600 including clarification of high performance coating options.

RFI 26:

Is there a PLA or Union Labor requirement for this project?

A 26: No.

RFI 27a:

a- 1. Please confirm that all canopy framing (see A2-43) for the metal panels is by others (ex: z-girts and painted gauge metal on 12 & 4/A8-82, galvanized metal framing at 16 & 4/A8-82).

A 27a: Framing described is required to be included in final delivery of project by GC.

RFI 27b:

b- 2. Please confirm there is no lath and plaster scratch coat setting bed behind exterior tile, per detail 15/A8-72 tile is installed with thin set over CMU.

A 27b: Confirmed: no scratch coat required behind exterior tile.

RFI 27c:

c- 4. Please advise if engineered shop drawings and calculations are required for the interior framing.

A 27c: Where interior non- bearing stud walls are detailed per structural sheets no calculations or shop drawings are required. Interior details that differ from -- or are not per structural drawings, or are outside the scope of typical interior metal studs details shown on structural sheets plus Exterior Metal studs -- are required to be submitted (shop drawings and calculations) for review per design-build requirements noted on the plans.

RFI 27d:

d- 5. Please clarify soffit drop fasteners to structure, drawing A8-51 shows shot pins and detail on S1-12 shows expansion anchors?

A 27d: Expansion anchor fasteners are to be installed per structural plans and specifications. Shotpins are <u>not</u> allowed for hanging conditions. Refer to Addendum #2, Item III.F for revised sheet A8-51 with the requisite clarification / stipulation.

RFI 27e:

e- 6. Please confirm that detail 15/A8-50 is to be used at all acoustical ceiling locations for the window shade detail, several locations show the gypsum board detail 18/A8-51 (which has a stud soffit drop) at Acoustical ceilings.

A 27e: Confirmed. 15/A8-50 shows the intended shade pocket detail at acoustic ceiling tile conditions, while 18/A8-51 shows intended shade pocket detail to be used in gypsum board ceiling conditions.

RFI 27f:

f- 7. Please clarify the kickers at the soffit drops on A8-51, several details note kickers 4' on center ea way. Typically this would be alternating. Are two braces required every 4' on center or only one in alternating directions?

A 27f: Kickers are to be spaced at 4'-0" o.c., alternating direction every other location.

RFI 27g:

g- 8. Detail 9/A8.21 occurs at a 1 hr fire rated wall to beam condition, however, the beam is left exposed and the building does not have any fireproofing. Please confirm this beam does not need to be wrapped with drywall.

A 27g: Construct per detail. Beam not required to be fireproofed in Type III-B construction. However, fire proofing is required at perpendicular beam to wall penetrations as shown in detail 9/A8-21.

RFI 27h:

h- 9. Maximum allowable wall height chart on S1-11 shows 4" studs to be 18ga for 16'-6" deck heights, please confirm detail 9/A8-21 which notes 16ga metal stud framing can be 18ga when the height is 16'-6" or less.

A 27h: Gauge shown on structural is confirmed. Refer to Addendum #2, Item III.F for revised sheet A8-21 with the requisite clarification / stipulation.

RFI 27i:

i- 10. Please clarify tile backer board, specification section 09 2813 calls for ½" cement board while specification 09 2900 calls for dens-shield tile backer board?

A 27i: Utilize Dens-Shield tile backer board per specification section 09 2900.

RFI 27j:

j- 11. Please clarify if Tyvek Commercial Wrap is required (See specification 05 4000 under sheathing accessories). Lath & Plaster Specification 09 2425 calls for grade D paper under lath & specification 07 2727 Air & Water Barrier is a liquid air barrier system which is behind the grade D paper.

A 27j: No Tyvek Commercial Wrap is called for in the plans and specifications. Refer to Addendum #2, Item III.E for revised 05 4000 specification section eliminating such reference.

RFI 27k:

k- ~~12~~. Specification 09 2425 calls for standard corneraid at exterior corners; however, detail 11/A8-30 shows a Fry Aluminum corner trim. Please clarify which trim to use.

A 27k: Standard corneraid is to be used at typical exterior plaster conditions. Detail 11/A8-30 represents an interior plaster condition located in the stairwell of the East building shown on sheet A7-31. Fry Reglet or approved equal corner trim is to be utilized on interior plaster walls.

II. SUBSTITUTION/OR-EQUAL REQUESTS

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

Ref. Spec. or Plan Sheet	Specified Item	Proposed Substitution / Or Equal	Disposition	City Comment
07 1813	Elasto-Deck 5000 X2	Eco- Flex Deck, Evonik Corporation	Incomplete documentation submitted. Not Approved.	Final Determination.
07 1900	Aquatrete Concentrate	Protectosil Aquatrete Concrete, Evonik Corporation	Updated product name approved	Final Determination.
07 4619	AEP Span HR-36	MS IC72, Metal Sales Mfg. Corp.	Incomplete documentation submitted. Not Approved.	Final Determination.
10 2813.14	Exel	AB12 Quiet V, Dyson	Incomplete documentation submitted. Not Approved.	Final Determination.
07 2726	GRACE PERM-A-BARRIER VP	GE ELEMAX 2600 AWB, Momentive	Incomplete documentation submitted. Not Approved.	Final Determination.
09 6110	Vapor Seal 309 Sealer	KOSTER VAP I 2000, KOSTER	Incomplete documentation submitted. Not Approved.	Final Determination.
AV Plans	Creston	Extron	Incomplete documentation submitted. Not Approved.	Final Determination.

See also Item III.B on following page.

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

A. REFER TO THE OFFICIAL BIDDER'S SUBMITTAL PACKET (obtained from the City Clerk) AND TO SPECIFICATIONS VOLUME 1 "SECTION C – BID DOCUMENTS". SEE PAGES NOTED BELOW OF EACH.

Bidder's Submittal Pages C-1 through C-9, (9 pages) including Base Bid and Additive Bid Schedules are hereby deleted and replaced with the new Bidder's Submittal pages C-1, Addendum 2 through C-9, Addendum 2 (9 pages) which is attached to this Addendum and includes revised Base Bid and Additive Bid Schedules, including revisions issued in Addendum1. A Bidder must use the new Bidder's Submittal pages C-1, Addendum 2 through C-9, Addendum 2 for its bid.

B. REFER TO SPECIFICATIONS, VOLUME 1, SECTION E – SPECIAL PROVISIONS, SUBSECTION 4-1.6 Trade Names or Equals.

Add the following after the second paragraph:

"For the following Specification Sections only, Contractor must submit data concerning items desired to be considered as equal or substitution in accordance with Section 01 2513 within 35 days of Award of the Contract:

- Section 11 5200 AUDIO VISUAL SYSTEMS
- Section 10 7113 EXTERIOR SUN CONTROL DEVICES
- Section 09 6616 TERRAZZO FLOOR TILE
- Section 09 7723 ACCOUSTICAL WALL PANELS

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

The following items are revised as shown herein.

Item #	DESCRIPTION	UNIT	PAY ITEM DESCRIPTION
25	Equipment (N.I.C. Sections 11 5200 and 11 5233 and Exhibit 11 5233A)	LF	Per requirements of Division 11 and all Subdivisions EXCLUDING Sections 11 5200 and 11 5233 and Exhibit 11 5233A for provision and installation of Equipment Specified.
110	Construct Concrete Driveway with Depressed Sidewalk per City of Torrance Standard ~~T-W5~~ **T-105**, case 1 w/ADA Ramps @ Drives on CMB	SF	For concrete curb and curb and gutter (excluding integral curb and curb/gutter associated with driveways, alley intersections, curb ramps, and cross-gutters). Includes subgrade preparation, CMB placement and consolidation, line and grade, formwork, concrete placement all joints as shown in standard plans and construction details, all joints and keyways, as shown in standard plans and construction details, adjacent AC pavement reconstruction, protection of existing trees, parkway restoration, repainting of addresses on curb faces where painted addresses have been removed due to new curb construction and repainting of red curb (top and face) where red curb has been removed due to new curb construction.
112	Curb with Depressed Access for Wheelchair per ADA Requirements **on CMB**		For concrete integral curb and curb/gutter associated with driveways, alley intersections, curb ramps, and cross-gutters, includes subgrade preparation, CMB placement and consolidation, line and grade, formwork, concrete placement all joints as shown in standard plans and construction details, all joints and keyways, as shown in standard plans and construction details, adjacent AC pavement reconstruction, protection of existing trees, parkway restoration, also includes detectable warning surface for ramps.
114	4 in Thick A.C. Pavement on CMB		Includes subgrade preparation and furnishing, installing, **preparing and consolidating** base ~~and preparation~~, base course, leveling course, tack coat, and all work necessary to install complete in place. There shall be no separate payment for tack coat, header paving or temporary pavement

SPECIFICATIONS VOLUME 1 "SECTION E – SPECIAL PROVISIONS SUBSECTION 9-3.7 BID ITEM DESCRIPTIONS (CONTINUED)

The following items are deleted as shown herein.

Item #	DESCRIPTION	UNIT	PAY ITEM DESCRIPTION
~~59~~	~~Relocate Existing Streetlighting Poles~~	~~EA~~	~~Includes all work to remove and protect poles demolish and dispose of existing foundations, install new foundations, trenching, backfill and restoration, conduit, wires, pull boxes and handholes, hoisting and installation of poles and fixtures in new location, complete in place DELETED~~

Item #	DESCRIPTION	UNIT	PAY ITEM DESCRIPTION
~~78~~	~~6" DI Pipe, CL350~~	~~LF~~	~~As detailed in Special Provisions Section 306-1.6. DELETED~~
~~84~~	~~6" DI Pipe, CL350~~	~~LF~~	~~As detailed in Special Provisions Section 306-1.6. DELETED~~

SPECIFICATIONS VOLUME 1 "SECTION E – SPECIAL PROVISIONS SUBSECTION 9-3.7 BID ITEM DESCRIPTIONS (CONTINUED): The following items are added as shown herein.

Item #	DESCRIPTION	UNIT	PAY ITEM DESCRIPTION
128	Utility Coordination Allowance	ALW	Preset Bid Allowance for administering required utility costs such as, but not limited to, utility account setup, utility design fees, utility installation costs and fees, etc. Actual utility costs plus allowable subcontractor markups established in Special Provisions Section 3-3.2.3.2 shall be fully documented and provided with payment requests.

The following Alternate Bid Item Descriptions 25B-F (Reference RFI #9c) are added as shown herein.

Item #	DESCRIPTION	UNIT	PAY ITEM DESCRIPTION
25B	Training Room and Conference Room AV Systems	LS	Per Requirements of Division 11, Subdivision 11 5200 for provision and installation of Training and Conference Room AV Systems equipment, not including electrical requirements included under Division 26.
25C	Paging Systems	LS	Per Requirements of Division 11, Subdivision 11 5200 for provision and installation of Paging Systems equipment, not including electrical requirements included under Division 26.
25D	Television Systems	LS	Per Requirements of Division 11, Subdivision 11 5200 for provision and installation of Television Systems equipment, not including electrical requirements included under Division 26.
25E	Conference Room Digital Media Receptacles and Control	LS	Per Requirements of Division 11, Subdivision 11 5200 for provision and installation of Conference Room Digital Media Receptacles and Control Systems equipment, not including electrical requirements included under Division 26.
25F	AV Annual Maintenance	YR	Per Requirements of Division 11, Subdivision 11 5200 for Annual Maintenance for up to 5 years. Cost shall include escalation over 5 years. This item will be implemented via a direct, separate contract with the AV maintenance provider.

D. REFER TO SPECIFICATIONS VOLUME 2, PROJECT MANUAL

- In the Section 00 1010 "Table of Contents" make the following revisions:
  - Under Division 9 - FINISHES, add new Section 09 7223 ACCOUSTICAL WALL PANELS
  - Under Division 10, add new Section 10 7113 EXTERIOR SUN CONTROL DEVICES
  - Under Appendices, add APPENDIX D CANOPY CEILING SUPPORT CALCULATIONS
  - Under Appendices, add APPENDIX E DIGTIAL FILE WAIVER

- In Project Directory Page 00 0102-2, under LEED CONSULTANT add the following:

  "The project already has a LEED Project Administrator that is responsible for coordinating with the construction team for compliance with LEED-related specifications including but not limited to 01 81 13 SUSTAINABILITY DESIGN REQUIREMENTS. Furthermore, the project already has a LEED Commissioning Provider (CxP) that is responsible for overall LEED Fundamental and Enhanced commissioning while coordinating the selected General Contractor and its subcontractors to ensure compliance with commissioning-related specifications including but not limited to 01 91 13 GENERAL COMMISSIONING REQUIREMENTS."

E. REFER TO THE LINK BELOW FOR REVISED OR ADDITIONAL SPECIFICATION SECTIONS AS NOTED BELOW:

https://andpen.egnyte.com/fl/FoaQ6AEU64/B2017-39_Addendum_02_Final

- Section 11 5200 issued with Addendum 1 is hereby deleted and replaced with revised Section 11 5200, in response to RFI No. 9c.
- Add APPENDIX D "STRUCTURAL CALCULATIONS for Torrance Transit Regional Park and Ride, Ceiling Framing Design, Dated 10/17/2017, in response to RFI 10.
- Add new Section 10 7113 EXTERIOR SUN CONTROL DEVICES, in response to RFI 11.
- Replace Section 09 6616 with revised Section 09 6616 in response to RFI 12a.
- Add new Section 09 7723 in response to RFI 12b.
- Add APPENDIX E "DIGITAL FILE WAIVER" in response to RFI 12e.
- Replace Section 12 3630 with revised Section 12 3630 in response to RFI 19c.
- Replace Section 05 4000 with revised Section 05 4000 in response to RFI 27j
- Replace Section 09 9600 revised Section 09 9600 from RFI 25.
- Replace Section 10 1300 with revised section 10 1300 in response to RFIs 23k & l.
- Replace Section 11 5233B Equipment List with revised Section 11 5233B Equipment List in response to RFI 23 m.

F. REFER TO THE LINK BELOW TO DOWNLOAD REVISED AND ADDITIONAL PLAN SHEETS AS NOTED BELOW:

https://andpen.egnyte.com/fl/FoaQ6AEU64/B2017-39_Addendum_02_Final_

- Revised sheets A1-11, A4-15 in response to RFI 6a, and E-101 in response to RFIs 6a and 18. Provides clarifications and adjustments related to low voltage distribution in response to RFI 6a.
- Revised sheets (in response to) A2-43 and A8-84B (RFIs 10), A3-02 (RFI 10, 14a & 16a) A3-25 (RFIs 10, 16a, 17e, 20c and 20d), A8-82 (RFIs 10, 16a, 17e and 20d)
- Revised sheet A1-11 in response to RFI No. 12c.
- Revised sheet IDO.10 in response to RFI 12a and 14e.
- Revised Sheet A7-40 in response to RFI 12d.
- Revised sheet A4-25 in response to RFI 16b.
- Revised sheets A8-82 (RFIs 10, 16a, 17e and 20d) and A8-84 (RFI 17e).
- Revised Sheets E-100 & E-111 in response to RFI 18.
- Added SCE Final Design Plan No. 62745 to Electrical sheets in response to RFI 20b.
- Revised plan sheets A3-21 through A3-38 in response to RFI 20c.
- Revised plan sheet A8-51 in response to RFI 27d.
- Revised plan sheet A8-21 in response to RFI 27h.

G. REFER TO PLAN SHEETS AND FOR NOTED REVISIONS BELOW:

- On Sheet E-003, Distribution Board 'WLDB' and E-100 Note 17, Vehicle Charging Stations will be GE Durastation model number EVDRN3 for dual station set up (Refer to RFI 19d.)
- On Sheet G-01, in the Drawing Index, add 627475_0101 SCE Final Design Plan (2 sheets) under E-301 Electrical Details. (Refer to RFI 20d.)

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. 2 and accept all conditions contained therein.

Tobo Construction Inc.
Bidder

By

11/07/2017
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.

CITY OF TORRANCE, CALIFORNIA

ADDENDUM NO. 3
Issued: November 8, 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)

(NONE WITH THIS ADDENDUM)

II. SUBSTITUTION/OR-EQUAL REQUESTS

(NONE WITH THIS ADDENDUM)

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 AND ADDENDUM 1 SECTION III.A.

On page A-1, the first paragraph, as modified in Addendum #1, 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 22, 2017*** *after which time they will be publicly opened and read at 3:15 p.m. in the Council Chambers of said City:"*

B. REFER TO SPECIFICATIONS, VOLUME 1, SECTION E – SPECIAL PROVISIONS, SUBSECTION 4-1.6 Trade Names or Equals AND ADDENDUM 2 SECTION III.B.

After the third paragraph that was added by Addendum #2 Section III.B, add the following Specification Section to the list of Specification Sections:

- Section 12 3630 ECO RESIN PANELS

C. REFER TO SPECIFICATIONS (VOLUME 2) FOR REVISIONS BELOW:

Section 01 4216 DEFINITIONS AND STANDARDS.

Add the following subsection.

K. The following Definitions shall apply to Plans and Specifications:

- Provided By Others: Item is specified on other plan sheets or specifications and is included in the Contract and must be included in the Bid.
- Not In Contract (N.I.C.): Item is not in contract and must not be included in the Bid.

D. REFER TO THE LINK BELOW TO DOWNLOAD REVISED AND ADDITIONAL PLAN SHEETS AS NOTED BELOW:

https://andpen.egnyte.com/fl/2iSzNo54sC/TorranceTransitBidFileshare

- Revised sheets AG-03, AG-05 and AG-07 for additional clarifications / revisions to signage requirements. Regarding the revised callout for lettering for Sign Type 10 / Detail 3 on Sheet AG-05, either the primary or alternate lettering is acceptable.

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. 3 and accept all conditions contained therein.

Toho Construction Inc.
Bidder

By

11/8/17.
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.

CITY OF TORRANCE, CALIFORNIA

ADDENDUM NO. 4
Issued: November 15, 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)

(NONE WITH THIS ADDENDUM)

II. SUBSTITUTION/OR-EQUAL REQUESTS

(NONE WITH THIS ADDENDUM)

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

A. REFER TO THE LINK BELOW TO DOWNLOAD REVISED SPECIFICATION SECTIONS AS NOTED BELOW:

https://andpen.egnyte.com/fl/YoEzuLE1QT/TorranceTransitBidFileshare

- In Specifications Volume 2 and all prior Addenda, Section 08 4413 is hereby deleted in its entirety and replaced with a revised Section 08 4413 labeled as "Addendum 4 – 11/14/2017" at the bottom right. This revision clarifies Mockup requirements (Subsection 1.5.B) and revised Glazed Aluminum Storefront Type (Subsection 2.1.A.2). Revisions are shown with tracked changes in red and blue text.
- In Specifications Volume 2 and all prior Addenda, Section 08 8100 is hereby deleted in its entirety and replaced with a revised Section 08 8100 labeled as "Addendum 4 – 11/14/2017" at the bottom right. This revision clarifies Mockups requirements (Subsection 1.5.K), revised Glazing Materials (Subsection 2.2.A) and revised Glass Schedule (Subsection 3.6). Revisions are shown with tracked changes.

For convenience, the revised specifications sections are attached to this Addendum.

B. REFER TO THE LINK BELOW TO DOWNLOAD REVISED AND ADDITIONAL PLAN SHEETS AS NOTED BELOW:

https://andpen.egnyte.com/fl/YoEzuLE1QT/TorranceTransitBidFileshare

- Sheets A3-32, A8-00 and A8-02 from the Original Bid Plans are hereby deleted and replaced with revised Sheets A3-32, A8-00 and A8-02 as noted on each. This revision is to clarify storefront glazing requirements.

By Order of the City Engineer

/S/ CRAIG BILEZERIAN

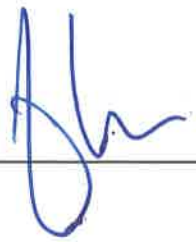
Craig Bilezerian
Deputy Public Works Director/City Engineer

Enclosures: Specification sections and linked Files as referenced above

BIDDER'S CERTIFICATION

I acknowledge receipt of the foregoing Addendum No. 4 and accept all conditions contained therein.

Tobo Construction Inc.
Bidder

By 

11/15/17
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 08 4413
GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Aluminum curtain wall, storefronts, windows and entrances.

2. Mockup(s).

3. Aluminum compensating channels and closure pieces.

4. Extruded or formed aluminum flashings at perimeter of curtain wall and storefront framing.

5. Glass and glazing for the work of this Section.

6. Sealants for the work of this Section.

7. Electrical continuity and grounding of this work.

8. Supplementary parts and components, such as inserts, clips, fasteners, anchors, bracing and other miscellaneous supports and accessories required for a complete installation.

B. Work installed but furnished in other Sections:

1. Division 8 for finish hardware.

C. Work furnished but installed in other Sections:

1. Division 3 for concrete embeds.

D. Related work:

1. Division 7 for sealants other than required for the work of this Section.

2. Division 7 for composite metal panels.

3. Division 8 for glass and glazing

1.2 STANDARDS

A. AA, Specification for Aluminum Structures.

B. AA, Standards and Data.

C. AISC, Steel Construction Manual.

D. AISI, Cold-Formed Steel Design Manual.

E. ACI 301, Building Code Requirements for Reinforced Concrete.

F. AWS D1.1, Structural Welding Code.

1.3 DESIGN AND PERFORMANCE CRITERIA

A. General: The intent is to provide weathertight, structurally sound assemblies meeting the provisions of this Section.

1. Drawings are schematic and do not identify or solve the issues of thermal or structural movements, anchorage, flatness and stability of facing, or moisture disposal.

2. Drawings do not solve issues in the glass line associated with glass movement, pressure fracture, or thermal shock.

3. Drawings contain details that suggest possible solutions for solving some of the major design requirements. Contractor may use the intent of these details and develop them as Contractor deems best.

4. Specifications are of the performance type and include the minimum requirements of the glazed assemblies without limiting the Contractor to methods of achieving such performance.

5. Unless otherwise defined by Contract Documents, the appearance of exposed elements, including width and depth shall be consistent throughout the project.

6. Unless otherwise defined by Contract Documents, the overall thickness of each glass type, and the component thickness of each multiple layer glass type shall be consistent throughout the Project.

B. Design criteria and performance requirements for glazed assemblies:

1. Design wind pressures, both inward and outward and acting normal to the plane of the wall (including return surfaces) shall be those prescribed by Code, except that structural tests shall be conducted at 150 percent of loads prescribed by Code.

2. Dead load shall be the actual weight of materials supported by the glazed assemblies.

3. At the design pressures and loads, limit framing member stresses and deflections as specified below. Measurements shall be taken at the location of maximum deflection.

a. Normal to the plane of the wall, deflection of framing members, including cantilevers, shall not exceed 1/175 of span length, but in no case more than 3/4 inch, whichever is less. Where a sealant joint occurs between a framing member and a relatively stiff building element, deflection of the framing member shall not exceed 1/2 of the joint width, or less if required by sealant manufacturer.

b. In the plane of the wall, deflection of framing members shall not reduce the glass bite below 75 percent of the design dimension, and shall not reduce the glass edge clearance below 25 percent of the design dimension. Restrict deflection further if required for assembly and fit of components.

c. Stresses shall not exceed the allowable values established by the reference standards listed. In no case shall allowable values exceed the yield stress.

d. NOTE: Structural elements are not designed to resist torsional forces induced by the glazed assemblies. The Contractor shall include in the design of the glazed assemblies sufficient bracing, stiffeners and other reinforcements, as required to

ensure the stability of the primary structure under all loads imposed by the glazed assemblies at its support points.

4. Seismic design: Comply with Code.

5. Thermal movement clearance:

   a. Design glazed assemblies to provide clearance for thermal movement within a surface temperature range of 160 degrees F.

   b. Provide additional clearance as required to accommodate erection tolerance.

   c. Doors and windows shall operate normally and no distortion, damage and failure, including glass breakage, shall occur over this temperature range.

6. Air infiltration: When tested in compliance with ASTM E 283 at a differential static pressure of 1.57 psf, air infiltration at fixed wall shall not exceed 0.06 cubic foot/minute/square foot or less when more restrictive provisions are required by CCR Title 24.

7. Water infiltration: Water infiltration, in this Section, is defined as any leakage which is not controlled and drained to the exterior, or which could cause damage to or impair the function and appearance of the assemblies, and adjacent finishes.

   a. Make provisions in the design to drain to the exterior face of the assemblies any leakage of water occurring at joints and condensation taking place within the construction.

   b. No water infiltration under static pressure shall occur when the assembly is tested in compliance with ASTM E 331 at a differential static pressure of 20 percent of the design wind pressure, but not less than 6.24 psf for 15 minutes.

8. The exterior glazed assemblies shall perform quietly at all times and without:

   a. Vibration harmonics.

   b. Wind whistles.

   c. Noises caused by thermal movement (including “popping” and “ticking”).

   d. Thermal movement transmitted to other building elements

   e. Loosening, weakening or fracturing of attachments or components or system.

C. Performance requirements for doors: Resistance to corner racking shall be tested by the "Dual Moment Load" test as follows.

1. Test section shall consist of a standard top door corner assembly. Side rail section shall be 24 inches long; top rail section shall be 12 inches long.

2. Anchor "top rail" positively to test bench so that corner protrudes 3 inches beyond the bench edge.

3. Anchor a lever arm positively to "side rail" at a point 19 inches from the inside edge of "top rail." Attach weight support pad at a point 19 inches from inner edge of "side rail".

4. Test section shall withstand a load of 170 lb. on the lever arm before reaching the point of a 1/18 inch gap at the stile/rail, joint or a 3-degree rotation in the stile. Further failure, defined as a rotation of the lever arm in excess of 45, shall not be reached before 270 lb.

1.4 SUBMITTALS

A. Shop drawings:

1. Detailed, large scale, dimensioned shop drawings of the mockup identifying all materials.

2. Detailed, large scale, dimensioned shop drawings of the glazed assemblies showing joinery techniques, provision for horizontal and vertical expansion, glass and metal thicknesses, and framing member profiles.

a. Identify all materials, including metal alloys, glass types, fasteners and glazing materials.

b. Identify shop and field sealants by product name and located on drawings.

c. Show relative layout of adjacent walls, beams and slabs, all correctly dimensioned.

d. Dimension position of glass edge showing "glass bite" and size of structural silicone sealant.

3. Die drawings for all extrusions, gaskets and weatherstrips.

4. Method of attachment of insulation. Unless accepted in writing by the glass manufacturer, the thermal insulation shall not be attached directly to the glass, or opacifier applied thereto.

5. Revise the approved shop and erection drawings to correspond to procedures established by the satisfactory mockup tests (when performed) and field changes. Make no changes in the field without the Architect's prior written approval.

B. Structural calculations:

1. Submit calculations prepared in compliance with current design rules of the AS, AISI, AISC and ACI. Calculations must be signed and sealed by a California-registered civil or structural engineer.

2. Include analysis for wind and dead load on framing members, structural silicone adhesive and concrete inserts.

3. Show section property computations for framing members and submit full size die drawings.

C. Test reports:

1. The report for all tests shall include the following information:

a. Date of test and date of report.

b. Identification of the specimen (manufacturer, source of supply, dimensions, model, type, materials, and other pertinent information).

c. Identification of glass thickness and type, and method of glazing.

d. Type or types of weatherstrip.

2. For air infiltration under uniform static air pressure: A statement or tabulation of the pressure difference exerted across the specimen during the test and the corresponding rate of air leakage for each specimen tested, calculated in compliance with ASTM E 283.

3. For water penetration under uniform static air pressure:

   a. A statement or tabulation of pressure difference or differences exerted across the specimen and water application rates during the test.

   b. A record of all points of water penetration on the indoor face of the test specimen, and of water leakage as defined herein.

4. For structural performance under uniform static air pressure difference:

   a. A tabulation of pressure differences exerted across the specimen during the test and the deflections and permanent deformations at locations specified for each specimen tested.

   b. The duration of test loads.

   c. Record of visual observations of performance.

   d. When the tests are made to check conformity of the specimen to a particular specification, an identification or description of that specification.

   e. Statement that the tests were conducted in compliance with this method, or a full description of deviations from this method.

   f. Statement as to whether or not tape, film, or both, were used to seal against air leakage, and whether in the judgment of the test agency the tape or film influenced the results of the test.

   g. If several essentially identical specimens of a component are tested, results for all specimens shall be reported, each specimen being properly identified, particularly with respect to distinguishing features or differing adjustments. A separate drawing for each specimen will not be required if all differences between them are noted on the drawings provided.

D. Samples: Metal samples with specified finishes. Refer to Section 05 0515 for clear anodized samples.

E. Manufacturer's approval: Shop drawings of the glazed assemblies to the glass and glazing sealant manufacturers and obtain their approval for these shop drawings before proceeding further. These approvals shall include, but not be limited to the following.

   1. Selection of the glass and glazing materials (glass, sealants, gaskets, setting blocks, jamb shims and similar items).

   2. Size, thickness, design and dimensional limitations of the glass pockets and compatibility of materials.

   3. Size and surface preparation relating to structural silicone adhesive. Sealant manufacturer's approval shall be based upon adhesion and compatibility tests performed with specific project substrate materials and shall include sealant manufacturer's recommendations for surface preparation.

F. Closeout: Furnish the City a comprehensive plan for replacement of broken glass. Include a local source.

G. LEED Submittals:

1. Recycled Content (MRc4):

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).

b. Include information on Material Tracking Worksheets.

2. Adhesives & Sealants (EQc4.1): Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.

3. Low-Emitting Paints and Coatings (EQc4.2): Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.

1.5 QUALITY ASSURANCE

A. Fabricator/installer's qualifications: Single firm which can show a minimum 5 years experience in fabricating and erecting work similar to that required for this Project.

B. Mockup:

1. Provide a mockup of the glazed assemblies ~~as indicated on the Drawings~~, size selected by Contractor:

a. Performance testing shall be performed and accepted prior to review of the visual quality. The performance testing of the assembly is indicated below.

~~a.~~b. Provide an ~~test~~ assembly for all trades, after acceptance of the performance test, whose work is represented by the mockup, to verify their materials and installation methods, and make necessary adjustments before proceeding with the work on the building.

~~b.~~c. Obtain the City/Architect's approval of the visual quality of the mockup.

~~c.~~d. Provide a standard of materials, quality and workmanship to be matched for work on the building.

2. Assemble the mockup using installation methods and materials duplicating, as closely as possible, the glazed assemblies on the building. Construct mockup in compliance with approved shop drawings; deviations from, or additions to details shown on drawings are subject to the Architect's approval. Interior finishes are required.

3. After approval of the ~~visual quality~~ performance testing of the mockup by the City/Architect, install sufficient thermal and safing insulation and other items adjacent to the curtain wall to demonstrate installation procedures.

4. Locate the mockup at the job site, or if impractical, at another location acceptable to the City/Architect.

5. This mockup is ~~not~~ intended to be field tested. ~~If testing of a~~ Testing of the mockup ~~has to~~ shall be performed to determine compliance with the requirements of this Section, submit shop drawings, ~~testing agency's name and qualifications,~~ test procedures and sequence and other information requested by the Architect. Notify the Architect before mockup is constructed and tested.

C. Performance requirements for site mockup:

1. Water infiltration:

a. Perform a 1 in. diameter water hose test to check for water infiltration for a minimum period of 10 minutes. Water shall be directly applied under high pressure on the glazing, aluminum extrusions, gaskets, weatherstripping, sealants and all other components.

b. Water infiltration, in this document, is defined as any leakage which is not controlled and drained to the exterior, or which could cause damage to or impair the function and appearance of the assemblies, and adjacent finishes.

c. Make provisions in the design to drain to the exterior face of the wall any leakage of water occurring at joints and/or any condensation taking place within the construction.

D. Approved mockups may remain a portion of the Work, provided that they are not damaged prior to Substantial Completion.

1.6 HANDLING

A. Procedure: "Care and Handling of Architectural Aluminum from Shop to Site" published by AAMA.

1.7 WARRANTIES

A. Warrant work of this Section for satisfactory performance, and against defects in materials and workmanship for 5 years from Substantial Completion, except where longer warranties are specified below.

1. Submit written warranty agreeing to provide all labor and materials required to repair or replace defective materials and workmanship during the warranty period, including damage to the building and furnishings occasioned by defective materials or workmanship or damage as part of repairs to the wall. Defective materials and workmanship include, but are not limited to:

a. Penetration of water into the building.

b. Air infiltration exceeding specified limits.

c. Structural failure of components resulting from forces within specified limits.

d. Cracking, crazing, flaking of coatings and opacifiers on glass.

e. Glass breakage.

f. Secondary glass damage and/or damage due to falling glazed assemblies components.

g. Adhesive or cohesive failure of sealant.

h. Surface crazing of non-structural sealant.

i. Non-structural sealant hardening beyond Shore A durometer 50 or softening below 20.

j. Failure to fulfill other specified performance requirements.

k. Failure of operating parts to function normally.

B. Aluminum finish: As specified in Section 05 0515.

C. Glass:

1. Warrant to remove and replace glass light that fails to meet the design and performance requirements.

a. Warranty shall include labor and materials required to remove and replace the faulty glass and installation for a period of not less than 5 years, except as noted otherwise below.

b. Warranty period for peeling or deterioration of glass reflective coating shall be 10 years.

2. Include the following in the warranty:

a. Glass breakage due to wind pressures up to the specified values or thermal stress; defective glass or damaged glass (prior to or during construction). Secondary glass damage and breakage of tempered glass is regarded in this Specification as being the result of a material defect, and is therefore included in the warranty.

b. Deterioration of any form, and discoloration of glass reflective coating.

D. Corrections of defective work:

1. Should any work under this Contract be found defective in materials or workmanship, it shall be corrected in accord with the following provisions.

2. If, within 5 years after Substantial Completion, any of the work is found to be defective or not in compliance with the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the City. The City will give such notice promptly after discovery of the condition.

3. If exploratory work is required to determine the cause of the defects, the cost of this work shall be borne by the Contractor.

E. The warranty does not include damage caused by vandalism, or natural conditions exceeding the performance requirements.

F. This warranty and its enforcement shall not deprive the City of other action, right or remedy available to him.

PART 2 - PRODUCTS

2.1 MANUFACTURER/MODEL

A. Provide curtain wall sections from a single manufacturer.

1. Glazed aluminum curtain wall: Outside glazed, stick-erected pressure bar system, curtainwall system, 2-1/2 in. x 7 in. total depth, FF3250 by US Aluminum (CR Laurence Co. Inc.) (basis of design), equal by Wausau Window and Door, Arcadia Inc., Kawneer North America, Oldcastle Building Envelope or EFCO Corp. or approved equal.

2. Glazed aluminum storefront: ~~Center~~ Flush front glazed, stacked storefront system, 2 in. x 6 in. total depth, ~~FF601~~ FT601 by US Aluminum (CR Laurence Co. Inc.) (basis of design), equal by Wausau Window and Door, Arcadia Inc., Kawneer North America, Oldcastle Building Envelope or EFCO Corp. or approved equal.

2.2 MATERIALS/COMPONENTS

A. Aluminum:

1. Extrusions: ASTM B 221, 6063-T5 alloy and ASTM B 308 for structural aluminium.

a. Provide a minimum nominal wall thickness of 1/8 inch for structural members and 1/16 inch for non-structural members. Standard commercial tolerances listed in AA "Aluminum Standards and Data" apply to finished, fabricated and assembled materials.

b. Stricter tolerances shall apply where required to assure proper functioning of glass and glazing materials.

2. Sheet: ASTM B 209, 5005-H34 alloy. Provide a minimum nominal thickness of 3/16 inch. Standard commercial tolerances listed in AA "Aluminum Standards and Data" apply to finished, fabricated and assembled materials.

3. Surface flatness and edges: For exposed work, provide materials that have been cold-rolled, cold-finished, cold-drawn, extruded, stretcher-leveled, machine-cut and otherwise produced to the highest commercial standard for flatness with edges and corners sharp and true to angle or curvature as required.

4. Recycled Content (MRc4): Building materials in this section must have 50 percent post- and/or pre-consumer recycled content by weight of total product.

B. Fasteners for aluminum components: 300 Series (18-8) non-magnetic stainless steel for all screws, bolts, nuts, washers and rivets.

C. Steel:

1. Hot-rolled shapes and plates: ASTM A 36.

2. Cold-rolled steel conforming to one of the material specifications listed in AISI Specifications for the Design of Cold-Formed Steel Structural Members.

D. Glass: Refer to the Drawings and Section 08 8100.

E. Gaskets/weatherstripping:

1. Gaskets/weatherstripping: Neoprene or EPDM, except where used in contact with a silicone seal. In contact with silicone seal, gaskets and spacers shall be preformed heat-cured silicone rubber, chemically compatible with the silicone sealant and suitable for the specific purpose intended. Gaskets/weatherstripping/ spacers shall have continuous mechanical engagement to framing members; adhesive attachment is not acceptable. Corners of gaskets/ weatherstripping shall be vulcanized.

2. Sponge gaskets/weatherstripping/spacers: Extruded black neoprene, EPDM or silicone rubber with a hardness of 35 to 45 durometer Shore A and conforming to ASTM C 509 (for neoprene and EPDM). Sponge gaskets shall be compressed 20 percent - 35 percent in the final installed position.

3. Dense gaskets/weatherstripping: Extruded black neoprene or EPDM conforming to ASTM C 864 or silicone rubber with a hardness of 70 - 80 durometer Shore A for hollow profiles and 55 - 65 for solid profiles.

F. Miscellaneous materials:

1. Weephole filters: Fully reticulated, vinyl impregnated open cell urethane foam by Scott Paper, or equal.

2. Slip pads:

   a. Provide eel slip, nylatron, high impact polystyrene or equal slip pads between moving parts at all expansion connections. Provide minimum thickness of 1/16-inch for nylatron and polystyrene, and 1/8 inch for eel slip.

   b. Do not use nylatron or polystyrene in close proximity to field welds, unless installed after welding.

3. Isolators between dissimilar materials: Rigid, high impact, smooth both sides, high density polyethylene or DuPont Zytel nylon with a minimum thickness of 1/32-inch.

4. Shims: 300 Series stainless steel or plastic bearing material with a minimum 8,000 psi compressive strength.

5. Inserts for anchorage in concrete: Steel with integral or welded projections for embedment.

6. Sealants:

   a. Shop sealants: Use GE Silpruf or Dow Corning 795 for joints which are sealed in the manufacturer's plant.

   b. Field sealants and back-up materials: As specified in Section 07 9200, except that all sealants for the glazed assemblies shall be made by the same manufacturer.

   c. Adhesives & Sealants (EQc4.1): Adhesives and Sealants applied on site within the weather proofing exterior in this section must comply with South Coast Air Quality Management District Rule 1168 OR Green Seal Standard GS-36. Refer to LEED Specification 01 8113 for specific VOC requirements.

7. Primer:

   a. For aluminum surfaces in contact with masonry, concrete or steel: Rust-inhibitive primer made by one of the manufacturers listed in Section 09 9100, or bituminous paint.

   b. Steel anchors, anchor inserts, reinforcement and supports: Rust-inhibitive primer made by one of the manufacturers listed in Section 09 9100.

   c. Paints & Coatings (EQc4.2): Paints and coatings applied on site within the weather proofing exterior in this section must comply with Green Seal Standard GS-11, Green Seal Standard GC-03, OR South Coast Air Quality Management District Rule 1113. Refer to LEED Specification 01 8113 for specific VOC requirements.

G. Aluminum-framed doors: Wide stile, 1-7/8 in. deep x 3/16 in. thick walls, 850 Durafront by US Aluminum or equal.

1. Vertical stiles: 5 in.

2. Top rail: 5-1/2 in.

3. Bottom rail: 9-1/2 in.

2.3 FABRICATION AND WORKMANSHIP

A. Maintain the visual design concept shown, including member sizes, profiles and alignment of components. Coordinate work with that of other trades. Promptly furnish items to be placed during the installation of other work.

B. Insofar as practicable, fitting and assembly or the work shall be done in the shop.

C. Exposed work shall be carefully matched to produce continuity of line and design with joints accurately fitted and rigidly secured with flush, hairline contacts.

D. Except where otherwise specified or directed, the method of assembly and joining shall be the Contractor's option provided the results are satisfactory.

1. The manufacturer's proven methods that will produce the required standards of workmanship shall be used, subject to approval.

2. Assemble metal work so that it will not be distorted nor the fasteners over-stressed from expansion and contraction.

E. Isolate the glazing perimeter of each opening so that any leakage is confined to and wept from the opening of the leakage origin.

F. Except for spandrel glass and glass glazed with structural silicone, details of installation shall permit replacement of glass from within the building after the construction period with the same size glass without cutting or modification of frames.

G. Welding shall conform to the appropriate recommendation of the AWS and shall be done with electrodes and by methods recommended by the manufacturer of the alloys being welded.

1. Welds behind finished surfaces shall be so done as to minimize distortion and discoloration on the finished side.

2. Remove weld spatter and welding oxides on finished surfaces by descaling and/or grinding.

H. Grind exposed welds and finish to match and blend with finish on adjacent parent metal.

1. Grinding and polishing on non-ferrous metals shall be done only with clean wheels and compounds free from iron and iron compounds.

2. No soldering or brazing allowed.

I. Do not use exposed fasteners. Provide lock washers or other approved locking device at all bolted connections.

J. Fabricate aluminum and stainless steel components before finishing.

K. Finishing:

1. Aluminum surfaces: Finish exposed surfaces as specified in Section 05080; concealed surfaces may be mill finished, except that when in contact with another material other than stainless steel, prime with rust-inhibitive primer or bituminous paint.

2. Steel surfaces other than galvanized: Prime with rust-inhibitive primer.

3. Primer application:

a. Remove oil and other deleterious materials in compliance with SSPC SP-1 "Solvent Cleaning" before priming.

b. Apply specified primer immediately after surface preparation. Apply 2 coats of primer changing color of each coat. Provide minimum DFT of 2 mils for each coat primer and 30 mils for bituminous paint. Allow primer to dry thoroughly before handling.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine adjacent construction and supports.

B. Verify that openings and supporting surfaces are within allowable tolerances, plumb, level, clean, and will provide a solid anchoring surface.

C. Correct other conditions detrimental to the proper or timely completion of this work before proceeding with installation.

3.2 ERECTION

A. General:

1. Installed glazed assemblies shall match the approved mockup(s).

2. Erect components in compliance with the approved shop drawings. Provide accurate bench marks for use in erection at all floors. Promptly correct errors and inconsistencies.

3. Set work plumb, square and level with hairline, flush joints. Fasten securely in correct vertical and horizontal alignment. Seal joints within assemblies, and between assemblies and adjacent construction to make waterproof.

4. Clean debris, dust and other foreign materials from behind the glazed assemblies as it is erected. Provide temporary closures if necessary to prevent the accumulation of debris, dust and foreign materials in the voids behind the glazed assemblies.

B. Tolerances: Tolerances for the building frame and other work are specified in other Sections of these Specifications and/or in referenced standards of these Sections. Design the glazed assemblies to accommodate these tolerances. All parts of the metal framing shall be within the following tolerances.

1. Maximum deviation from plumb, level or dimensioned angle: 1/8 inch in a story height and per 10-foot length of any member, or 1/4 inch in any 40-foot run.

2. Maximum deviations from theoretical position in plan or elevation based on established floor and column lines, including deviation from plumb, level or dimensioned angle:

a. Three-eight-inch total at any location.

b. Change in deviation shall not exceed 1/8-inch for any 10-foot run in any direction.

3. Maximum offset from true alignment between 2 consecutive members placed end to end:

a. One-sixteen-inch, including members which are designed to be 1/2-inch or less out-of-flush, and members separated 2-inch or less by a reveal or protrusion in the plane of the wall.

b. One-eight-inch including members which are designed to be out-of-flush by more than 1/2-inch, or separated by a reveal or protrusion more than 2 inches wide.

4. Maximum offset between glass framing members at corners of glazing pocket: 1/32 inch.

C. Assembly and anchorage:

1. Anchor components securely in place by bolting, welding other permanent mechanical attachment system, which will comply with performance requirements and permit movements which are intended or necessary. Install slip pads between moving parts.

2. Provide a separator at contact surface of dissimilar materials wherever there is a possibility of corrosive or electrolytic action.

3. Remove weld slag and apply primer over welds. Also paint exposed portions of inserts. Clean paint damaged by welding or other causes to bright metal and touchup with primer.

D. Doors: Install doors, and their finish hardware, at indicated locations and adjust the hardware as necessary so the doors operate freely for their full travel, without sticking or binding.

3.3 GLAZING

A. Comply with the requirements of Section 08 8100 and the following.

B. All surfaces to which the structural silicone or weather seal silicone sealants will adhere shall be warranted by finish and sealant manufacturers as sufficient to provide structural silicone bond surface. Mill finish aluminum is not acceptable in this application.

C. Defer glazing of opening obstructed during construction. Glaze such openings when obstructions are removed.

D. Replace glass which breaks or sustains edge damage, surface damage or damage or reflective coating.

3.4 PROTECTION/CLEANING

A. Protect this work against damage and contamination during construction. Clean surfaces as required to remove corrosive substances. At the conclusion of construction, clean the work to the Architect's satisfaction.

B. Use only cleaning agents compatible with aluminum, glass, glazing materials and sealants.

3.5 FIELD QUALITY CONTROL

A. Perform field water test in compliance with ASTM E 1105, on completed portions of the glazed assemblies.

B. If testing results in leakage, eliminate the causes of the leakage at no additional cost to the City.

C. Remedial measures must maintain standards of quality and durability and are subject to the Architect's approval.

D. Provide powered scaffold, hose and sufficient personnel to operate scaffold and hose.

E. Perform one test each at 10 percent, 50 percent and 80 percent of glazed assemblies completion, with repeat tests of failures occur.

END OF SECTION

SECTION 08 8100
GLASS AND GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. All glass and glazing for the Project except as noted below.

2. Glazing accessories.

3. Glazing sealants.

B. Related work:

1. Divisions 7 and 9 for sealants other than required for the work of this Section.

2. Division 10 for glass and glazing in equipment such as fire extinguisher cabinets.

1.2 REFERENCES

A. Glazing publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA "Glazing Manual" and "Laminated Glass Reference Manual".

2. SIGMA TM-3000, "Vertical Glazing Guidelines".

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following; defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat-treated) required to meet or exceed the following criteria.

1. Glass thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Specified design wind loads: Per Code.

b. Probability of breakage for vertical glazing: 8 lites per 1000 for lites set vertically or not more than 15-degree off vertical and under wind action. Assume load duration of 60 seconds.

1) Provide heat-treated glass where annealed glass would be vulnerable to thermal breakage.

c. Maximum lateral deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or one inch, whichever is less.

1) For monolithic-glass lites heat-treated to resist wind loads.

2) For insulating glass.

3) For laminated-glass lites.

d. Minimum glass thickness for exterior lites: 6 mm.

2. Thermal movements:

a. Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

b. Temperature change (range): Minimum material temperature increase of 100-degree F and decrease of 50-degree F relative to nominal condition 120-degree F, ambient; 180-degree F material surfaces.

1.4 SUBMITTALS

A. Product data: For each type of glass assembly provide the following glazing properties including U-value (winter and summer), exterior reflectance, solar heat gain coefficient, and visible light transmittance. Verify properties are consistent with those inputted in the energy model

B. Samples:

1. Twelve-inch square labeled samples of each type of glass, with taped or ground edges.

2. Coated glass samples shall show extremes of color range.

3. Glass indicated or required to be "heat-treated" need not be when submitting samples.

C. Certification: Glass manufacturer's certification as specified.

1. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements. Include wind pressure analysis, thermal stress analysis, including shading effects, and review of shop drawings stating that details are suitable for proposed glass products.

2. Separate certifications are not required for glazing materials bearing the manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

D. Glazing schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

E. Preconstruction adhesion and compatibility test report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

F. Product test reports: From a qualified testing agency indicating the following products comply with requirements, based on comprehensive testing of current products:

1. Coated float glass.

2. Insulating glass.

3. Glazing sealants.

4. Glazing gaskets.

G. Labels: Provide NFRC Rating Labels as required by 2013 California Energy Code. Reference 2013 compliance guide for information required.

H. LEED Submittals:

1. Adhesives & Sealants (EQc4.1): Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.

1.5 QUALITY ASSURANCE

A. Glazier's qualifications: Experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Fabricator's qualifications: When the glass manufacturer has a certification program, the fabricator shall have a current "Certified Fabricator" certificate form the glass manufacturer.

C. Source limitations for clear glass: Obtain clear float glass from one primary glass manufacturer.

D. Source limitations for coated glass: Obtain coated glass from one manufacturer for each type of coating and each type and class of float glass indicated.

E. Source limitations for insulating glass: Obtain insulating-glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.

F. Source limitations for laminated glass: Obtain laminated-glass units from one manufacturer using the same type of glass lites and interlayers for each type of unit indicated.

G. Source limitations for glazing accessories: Obtain glazing accessories from one source for each product and installation method indicated.

H. Fire-rated door assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

I. Safety glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

J. Insulating glass certification program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following inspecting and testing agency.

1. Insulating Glass Certification Council.

2. Associated Laboratories, Inc.

3. National Accreditation and Management Institute.

K. Mockups: Before glazing, build mockups for each glass product indicated below in accordance with the following requirements, using materials indicated for the completed Work.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect. Refer to Section 08 4413 for additional information regarding mockups.

2. Build mockups with the following kinds of glass to match glazing systems required for Project, including typical lite size, framing systems, and glazing methods:

a. Heat-strengthened coated glass.

b. Fully tempered glass.

c. Laminated glass.

d. Coated insulating glass.

3. Obtain Architect's approval of mockups before starting fabrication.

4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

5. Demolish and remove mockups when directed.

6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

L. Manufacturer's certification: Submit manufacturer certification that.

1. All materials to be used in the glazing system such as sealants, setting blocks, spacers, backing rods, metal finishes, etc. have been reviewed by the glass manufacturer.

2. These materials are compatible with the glass supplied to the Project site.

3. These materials will not cause deterioration, premature aging, and staining of adjacent materials.

M. Labeling:

1. Submit a certificate stating that the glass furnished for the Project complies with the Specifications.

2. Label each piece of heat-treated glass with a permanent logo etched in one corner to identify the fabricator.

1.6 HANDLING

A. Storage: Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, run-off, and other causes.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of bulk sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

1.8 WARRANTY

A. Refer to Section 08 4413 for exterior glass.

B. Warrant laminated glass against delamination, deterioration of plastic sheet or laminating film, loss of transparency, color change or other forms of deterioration due to defective materials or lamination, for 5 years after Substantial Completion.

C. Warrant insulating glass against fogging, loss of transparency and frost build-up between the glass panes due to defective materials or sealant failure for 5 years after Substantial Completion.

D. Glass shall not experience spontaneous breakage.

1. This Specification defines nickel sulfide stones as a glass material defect.

2. Installed tempered glass which breaks due to nickel sulfide stones shall be included in the warranty.

E. Replace defective materials and workmanship during the warranty period at no cost to the City.

PART 2 - PRODUCTS

2.1 GLASS

A. General:

1. Float glass shall comply with ASTM C 1036; heat-treated glass shall comply with ASTM C 1048.

2. ASTM C 1172 Standard Specification for Laminated Architectural Flat Glass.

3. ASTM C 1376 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass

4. ASTM C 1503 Standard Specification for Silvered Flat Glass Mirror.

4-5. ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.

~~5.~~6. ANSI Z97.1 American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications Method of Test.

~~6.~~7. US Consumer Product Safety Commission CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials

~~7.~~8. Glass shall be free from bubbles, smoke vanes, air holes, scratches and other defects.

~~8.~~9. Laminated glass shall comply with ASTM C 1172. Glass in the lamination shall be from the same manufacturer when heat-strengthened.

~~9.~~10. Fabricate tempered glass by horizontal (roller hearth) process with roll wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.

~~10.~~11. Comply with Code and the Drawings for glass in hazardous locations. Laminated glass subject to human impact shall comply with CPSC 16 CFR Part 1201.

~~11.~~12. Provide insulating glass assemblies CBA rated by IGCC when tested in compliance with ASTM E 774, and permanently labeled with the appropriate certification label of IGCC, ALI or NCTL.

B. Glass types: Refer to the schedule at the end of this Section.

2.2 GLAZING MATERIALS

A. Laminated glass interlayer: Clear, with a proven record not to bubble, discolor, or loose physical and mechanical properties after laminating glass lites and during service life.

1. For glass-to-glass: ~~0.060~~ 0.030 inch thick, ~~clear polymer~~ colored PVB interlayer by Glaspro~~, SentryGlas by DuPont~~ or equal.

~~a.Interlayer physical properties:~~

~~1)Young's Modulus: 43 kpsi, when tested in accordance with ASTM D 5026.~~

~~2)Tensile Strength: 5.0 kpsi, when tested in accordance with ASTM D 638.~~

~~3)Elongation: 400%, when tested in accordance with ASTM D 638.~~

~~4)Flex Modulus: 50 kpsi, when tested in accordance with ASTM D 790.~~

~~5)Heat Deflection Temperature at 0.46 MPa: 110 deg F, when tested in accordance with ASTM D 648.~~

B. Setting block: Neoprene or, in the case of structural silicone glazing, dense extruded silicone; both with a hardness of 85 ±5 durometer Shore A with a minimum length of 4" or as required by GANA guidelines.

C. Side blocks: Neoprene or dense silicone with a harness of 65 ±5 durometer Shore A.

D. Spacer: Neoprene, silicone, or EPDM, 50 to 60 durometer hardness, compatible with sealants used.

E. Sealants:

1. For primary seal of insulating units: Manufacturer standard sealant.

2. For all other conditions: Medium and low modulus (weatherseal) silicone sealant, one-part, non acidic, neutral curing, Type S, Grade NS, Class 25, Use NT, capable of withstanding movements from plus 50 to minus 50 for medium modulus and plus 100 to minus 50 percent for low modulus based on original joint design.

   a. Color: Match Architect's paint color for sealant.

   b. Acceptable products:

      1) Dow Corning 795 and 790.

      2) General Electric - Silpruf, Silpruf LM.

      3) Equal.

   c. Only low modulus sealant, such as Dow 790 or GE Silpruf LM, shall be used when sealing to cementitious substrate.

3. Adhesives & Sealants (EQc4.1): Adhesives and Sealants applied on site within the weather proofing exterior in this section must comply with South Coast Air Quality Management District Rule 1168 OR Green Seal Standard GS-36. Refer to LEED Specification 01 8113 for specific VOC requirements.

F. Glazing gasket: Resilient, continuous neoprene, (except as specified below) extrusions, 40 to 60 Shore A durometer hardness, meeting the requirements of ASTM C 509 for cellular (closed-cell) material, and AAMA SG-1 for non-cellular (dense) material, with molded corners.

1. Gaskets shall have a continuous mechanical engagement to framing members and factory molded corners.

2. Gasket corners, whether molded or not, shall be bedded in elastomeric sealant compatible with glazing gaskets.

3. When in direct contact with silicone sealants, gaskets, spacers and setting blocks shall be heat cured silicone rubber based material chemically compatible with the silicone sealant and with sufficient hardness for the specific purpose intended. Compatibility testing by the silicone sealant supplier/manufacturer shall be required.

4. Design interior and exterior gasket profiles to produce a glass edge pressure of 12 psf unless otherwise recommended by the glass manufacturer.

G. Compressible filler rod:

1. Closed-cell or waterproof jacketed rod stock of synthetic rubber or plastic foam compatible with sealants used, flexible and resilient, with 5 to 10 psi compressive strength at 25 percent deflection.

2. Do not use vinyl foam stock.

H. Cleaner, primer and sealer: Type recommended by sealant or gasket manufacturer.

2.3 FABRICATION

A. Cutting:

1. Obtain sizes from shop drawings or by field measurement. Cut glass to fit each opening with at least the minimum edge clearance and bite on glass recommended by glass manufacturer.

2. When glass will be precut to sizes obtained from shop drawings, take field measurements of each opening before glazing to verify adequate bite on glass and minimum edge clearance.

3. Glaze openings, which do not fall within tolerances for which precut glass has been sized only with glass specially cut to fit such openings.

4. Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option.

B. Edge quality of annealed and heat-strengthened glass:

1. Shark teeth shall not penetrate more than half of glass thickness.

2. Serration hackle shall not penetrate more than 10 percent of glass thickness.

3. Flare shall not exceed 0.062-inch as measured perpendicular to glass surface edge.

4. Bevel shall not exceed 0.062-inch.

5. Flake chip depth shall not exceed 0.031-inch and length or diameter shall not exceed 0.25-inch.

6. Rough chips are not permitted. Rough chips are those that exceed dimensional limits for flake chips.

7. For glass to be cut at site, provide glass 2-inch larger than required, in both dimensions, to facilitate cutting of clean-cut edges without seaming or nipping.

8. Do not cut, seam, nip, or abrade tempered and heat strengthened glass after tempering.

9. Provide flat ground edges with arised corners where glass edge is not covered by a metal stop.

C. Laminated glass:

1. Factory-laminate using manufacturer standard heat-plus-pressure process.

2. Exercise caution to exclude dirt and other foreign materials from lamination and to eliminate all voids.

3. Conceal processed and coated glass in the lamination.

4. Factory-cut units to proper size; do no cutting at Project site.

D. Insulating glass:

1. Provide black aluminum spacers with bent (not mitered or spliced) corners; only one seam is allowed in each spacer of each unit.

2. The date of the manufacture of the unit shall be discretely identified on the spacer (top of unit, left or right corner).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Verify that openings and frames to be glazed are within allowable tolerances, plumb, level and square.

C. Inspect framing joint intersections to insure that the offset in the joinery will not impose undue edge pressure on the glass in compliance with GANA, Glazing Manual, and Sealant Manual, guidelines.

D. Correct other detrimental conditions before proceeding with glazing.

3.2 STANDARDS AND PERFORMANCE

A. Watertight and airtight installation is required for each piece of glass installed in an exterior wall.

B. Each installation must withstand normal temperature changes, wind loading, and impact from normal operation for doors, without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the Work.

C. Installed glass shall be free from rattle.

D. Protect glass from damage at all times during handling, installation and operation of the building until Substantial Completion.

E. Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are specified.

F. Comply with GANA, Glazing Manual, and Sealant Manual guidelines, except as otherwise.

G. Except as recommended otherwise by the manufacturers of the glass and glazing materials, comply with GANA Glazing Manual and the following:

1. Provide minimum nominal glass bite of 0.375-inch on monolithic lites; 1/2 inch on insulated glass units.

2. Where joint movement will result in variable glass bite, increase nominal bit to provide 0.375-inch minimum bite and 0.25-inch minimum edge clearance.

H. Inspect each piece of glass immediately before installation, and eliminate those with edge damage or face imperfections.

I. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other pieces.

3.3 PREPARATION FOR GLAZING

A. Immediately before glazing, clean the glazing channel and other framing members to receive glass.

1. Remove coatings not firmly bonded to the substrate.

2. Verify that framing is satisfactory to receive the glass.

B. Apply primer or sealer to joint surfaces when recommended by sealant manufacturer.

3.4 GLASS INSTALLATION

A. Erect each pane of glass square, plumb, and with uniform clearances between panel and rebates.

B. Follow glass manufacturer's instructions and GANA Standards. Provide minimum nominal glass bite of 0.375 inch on monolithic lites, and 1/2 inch on insulating glass units. Maintain minimum bed clearance between glass and frame.

C. Do not nip glass. Do not install glass with edge damage.

D. Install glass with required glass markings right side up so they can normally be read from the exterior.

E. Setting blocks:

1. Minimum length of 4 inches or as required by GANA guidelines; minimum width shall correspond to the glass thickness and retaining member but, in no case less than the glass thickness at point of contact.

2. Locate at quarter points, or in accordance with GANA glazing guidelines.

3. Secure against migration.

4. Shims used in conjunction with setting blocks must be of the same material, hardness, length and width as the setting blocks.

F. Side blocks:

1. Locate side blocks where required within the upper half of each jamb for each light.

2. Install block with 1/8-inch clearance between block and glass bearing surface.

3. Block shall be sufficient length to prevent point loading on the glass.

4. Side blocks are not required where an individual glass light is continuously sealed with silicone at 2 or more edges, when the sealant is installed immediately following the setting of the glass.

G. Provide spacers inside and out unless continuous gaskets are used. Use glass manufacturer recommended size and spacing.

H. Prevent exudation of sealant or compound by forming voids or installing filler rods in the channel at the heel of jambs and head (do not leave voids in the sill channels, except as needed for drainage and weep holes) depending on light size, thickness and type of glass, and complying with manufacturer's recommendations.

I. Sealant shall not be adhered to, or placed against, the edge of a laminated glass unit interlayer.

J. Force sealants into channel to eliminate voids and to assure complete "wetting" or bond of sealant to glass and channel surfaces.

K. Tool exposed surfaces of sealants to provide a substantial "wash away" from the glass.

L. Install pressurized gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.

M. Clean and trim excess glazing materials from the glass, stops and frames promptly after installation, and eliminate stains and discolorations.

N. Where wedge shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement.

1. Anchor gasket to stop with matching ribs, or with adhesive.

O. Clean, prime and mask structural silicone joints the same day when silicone is applied.

3.5 CURING/PROTECTING/CLEANING

A. Cure glazing sealants and compounds in compliance with their manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

B. Protect glass from breakage immediately upon installation. Do not apply markers of any type to glass.

C. Before Substantial Completion, remove and replace glass which is broken, chipped, cracked, abraded, stained or damaged in other way, including natural causes, accidents and vandalism.

D. Maintain glass in a clean condition during construction so that it will not be damaged by corrosive action and will not contribute (by wash-off) to the deterioration of glazing materials and other work.

E. Remove remaining labels and wash and polish glass on both faces not more than 4 days prior to City's acceptance of the work in each area. Comply with GANA 01-0300 and the glass manufacturer's recommendations.

3.6 GLASS SCHEDULE

A. Type GL-1: 1 in. thick insulated assembly consisting of 1/4-inch thick, clear, tempered, float glass with Low-E coating on surface 2 (Solarban 70XL by ~~PPG~~ Vitro Architectural Glass), 1/2-inch dehydrated air space, and 1/4-inch thick, clear, tempered, float glass for the interior lite. The assembly shall have a visible light transmittance of 64 percent, a SHGC of 0.27, a shading coefficient of 0.32, and a ~~summer~~ winter U-factor of ~~0.26~~ 0.28.

~~B. Type GL-2: 1/4 in. clear, tempered float glass.~~

~~C. Type GL-3: 9/16 in. laminated assembly consisting of 2 layers of 1/4 in. clear, tempered, float glass and 0.06 in. thick, clear polymer interlayer.~~

B. Type GL-2: 1 in. thick insulated assembly consisting of 1/4 in. thick, tempered, blue-green tinted glass (Pacifica by Vitro Architectural Glass) with Low-E coating on surface 2 (Solarban 70XL by Vitro Architectural Glass); 1/2 in. dehydrated air space; and 1/4-inch thick, clear, tempered, float glass for the interior lite. The assembly shall have a visible light transmittance of 32 percent, a SHGC of 0.19, and a winter U-factor of 0.28.

C. Type GL-3: 1 in. thick insulated spandrel assembly consisting of a laminated assembly of 2 layers of 1/8-inch thick, clear, tempered, float glass with 0.03 in. thick PVB, "True Blizzard" by Glaspro or equal; 15/32-inch dehydrated air space; and 1/4-inch thick, clear, tempered, float glass for the interior lite. The assembly shall have a visible light transmittance of 65 percent, a SHGC of 0.58, and a winter U-factor of 0.47.

D. Type GL-4: 1 in. thick insulated spandrel assembly consisting of 1/4 in. thick, blue-green tinted glass (Pacifica by Vitro Architectural Glass) with Low-E coating on surface 2; 15/32 in. dehydrated air space; and laminated 17/32 in. thick assembly consisting of 2 layers of 1/8-inch thick, clear, tempered, float glass with 0.03 in. thick PVB, "True Blizzard" by Glaspro or equal for the interior lite. The assembly shall have a visible light transmittance of 34 percent, a SHGC of 0.58, and a winter U-factor of 0.47.

E. Type GL-5: 1 in. thick insulated spandrel assembly consisting of a laminated assembly of 2 layers of 1/8-inch thick, clear, tempered, float glass with 0.03 in. thick PVB, "Emerald" by Glaspro or equal; 15/32-inch dehydrated air space; and 1/4-inch thick, clear, tempered, float glass for the interior lite. The assembly shall have a visible light transmittance of 65 percent, a SHGC of 0.58, and a winter U-factor of 0.47.

F. Type GL-6: 1/4 in. thick, one way mirror, Mirropane by Pilkington Industries, butt joint with mirrored side facing the public. Grind and polish exposed vertical edges.

G. Type GL-7: 1/4 in. clear, tempered float glass.

H. Type GL-8: 1/4 in. clear, tempered, translucent float glass.

I. Type GL-9: 1/2 in. clear, tempered float glass.

END OF SECTION